Advanced Livestock Production & Management

Instructor Guide

10-4020-I

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College of Education and College of Agriculture, Food and Natural Resources
University of Missouri-Columbia

Agricultural Education Section Division of Vocational and Adult Education
Department of Elementary and Secondary Education, Jefferson City, Missouri

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10-4020-I

ADVANCED LIVESTOCK PRODUCTION AND MANAGEMENT

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FOREWORD

The development of the *Advanced Livestock Production and Management* curriculum guide is the result of suggestions by the MVATA Teaching Aids Committee. The Advanced Livestock Production and Management Advisory Committee suggested the topics to be included and reviewed the materials.

This curriculum contains ten units. The instructor guide includes: objectives, competencies, motivational techniques, teaching procedures, other activities, activity sheets, transparency masters, evaluations, answers to evaluations and activity sheets, references, and teaching aids. Topics include current and future issues in animal agriculture; a description of beef, dairy, swine, sheep, horse, and poultry enterprises; livestock selection; breeding procedures; parturition; health; facilities and equipment; animal feeding; herd/flock management; and marketing. One copy of the student reference is packaged with the instructor guide. Additional copies of the student reference can be purchased separately.

During the summer of 1981, the Missouri State Board of Education formally adopted the concept of "Instructional Management Systems" (IMS) as a priority for the 1981-82 school year. The Missouri Commissioner of Education described the IMS concept as a practical way of "organizing for excellence" in education. To meet the demand for greater productivity and accountability, the director of Vocational Education applied the elements of IMS to form the Vocational Instructional Management System (VIMS). The VIMS process provides a framework to use in planning and organizing to assure excellence in Missouri's vocational education system by focusing greater attention on the management of teaching and learning.

This guide incorporates the needed components to aid agriculture teachers in the implementation of VIMS. For ease of use, performance objectives and competencies have been included at the beginning of the guide as well as incorporated within each lesson. A competency profile has been provided in the front of the guide for convenient record keeping. A table is included to show how the competencies in *Advanced Livestock Production and Management* relate to the Show-Me Standards and Curriculum Frameworks. *Advanced Livestock Production and Management* is primarily oriented toward students in the Natural Resources career path; however, several concepts would be valuable for students interested in other career pathways.

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ADVANCED LIVESTOCK PRODUCTION AND MANAGEMENT

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COMPETENCIES/OBJECTIVES

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1. Identify current and future issues relating to animal agriculture.

UNIT II - ENTERPRISES
1. Describe the importance of the livestock industry in Missouri.
2. Select a beef enterprise based on available resources.
3. Select a dairy enterprise based on available resources.
4. Select a swine operation based on available resources.
5. Select a sheep enterprise based on available resources.
6. Select a horse enterprise based on available resources.
7. Select a poultry enterprise based on available resources.

UNIT III - SELECTION
1. Use correct terminology for each species.
2. Identify factors in livestock and poultry selection.
3. Select beef animals for production and breeding.
4. Select dairy animals for production and breeding.
5. Select swine for production and breeding.
6. Select sheep for production and breeding.
7. Select horses for performance and breeding.
8. Select poultry for production and breeding.

UNIT IV - BREEDING
1. Select and develop a breeding system for a livestock enterprise.
2. Select a mating system for a livestock enterprise.
3. Discuss the steps to be taken to ensure reproductive efficiency in beef and dairy cattle.
4. Discuss the steps to be taken to ensure reproductive efficiency in swine.
5. Discuss the steps to be taken to ensure reproduction efficiency in sheep.
6. Discuss the steps to be taken to ensure reproductive efficiency in horses.
7. Discuss the steps to be taken to ensure reproductive efficiency in poultry.

UNIT V - PARTURITION
1. Develop and practice production management strategies for parturition of beef and dairy cattle.
2. Create and implement production strategies for parturition in swine.
3. Create and implement production strategies for parturition of sheep.
4. Create and implement production strategies for parturition of horses.

5. Create and implement production strategies for incubation and hatching management in poultry.

UNIT VI - ANIMAL HEALTH
1. Identify common problems associated with beef and dairy herd health.
2. Develop a health plan for beef and dairy cattle.
3. Identify common problems associated with swine herd health.
4. Develop a health plan for swine.
5. Identify problems associated with sheep flock health.
6. Develop a flock health plan for sheep.
7. Identify problems associated with horse health.
8. Develop a health plan for horses.
9. Identify common problems associated with poultry flock health.
10. Develop a health plan for poultry.

UNIT VII - FACILITIES AND EQUIPMENT
1. Identify facility needs for beef cattle.
2. Identify facility needs for dairy cattle.
3. Identify facility needs for swine operations.
4. Identify facility needs for sheep.
5. Identify facility and equipment needs for horses.
6. Identify facility and equipment needs for poultry.

UNIT VIII - ANIMAL FEEDING
1. Develop a feeding program for livestock.
2. Identify feeding options for livestock and poultry.

UNIT IX - HERD/FLOCK MANAGEMENT
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2. Develop and implement management factors for beef replacement stock.
3. Develop and implement management practices for beef cows and bulls.
4. Develop and describe management practices for dairy cattle from birth through production.
5. Develop and implement management practices for market swine both from birth to market.
6. Make appropriate decisions for the management of swine breeding stock.
7. Develop and describe management practices for market sheep from birth to market.
8. Develop and describe management practices for sheep breeding stock.
9. Develop and describe appropriate management practices for horse production.
10. Develop and describe appropriate management practices for poultry production.

UNIT X - MARKETING
1. Select the appropriate marketing option for a specific livestock enterprise.

EVALUATION

1. Give short, objective tests following each lesson and a more in-depth objective test at the conclusion of the unit.
2. Observe the changes in behavior as evidence of the improved ability of students to deal with problems in this unit using background information acquired from earlier units.
3. Observe students' attempts to solve similar problems in their supervised agricultural experience programs.

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Advanced Livestock Production and Management - Competency Crosswalk

Duty Band and Task Statement	SHOW-ME STANDARDS		CURRICULUM FRAMEWORKS					
	Knowledge (Content)	Performance (Goals)	Math	Communication Arts	Science	Social Studies	Health/ Physical Education	Fine Arts
A-1	CA-3, CA-4, HP-1, SC-3, SS-6	1.2, 1.4, 1.5, 1.6, 1.7, 3.1, 3.5, 3.6, 4.7		CA/I/9-12/1a, 1b, 1c, 1d CA/IV/9-12/1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i	SC/I/9-12/2a	SS/II-B/9-12/3a, 3b, 3c, 3d, 3e, 3f, 3g, 3h, 3i, 3j, 3k, 3l, 3m, 3n, 3o	HP/II/9-12/2a	
B-1	CA-3, HP-1, SS-4	1.2, 1.4, 1.5, 1.6, 1.7, 3.1, 3.2, 3.6, 3.8		CA/I/9-12/1a, 1b, 1c, 1d CA/IV/9-12/1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i		SS/I/9-12/a, b, c, d, e, f, g, h, I, j SS/II/9-12/a, b, c, d, e, f, g, h, I, j SS/III/9-12/a, b, c, d, e, f, g, h, I, j SS/IV/9-12/a, b, c, d, e, f, g, h, I, j	HP/II/9-12/1a	
B-2	CA-1, CA-3, SS-4, MA-1	1.2, 1.4, 1.5, 1.6, 1.7, 2.1, 2.4, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8	MA/V/9-12/1a	CA/I/9-12/1a, 1b, 1c, 1d CA/IV/9-12/1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i		SS/I/9-12/a, b, c, d, e, f, g, h, I, j SS/II/9-12/a, b, c, d, e, f, g, h, I, j SS/III/9-12/a, b, c, d, e, f, g, h, I, j SS/IV/9-12/a, b, c, d, e, f, g, h, I, j		
B-3	CA-1, CA-3, SS-4, MA-1	1.2, 1.4, 1.5, 1.6, 1.7, 2.1, 2.4, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8	MA/V/9-12/1a	CA/I/9-12/1a, 1b, 1c, 1d CA/IV/9-12/1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i		SS/I/9-12/a, b, c, d, e, f, g, h, I, j SS/II/9-12/a, b, c, d, e, f, g, h, I, j SS/III/9-12/a, b, c, d, e, f, g, h, I, j SS/IV/9-12/a, b, c, d, e, f, g, h, I, j		
B-4	CA-1, CA-3, SS-4, MA-1	1.2, 1.4, 1.5, 1.6, 1.7, 2.1, 2.4, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8	MA/V/9-12/1a	CA/I/9-12/1a, 1b, 1c, 1d CA/IV/9-12/1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i		SS/I/9-12/a, b, c, d, e, f, g, h, I, j SS/II/9-12/a, b, c, d, e, f, g, h, I, j SS/III/9-12/a, b, c, d, e, f, g, h, I, j SS/IV/9-12/a, b, c, d, e, f, g, h, I, j		

Duty Band and Task Statement	SHOW-ME STANDARDS		CURRICULUM FRAMEWORKS					
	Knowledge (Content)	Performance (Goals)	Math	Communication Arts	Science	Social Studies	Health/ Physical Education	Fine Arts
B-5	CA-1, CA-3, SS-4, MA-1	1.2, 1.4, 1.5, 1.6, 1.7, 2.1, 2.4, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8	MA/V/9-12/1a	CA/I/9-12/1a, 1b, 1c, 1d CA/IV/9-12/1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i		SS/I/9-12/a, b, c, d, e, f, g, h, I, j SS/II/9-12/a, b, c, d, e, f, g, h, I, j SS/III/9-12/a, b, c, d, e, f, g, h, I, j SS/IV/9-12/a, b, c, d, e, f, g, h, I, j		
B-6	CA-1, CA-3, SS-4, MA-1	1.2, 1.4, 1.5, 1.6, 1.7, 2.1, 2.4, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8	MA/V/9-12/1a	CA/I/9-12/1a, 1b, 1c, 1d CA/IV/9-12/1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i		SS/I/9-12/a, b, c, d, e, f, g, h, I, j SS/II/9-12/a, b, c, d, e, f, g, h, I, j SS/III/9-12/a, b, c, d, e, f, g, h, I, j SS/IV/9-12/a, b, c, d, e, f, g, h, I, j		
B-7	CA-1, CA-3, SS-4, MA-1	1.2, 1.4, 1.5, 1.6, 1.7, 2.1, 2.4, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8	MA/V/9-12/1a	CA/I/9-12/1a, 1b, 1c, 1d CA/IV/9-12/1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i		SS/I/9-12/a, b, c, d, e, f, g, h, I, j SS/II/9-12/a, b, c, d, e, f, g, h, I, j SS/III/9-12/a, b, c, d, e, f, g, h, I, j SS/IV/9-12/a, b, c, d, e, f, g, h, I, j		
C-1	CA-1, CA-3	1.2, 1.4, 1.5, 1.6, 1.7, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8		CA/I/9-12/1a, 1b, 1c, 1d CA/IV/9-12/1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i				
C-2	CA-1, CA-3, SC-3, HP-6, MA-3	1.2, 1.4, 1.5, 1.6, 1.7, 2.5, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 4.7	MA/V/9-12/1a	CA/I/9-12/1a, 1b, 1c, 1d CA/IV/9-12/1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i	SC/VII/9-12/2a		HP/II/9-12/4a	
C-3	CA-1, CA-3, MA-3, HP-6		MA/V/9-12/1a	CA/I/9-12/1a, 1b, 1c, 1d CA/IV/9-12/1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i			HP/II/9-12/4a	

Duty Band and Task Statement	SHOW-ME STANDARDS		CURRICULUM FRAMEWORKS					
	Knowledge (Content)	Performance (Goals)	Math	Communication Arts	Science	Social Studies	Health/ Physical Education	Fine Arts
C-4	CA-1, CA-3, MA-3, HP-6		MA/V/9-12/1a	CA/I/9-12/1a, 1b, 1c, 1d CA/IV/9-12/1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i			HP/II/9-12/4a	
C-5	CA-1, CA-3, MA-3, HP-6		MA/V/9-12/1a	CA/I/9-12/1a, 1b, 1c, 1d CA/IV/9-12/1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i			HP/II/9-12/4a	
C-6	CA-1, CA-3, MA-3, HP-6		MA/V/9-12/1a	CA/I/9-12/1a, 1b, 1c, 1d CA/IV/9-12/1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i			HP/II/9-12/4a	
C-7	CA-1, CA-3, MA-3, HP-6		MA/V/9-12/1a	CA/I/9-12/1a, 1b, 1c, 1d CA/IV/9-12/1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i			HP/II/9-12/4a	
C-8	CA-1, CA-3, MA-3, HP-6		MA/V/9-12/1a	CA/I/9-12/1a, 1b, 1c, 1d CA/IV/9-12/1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i			HP/II/9-12/4a	
D-1	CA-1, CA-3, SC-3	1.2, 1.3, 1.6, 1.8, 2.3, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7	MA/V/9-12/1a	CA/I/9-12/1a, 1b, 1c, 1d				
D-2	CA-1, CA-3, SC-3	1.2, 1.3, 1.6, 1.8, 2.3, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7		CA/I/9-12/1a, 1b, 1c, 1d	SC/VII-D/5-8/1a			
D-3	SC-3, SC-4, CA-1, CA-3, MA-1	1.2, 1.3, 1.6, 1.8, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7	MA/V/9-12/1a	CA/I/9-12/1a, 1b, 1c, 1d	SC/VII-D/5-8/1a SC/VII-B/9-12/3a			

Duty Band and Task Statement	SHOW-ME STANDARDS		CURRICULUM FRAMEWORKS					
	Knowledge (Content)	Performance (Goals)	Math	Communication Arts	Science	Social Studies	Health/ Physical Education	Fine Arts
D-4	SC-3, SC-4, CA-1, CA-3, MA-1	1.2, 1.3, 1.6, 1.8, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7	MA/V/9-12/1a	CA/I/9-12/1a, 1b, 1c, 1d	SC/VII-D/5-8/1a SC/VII-B/9-12/3a			
D-5	SC-3, SC-4, CA-1, CA-3, MA-1	1.2, 1.3, 1.6, 1.8, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7	MA/V/9-12/1a	CA/I/9-12/1a, 1b, 1c, 1d	SC/VII-D/5-8/1a SC/VII-B/9-12/3a			
D-6	SC-3, SC-4, CA-1, CA-3, MA-1	1.2, 1.3, 1.6, 1.8, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7	MA/V/9-12/1a	CA/I/9-12/1a, 1b, 1c, 1d	SC/VII-D/5-8/1a SC/VII-B/9-12/3a			
D-7	SC-3, SC-4, CA-1, CA-3, MA-1	1.2, 1.3, 1.6, 1.8, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7	MA/V/9-12/1a	CA/I/9-12/1a, 1b, 1c, 1d	SC/VII-D/5-8/1a SC/VII-B/9-12/3a			
E-1	HP-6, CA-1, CA-3, SC-8, HP-3	1.2, 1.3, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 4.7		CA/I/9-12/1b, 1c, 1d CA/IV/9-12/1c, 1d, 1e, 1f, 1g, 1h	SC/VII/9-12/3a		HP/III-A/9-12/1a HP/I/5-8/5a	
E-2	HP-6, CA-1, CA-3, SC-8, HP-3	1.2, 1.3, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 4.7		CA/I/9-12/1b, 1c, 1d CA/IV/9-12/1c, 1d, 1e, 1f, 1g, 1h	SC/VII/9-12/3a		HP/III-A/9-12/1a HP/I/5-8/5a	
E-3	HP-6, CA-1, CA-3, SC-8, HP-3	1.2, 1.3, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 4.7		CA/I/9-12/1b, 1c, 1d CA/IV/9-12/1c, 1d, 1e, 1f, 1g, 1h	SC/VII/9-12/3a		HP/III-A/9-12/1a HP/I/5-8/5a	
E-4	HP-6, CA-1, CA-3, SC-8, HP-3	1.2, 1.3, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 4.7		CA/I/9-12/1b, 1c, 1d CA/IV/9-12/1c, 1d, 1e, 1f, 1g, 1h	SC/VII/9-12/3a		HP/III-A/9-12/1a HP/I/5-8/5a	
E-5	HP-6, CA-1, CA-3, SC-8, HP-3	1.2, 1.3, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 4.7		CA/I/9-12/1b, 1c, 1d CA/IV/9-12/1c, 1d, 1e, 1f, 1g, 1h	SC/VII/9-12/3a		HP/III-A/9-12/1a HP/I/5-8/5a	

Duty Band and Task Statement	SHOW-ME STANDARDS		CURRICULUM FRAMEWORKS					
	Knowledge (Content)	Performance (Goals)	Math	Communication Arts	Science	Social Studies	Health/ Physical Education	Fine Arts
F-1	CA-1, CA-3, HP-3, SC-3	1.2, 1.3, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 4.7		CA/I/9-12/1b, 1c, 1d CA/IV/9-12/1e, 1f, 1g, 1h	SC/VIII-B/9-12/1a		HP/III-A/9-12/12a	
F-2	CA-1, CA-3, HP-3, SC-3	1.2, 1.3, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 4.7		CA/I/9-12/1b, 1c, 1d CA/IV/9-12/1e, 1f, 1g, 1h	SC/VIII-B/9-12/1a		HP/III-A/9-12/12a	
F-3	CA-1, CA-3, HP-3, SC-3	1.2, 1.3, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 4.7		CA/I/9-12/1b, 1c, 1d CA/IV/9-12/1e, 1f, 1g, 1h	SC/VIII-B/9-12/1a		HP/III-A/9-12/12a	
F-4	CA-1, CA-3, HP-3, SC-3	1.2, 1.3, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 4.7		CA/I/9-12/1b, 1c, 1d CA/IV/9-12/1e, 1f, 1g, 1h	SC/VIII-B/9-12/1a		HP/III-A/9-12/12a	
F-5	CA-1, CA-3, HP-3, SC-3	1.2, 1.3, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 4.7		CA/I/9-12/1b, 1c, 1d CA/IV/9-12/1e, 1f, 1g, 1h	SC/VIII-B/9-12/1a		HP/III-A/9-12/12a	
F-6	CA-1, CA-3, HP-3, SC-3	1.2, 1.3, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 4.7		CA/I/9-12/1b, 1c, 1d CA/IV/9-12/1e, 1f, 1g, 1h	SC/VIII-B/9-12/1a		HP/III-A/9-12/12a	
F-7	CA-1, CA-3, HP-3, SC-3	1.2, 1.3, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 4.7		CA/I/9-12/1b, 1c, 1d CA/IV/9-12/1e, 1f, 1g, 1h	SC/VIII-B/9-12/1a		HP/III-A/9-12/12a	
F-8	CA-1, CA-3, HP-3, SC-3	1.2, 1.3, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 4.7		CA/I/9-12/1b, 1c, 1d CA/IV/9-12/1e, 1f, 1g, 1h	SC/VIII-B/9-12/1a		HP/III-A/9-12/12a	
F-9	CA-1, CA-3, HP-3, SC-3	1.2, 1.3, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 4.7		CA/I/9-12/1b, 1c, 1d CA/IV/9-12/1e, 1f, 1g, 1h	SC/VIII-B/9-12/1a		HP/III-A/9-12/12a	

Duty Band and Task Statement	SHOW-ME STANDARDS		CURRICULUM FRAMEWORKS					
	Knowledge (Content)	Performance (Goals)	Math	Communication Arts	Science	Social Studies	Health/ Physical Education	Fine Arts
F-10	CA-1, CA-3, HP-3, SC-3	1.2, 1.3, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 4.7		CA/I/9-12/1b, 1c, 1d CA/IV/9-12/1e, 1f, 1g, 1h	SC/VIII-B/9-12/1a		HP/III-A/9-12/12a	
G-1	CA-1, CA-3, MA-1, MA-2, SC-8	1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.10, 3.1, 3.2, 3.3, 3.4, 3.5, 3.7, 3.8, 4.7	MA/IV/9-12/3a, 3b, 3c, 3d, 3e	CA/I/9-12/1a, 1b, 1c, 1d CA/IV/9-12/1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i	SC/I-A/9-12/1a			
G-2	CA-1, CA-3, MA-1, MA-2, SC-8	1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.10, 3.1, 3.2, 3.3, 3.4, 3.5, 3.7, 3.8, 4.7	MA/IV/9-12/3a, 3b, 3c, 3d, 3e	CA/I/9-12/1a, 1b, 1c, 1d CA/IV/9-12/1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i	SC/I-A/9-12/1a			
G-3	CA-1, CA-3, MA-1, MA-2, SC-8	1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.10, 3.1, 3.2, 3.3, 3.4, 3.5, 3.7, 3.8, 4.7	MA/IV/9-12/3a, 3b, 3c, 3d, 3e	CA/I/9-12/1a, 1b, 1c, 1d CA/IV/9-12/1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i	SC/I-A/9-12/1a			
G-4	CA-1, CA-3, MA-1, MA-2, SC-8	1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.10, 3.1, 3.2, 3.3, 3.4, 3.5, 3.7, 3.8, 4.7	MA/IV/9-12/3a, 3b, 3c, 3d, 3e	CA/I/9-12/1a, 1b, 1c, 1d CA/IV/9-12/1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i	SC/I-A/9-12/1a			
G-5	CA-1, CA-3, MA-1, MA-2, SC-8	1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.10, 3.1, 3.2, 3.3, 3.4, 3.5, 3.7, 3.8, 4.7	MA/IV/9-12/3a, 3b, 3c, 3d, 3e	CA/I/9-12/1a, 1b, 1c, 1d CA/IV/9-12/1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i	SC/I-A/9-12/1a			
G-6	CA-1, CA-3, MA-1, MA-2, SC-8	1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.10, 3.1, 3.2, 3.3, 3.4, 3.5, 3.7, 3.8, 4.7	MA/IV/9-12/3a, 3b, 3c, 3d, 3e	CA/I/9-12/1a, 1b, 1c, 1d CA/IV/9-12/1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i	SC/I-A/9-12/1a			

Duty Band and Task Statement	SHOW-ME STANDARDS		CURRICULUM FRAMEWORKS					
	Knowledge (Content)	Performance (Goals)	Math	Communication Arts	Science	Social Studies	Health/ Physical Education	Fine Arts
H-1	CA-1, CA-3, MA-1, MA-3, SC-3, SC-4, HPE-6	1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 2.5, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 4.7	MA/IV/9-12/3a, 3b, 3c, 3d, 3e MA/V/9-12/1a, 1b, 1c, 2a, 2b, 2c, 4a, 4b, 4c	CA/I/9-12/1a, 1b, 1c, 1d CA/IV/9-12/1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i	SC/VII-A/9-12/1a, 2a, 4a SC/VII-B/9-12/1a, 3a		HPE/III-D/9-12/1a	
H-2	CA-1, CA-3, MA-1, MA-3, SC-3, SC-4, HPE-6	1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 2.5, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 4.7	MA/IV/9-12/3a, 3b, 3c, 3d, 3e MA/V/9-12/1a, 1b, 1c, 2a, 2b, 2c, 4a, 4b, 4c	CA/I/9-12/1a, 1b, 1c, 1d CA/IV/9-12/1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i	SC/VII-A/9-12/1a, 2a, 4a SC/VII-B/9-12/1a, 3a		HPE/III-D/9-12/1a	
I-1	CA-1, CA-3, MA-1, MA-3, SC-8, HPE-3, HPE-6	1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 2.5, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 4.7	MA/IV/9-12/3a, 3b, 3c, 3d, 3e MA/V/9-12/1a, 1b, 1c, 2a, 2b, 2c, 4a, 4b, 4c	CA/I/9-12/1a, 1b, 1c, 1d CA/IV/9-12/1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i	SC/VIII-B/9-12/1a, 2a, 2b, 2c		HPE/III-A/9-12/1a, 9a, 11a, 12a HPE/III-D/9-12/1a	
I-2	CA-1, CA-3, MA-1, MA-3, SC-8, HPE-3, HPE-6	1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 2.5, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 4.7	MA/IV/9-12/3a, 3b, 3c, 3d, 3e MA/V/9-12/1a, 1b, 1c, 2a, 2b, 2c, 4a, 4b, 4c	CA/I/9-12/1a, 1b, 1c, 1d CA/IV/9-12/1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i	SC/VIII-B/9-12/1a, 2a, 2b, 2c		HPE/III-A/9-12/1a, 9a, 11a, 12a HPE/III-D/9-12/1a	
I-3	CA-1, CA-3, MA-1, MA-3, SC-8, HPE-3, HPE-6	1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 2.5, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 4.7	MA/IV/9-12/3a, 3b, 3c, 3d, 3e MA/V/9-12/1a, 1b, 1c, 2a, 2b, 2c, 4a, 4b, 4c	CA/I/9-12/1a, 1b, 1c, 1d CA/IV/9-12/1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i	SC/VIII-B/9-12/1a, 2a, 2b, 2c		HPE/III-A/9-12/1a, 9a, 11a, 12a HPE/III-D/9-12/1a	
I-4	CA-1, CA-3, MA-1, MA-3, SC-8, HPE-3, HPE-6	1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 2.5, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 4.7	MA/IV/9-12/3a, 3b, 3c, 3d, 3e MA/V/9-12/1a, 1b, 1c, 2a, 2b, 2c, 4a, 4b, 4c	CA/I/9-12/1a, 1b, 1c, 1d CA/IV/9-12/1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i	SC/VIII-B/9-12/1a, 2a, 2b, 2c		HPE/III-A/9-12/1a, 9a, 11a, 12a HPE/III-D/9-12/1a	

Duty Band and Task Statement	SHOW-ME STANDARDS		CURRICULUM FRAMEWORKS					
	Knowledge (Content)	Performance (Goals)	Math	Communication Arts	Science	Social Studies	Health/ Physical Education	Fine Arts
I-5	CA-1, CA-3, MA-1, MA-3, SC-8, HPE-3, HPE-6	1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 2.5, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 4.7	MA/IV/9-12/3a, 3b, 3c, 3d, 3e MA/V/9-12/1a, 1b, 1c, 2a, 2b, 2c, 4a, 4b, 4c	CA/I/9-12/1a, 1b, 1c, 1d CA/IV/9-12/1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i	SC/VIII-B/9-12/1a, 2a, 2b, 2c		HPE/III-A/9-12/1a, 9a, 11a, 12a HPE/III-D/9-12/1a	
I-6	CA-1, CA-3, MA-1, MA-3, SC-8, HPE-3, HPE-6	1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 2.5, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 4.7	MA/IV/9-12/3a, 3b, 3c, 3d, 3e MA/V/9-12/1a, 1b, 1c, 2a, 2b, 2c, 4a, 4b, 4c	CA/I/9-12/1a, 1b, 1c, 1d CA/IV/9-12/1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i	SC/VIII-B/9-12/1a, 2a, 2b, 2c		HPE/III-A/9-12/1a, 9a, 11a, 12a HPE/III-D/9-12/1a	
I-7	CA-1, CA-3, MA-1, MA-3, SC-8, HPE-3, HPE-6	1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 2.5, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 4.7	MA/IV/9-12/3a, 3b, 3c, 3d, 3e MA/V/9-12/1a, 1b, 1c, 2a, 2b, 2c, 4a, 4b, 4c	CA/I/9-12/1a, 1b, 1c, 1d CA/IV/9-12/1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i	SC/VIII-B/9-12/1a, 2a, 2b, 2c		HPE/III-A/9-12/1a, 9a, 11a, 12a HPE/III-D/9-12/1a	
I-8	CA-1, CA-3, MA-1, MA-3, SC-8, HPE-3, HPE-6	1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 2.5, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 4.7	MA/IV/9-12/3a, 3b, 3c, 3d, 3e MA/V/9-12/1a, 1b, 1c, 2a, 2b, 2c, 4a, 4b, 4c	CA/I/9-12/1a, 1b, 1c, 1d CA/IV/9-12/1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i	SC/VIII-B/9-12/1a, 2a, 2b, 2c		HPE/III-A/9-12/1a, 9a, 11a, 12a HPE/III-D/9-12/1a	
I-9	CA-1, CA-3, MA-1, MA-3, SC-8, HPE-3, HPE-6	1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 2.5, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 4.7	MA/IV/9-12/3a, 3b, 3c, 3d, 3e MA/V/9-12/1a, 1b, 1c, 2a, 2b, 2c, 4a, 4b, 4c	CA/I/9-12/1a, 1b, 1c, 1d CA/IV/9-12/1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i	SC/VIII-B/9-12/1a, 2a, 2b, 2c		HPE/III-A/9-12/1a, 9a, 11a, 12a HPE/III-D/9-12/1a	
I-10	CA-1, CA-3, MA-1, MA-3, SC-8, HPE-3, HPE-6	1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 2.5, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 4.7	MA/IV/9-12/3a, 3b, 3c, 3d, 3e MA/V/9-12/1a, 1b, 1c, 2a, 2b, 2c, 4a, 4b, 4c	CA/I/9-12/1a, 1b, 1c, 1d CA/IV/9-12/1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i	SC/VIII-B/9-12/1a, 2a, 2b, 2c		HPE/III-A/9-12/1a, 9a, 11a, 12a HPE/III-D/9-12/1a	

Duty Band and Task Statement	SHOW-ME STANDARDS		CURRICULUM FRAMEWORKS					
	Knowledge (Content)	Performance (Goals)	Math	Communication Arts	Science	Social Studies	Health/ Physical Education	Fine Arts
I-10	CA-1, CA-3, MA-1, MA-3, SC-8, HPE-3, HPE-6	1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 2.5, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 4.7	MA/IV/9-12/3a, 3b, 3c, 3d, 3e MA/V/9-12/1a, 1b, 1c, 2a, 2b, 2c, 4a, 4b, 4c	CA/I/9-12/1a, 1b, 1c, 1d CA/IV/9-12/1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i	SC/VIII-B/9-12/1a, 2a, 2b, 2c		HPE/III-A/9-12/1a, 9a, 11a, 12a HPE/III-D/9-12/1a	
J-1	CA-1, CA-3, MA-1, MA-3, SS-4	1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8	MA/IV/9-12/3a, 3b, 3c, 3d, 3e MA/V/9-12/1a, 1b, 1c, 2a, 2b, 2c, 4a, 4b, 4c	CA/I/9-12/1a, 1b, 1c, 1d CA/IV/9-12/1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i		SS/IV-D/9-12/1a, 1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i, 1j, 1k, 2a, 2b, 2c, 2d, 2e, 2f, 2g, 2h, 2i, 2j, 2k, 3a, 3b, 3c, 3d, 3e, 3f, 3g, 3h, 3i, 3j, 3k		

ADVANCED LIVESTOCK PRODUCTION AND MANAGEMENT

TEACHING CALENDAR

	Periods for Classroom Instruction/Activities	Length for Activity Sheets (AS)
Unit I, Lesson 1	3-4 days	AS 1.1 1 class period
		AS 1.2 1 class period
Unit II, Lesson 1	2-3 days	AS 1.1 1 class period
Unit II, Lesson 2	2-3 days	AS 2.1 1 class period
Unit II, Lesson 3	2-3 days	AS 3.1 1 class period
		AS 3.2 1 class period
Unit II, Lesson 4	2-3 days	AS 4.1 1 class period
		AS 4.2 1 class period
Unit II, Lesson 5	2-3 days	AS 5.1 1 class period
		AS 5.2 1 class period
Unit II, Lesson 6	2-3 days	AS 6.1 1 class period
		AS 6.2 1 class period
Unit II, Lesson 7	2-3 days	AS 7.1 1 class period
Unit III, Lesson 1	4-5 days	AS 1.1 1 class period
Unit III, Lesson 2	2-3 days	AS 2.1 1 class period
Unit III, Lesson 3	3-4 days	AS 3.1 1 class period
Unit III, Lesson 4	3-4 days	AS 4.1 1 class period
		AS 4.2 1 class period
Unit III, Lesson 5	3-4 days	AS 5.1 1 class period
		AS 5.2 1 class period
		AS 5.3 1 class period
Unit III, Lesson 6	2-3 days	AS 6.1 1 class period
		AS 6.2 1 class period
Unit III, Lesson 7	3-4 days	AS 7.1 1 class period
Unit III, Lesson 8	2-3 days	AS 8.1 1 class period
Unit IV, Lesson 1	2-3 days	AS 1.1 1 class period
Unit IV, Lesson 2	3-4 days	AS 2.1 1 class period
Unit IV, Lesson 3	3-4 days	AS 3.1 1 class period

	Periods for Classroom Instruction/Activities	Length for Activity Sheets (AS)
Unit IV, Lesson 4	2-3 days	AS 4.1 1 class period
Unit IV, Lesson 5	2-3 days	AS 5.1 1 class period
Unit IV, Lesson 6	2-3 days	AS 6.1 1 class period
Unit IV, Lesson 7	2-3 days	AS 7.1 1 class period
Unit V, Lesson 1	3-4 days	AS 1.1 1 class period
Unit V, Lesson 2	2-3 days	AS 2.1 1 class period
Unit V, Lesson 3	2-3 days	AS 3.1 1 class period
Unit V, Lesson 4	2-3 days	AS 4.1 1 class period
Unit V, Lesson 5	2-3 days	AS 5.1 1 class period
Unit VI, Lesson 1	5-7 days	AS 1.1 1 class period
		AS 1.2 1 class period
		AS 1.3 1 class period
Unit VI, Lesson 2	5-7 days	AS 2.1 1 class period
		AS 2.2 1 class period
Unit VI, Lesson 3	2-3 days	AS 3.1 1 class period
Unit VI, Lesson 4	2-3 days	AS 4.1 1 class period
Unit VI, Lesson 5	2-3 days	AS 5.1 1 class period
Unit VI, Lesson 6	2-3 days	AS 6.1 1 class period
Unit VI, Lesson 7	2-3 days	AS 7.1 1 class period
Unit VI, Lesson 8	2-3 days	AS 8.1 1 class period
		AS 8.2 1 class period
Unit VI, Lesson 9	2-3 days	AS 9.1 1 class period
Unit VI, Lesson 10	2-3 days	AS 10.1 1 class period
Unit VII, Lesson 1	3-4 days	AS 1.1 1 class period
Unit VII, Lesson 2	3-4 days	AS 2.1 1 class period
Unit VII, Lesson 3	3-4 days	AS 3.1 1 class period
Unit VII, Lesson 4	2-3 days	AS 4.1 1 class period
Unit VII, Lesson 5	3-4 days	AS 5.1 1 class period
Unit VII, Lesson 6	3-4 days	AS 6.1 1 class period
Unit VIII, Lesson 1	3-4 days	AS 1.1 1 class period

	Periods for Classroom Instruction/Activities	Length for Activity Sheets (AS)
Unit VIII, Lesson 2	4-5 days	AS 2.1 1 class period
Unit IX, Lesson 1	3-4 days	AS 1.1 1 class period
Unit IX, Lesson 2	2-3 days	AS 2.1 1 class period
Unit IX, Lesson 3	2-3 days	AS 3.1 1 class period
Unit IX, Lesson 4	4-5 days	AS 4.1 1 class period
Unit IX, Lesson 5	2-3 days	AS 5.1 1 class period AS 5.2 1 class period
Unit IX, Lesson 6	3-4 days	AS 6.1 1 class period
Unit IX, Lesson 7	2-3 days	AS 7.1 1 class period
Unit IX, Lesson 8	2-3 days	AS 8.1 1 class period
Unit IX, Lesson 9	3-4 days	AS 9.1 1 class period
Unit IX, Lesson 10	3-4 days	AS 10.1 1 class period
Unit X, Lesson 1	4-5 days	AS 1.1 1 class period AS 1.2 1 class period

Advanced Livestock Production and Management
Competency Profile

Directions: Evaluate the student by checking the appropriate number or letter to indicate the degree of competency. The rating for each task should reflect **employability readiness** rather than the grades given in class.

Rating Scale: **3 Mastered** - can work independently with no supervision
2 Requires Supervision - can perform job completely with limited supervision
1 Not Mastered - requires instruction and close supervision
N No Exposure - no experience or knowledge in this area

3	2	1	N

A. Issues in Animal Agriculture

1. Identify current and future issues relating to animal agriculture.

Other: _____

_____

3	2	1	N

B. Enterprises

1. Describe the importance of the livestock industry in Missouri.
2. Select a beef enterprise based on available resources.
3. Select a dairy enterprise based on available resources.
4. Select a swine operation based on available resources.
5. Select a sheep enterprise based on available resources.
6. Select a horse enterprise based on available resources.
7. Select a poultry enterprise based on available resources.

Other: _____

_____

3	2	1	N

C. Selection

1. Use correct terminology for each species.
2. Identify factors in livestock and poultry production.
3. Select beef animals for production and breeding.
4. Select dairy animals for production and breeding.

3	2	1	N

C. Selection (continued)

5. Select swine for production and breeding.
6. Select sheep for production and breeding.
7. Select horses for performance and breeding.
8. Select poultry for production and breeding.

Other: _____

_____

3	2	1	N

D. Breeding

1. Select and develop a breeding system for a livestock enterprise.
2. Select a mating system for a livestock enterprise.
3. Discuss the steps to be taken to ensure reproductive efficiency in beef and dairy cattle.
4. Discuss the steps to be taken to ensure reproductive efficiency in swine.
5. Discuss the steps to be taken to ensure reproductive efficiency in sheep.
6. Discuss the steps to be taken to ensure reproductive efficiency in horses.
7. Discuss the steps to be taken to ensure reproductive efficiency in poultry.

Other: _____

_____

3	2	1	N

E. Parturition

1. Develop and practice production management strategies for parturition of beef and dairy cattle.
2. Create and implement production strategies for parturition in swine.
3. Create and implement production strategies for parturition in sheep.
4. Create and implement production strategies for parturition of horses.
5. Create and implement production strategies for incubation and hatching management in poultry.

Other: _____

_____

3	2	1	N

F. Animal Health

1. Identify common problems associated with beef and dairy herd health.
2. Develop a health plan for beef and dairy cattle.
3. Identify common problems associated with swine herd health.
4. Develop a health plan for swine.
5. Identify problems associated with sheep flock health.
6. Develop a flock health plan for sheep.
7. Identify problems associated with horse herd health.
8. Develop a health plan for horses.

3	2	1	N

F. Animal Health (continued)

9. Identify common problems associated with poultry flock health.
10. Develop a health plan for poultry.

Other: _____

_____

3	2	1	N

G. Facilities and Equipment

1. Identify facility needs for beef cattle.
2. Identify facility needs for dairy cattle.
3. Identify facility needs for swine.
4. Identify facility needs for sheep.
5. Identify facility needs for horses.
6. Identify facility needs for poultry.

Other: _____

_____

3	2	1	N

H. Animal Feeding

1. Develop a feeding program.
2. Identify feeding options for livestock and poultry.

Other: _____

_____

3	2	1	N

I. Herd/Flock Management

1. Develop and implement management factors for beef cattle from birth to market.
2. Develop and implement management factors for beef replacement stock.
3. Develop and implement management practices for beef cows and bulls.
4. Develop and describe management practices for dairy cattle from birth through production.
5. Develop and implement management practices for market swine from birth to market.
6. Make appropriate decisions for the management of swine breeding stock.

3	2	1	N

I. Herd/Flock Management (continued)

7. Develop and describe management practices for market sheep from birth to market.
8. Develop and describe management practices for sheep breeding stock.
9. Develop and describe appropriate management practices for horse production.
10. Develop and describe appropriate management practices for poultry production.

Other: _____

_____

3	2	1	N

J. Marketing

1. Select the appropriate marketing option for specific livestock enterprises.

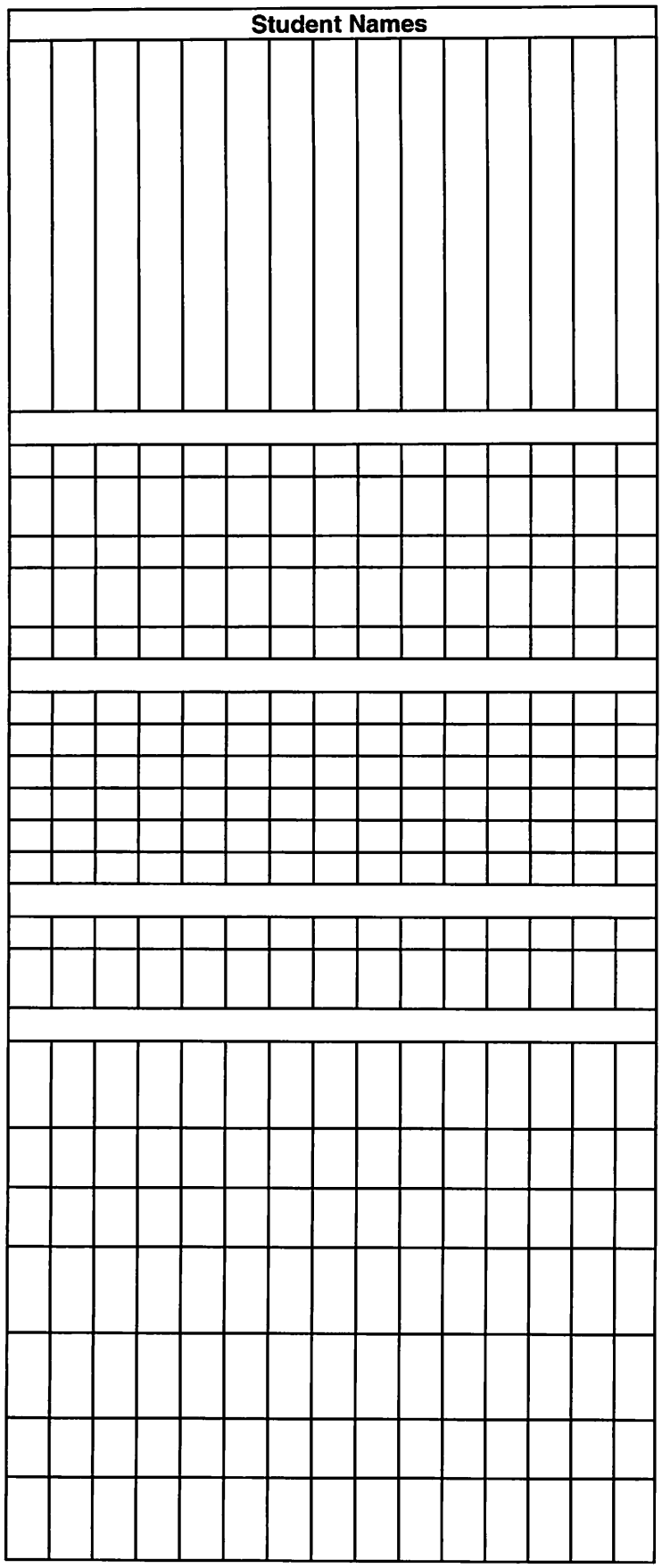
Other: _____

_____

Advanced Livestock Production and Management

Student Names	

Student Names



UNIT VI - ANIMAL HEALTH (Continued)

6. Develop a flock health plan for sheep.
7. Identify problems associated with horse herd health.
8. Develop a health plan for horses.
9. Identify common problems associated with poultry flock health.
10. Develop a health plan for poultry.

UNIT VII - FACILITIES AND EQUIPMENT

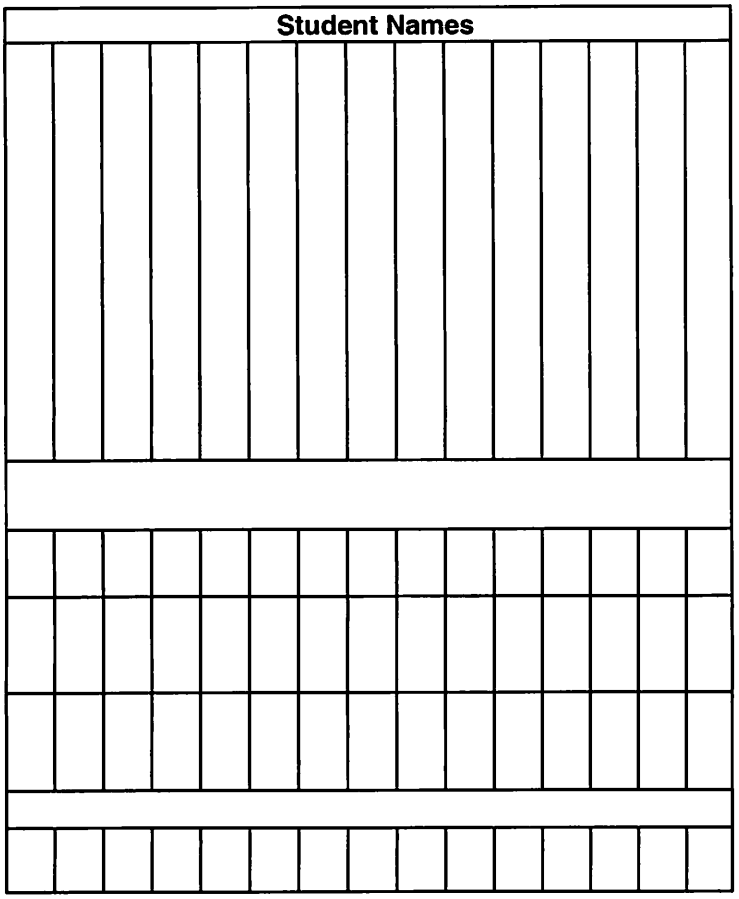
1. Identify facility needs for beef cattle.
2. Identify facility needs for dairy cattle.
3. Identify facility needs for swine operation.
4. Identify facility needs for sheep.
5. Identify facility needs for horses.
6. Identify facility needs for poultry.

UNIT VIII - ANIMAL FEEDING

1. Develop a feeding program.
2. Identify feeding options for livestock and poultry.

UNIT IX - HERD/FLOCK MANAGEMENT

1. Develop and implement management factors for beef cattle from birth to market.
2. Develop and implement management factors for beef replacement stock.
3. Develop and implement management practices for beef cows and bulls.
4. Develop and describe management practices for dairy cattle from birth through production.
5. Develop and implement management practices for market swine both from birth to market.
6. Make appropriate decisions for the management of swine breeding stock.
7. Develop and describe management practices for market sheep from birth to market.



UNIT IX - HERD/FLOCK MANAGEMENT (Continued)

8. Develop and describe management practices for sheep breeding stock.
9. Develop and describe appropriate management practices for horse production.
10. Develop and describe appropriate management practices for poultry production.

UNIT X - MARKETING

1. Select the appropriate marketing option for a specific livestock enterprise.

UNIT I - ISSUES IN ANIMAL AGRICULTURE

Lesson 1: Current and Future Issues

Competency/Objective: Identify current and future issues relating to animal agriculture.

Study Questions

1. **Why is agricultural literacy important to animal agriculture?**
2. **What is the difference between animal rights and animal welfare?**
3. **How do environmental concerns affect animal agriculture?**
4. **How do food safety issues affect animal agriculture?**
5. **How will new communication and information technologies affect animal agriculture?**
6. **How will scientific advances affect animal agriculture?**
7. **How will international standards of operation affect animal agriculture?**

References

1. *Advanced Livestock Production and Management* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit I.
2. Activity Sheets
   a) AS 1.1: Survey of Consumer's Views of Animal Agriculture
   b) AS 1.2: Current Issues Affecting Animal Agriculture

UNIT I - ISSUES IN ANIMAL AGRICULTURE

Lesson 1: Current and Future Issues

TEACHING PROCEDURES

A. ***Introduction***

Producers involved in livestock production should understand the issues surrounding animal agriculture. Consumer concerns can affect the market for animal products, so producers should support and encourage agricultural literacy among the general public. In addition, producers need to be aware of the changes in animal agriculture that will be brought about by improvements in communication and information technology, scientific advancements, and international standards for export items. In order to support production, producers should be willing to embrace change.

B. ***Motivation***

Ask students to give an example of one of the latest advances in agricultural technology. What are the potential benefits for animal agriculture? Does everyone see the advancement as beneficial?

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Ask students to define "agricultural literacy." Why is it important that consumers know how their food was produced, processed, and marketed?

   Why is agricultural literacy important to animal agriculture?

   a) Consumers are often unaware of how their food and fiber for clothing are produced.
      1) More of the population of the United States lives in urban and suburban areas than in rural areas.
      2) Nearly 90 percent of the population is two or three generations removed from direct contact with food and fiber production.
   b) They are unaware of the impact that agriculture has on the general welfare and standard of living in the nation.
   c) Consumers only spend about 14 percent of their disposable income on food because of the efficiency of the American agricultural producer.
   d) Consumers need to be educated about the activities of producers to appreciate the benefits they provide.
   e) Increased knowledge will encourage consumers to support U.S. agriculture and the producers that supply them with food and fiber.

2. Have students explain the difference between animal rights and animal welfare. Discuss the need for producers to understand the objectives of both types of activists. What is the perspective of producers?

   What is the difference between animal rights and animal welfare?

   a) Animal rights
      1) Believe animals have the same rights as humans, so humans do not have the right to use them as a resource
      2) Focus on activities like castration and dehorning as being inhumane because they are performed without anesthetic

3) Critical of the conditions in which animals are raised, like confinement housing for swine and poultry
4) Promote vegetarianism
5) Have carried out protests, mailings, and demonstrations against animal agriculture
6) Have web sites on the Internet that are critical of livestock production

b) Animal welfare
1) Support the humane treatment of animals
2) Believe that animals should have all their needs met in a comfortable environment
3) Frequently publicize and document cases of animal abuse in an effort to get laws changed to protect the welfare of animals
4) May not oppose animal agriculture if management practices are carried out in a humane manner

c) Producers
1) Concerned with the well-being of their animals
(a) Affects their growth and production, which will affect the profitablity of the operation
(b) In the best interests of the producer to provide proper care and management
2) Should help to educate consumers about livestock production
(a) Emphasize their concern for the welfare of their animals
(b) Help prevent perceptions of abuse and mistreatment.

3. Many people in today's society are concerned about the environment. Agricultural producers are directly tied to the environment for their livelihood. Discuss how environmental concerns affect animal agriculture.

How do environmental concerns affect animal agriculture?

a) Manure management
1) Concern for any livestock operation
2) Becomes a major concern when dealing with intensive agricultural confinement systems such as feedlots and confinement swine facilities
3) Potential problems
(a) Odor control
(b) Improper manure management practices leading to pollution
4) Producers - take measures to prevent problems associated with manure management

b) Water quantity and quality
1) Quantity
(a) Concerned about the quantity of water it takes to raise an animal
(b) Believe that water resources could be used more effectively for other things, including growing crops
2) Quality
(a) Tied to manure management and the contamination of the water supply by manure
(b) Groundwater contamination
(1) Runoff from animal feedlots or lagoon overflows that enters streams
(2) Improper application of manure as fertilizer
3) Producers
(a) Must manage their water supply effectively.
(b) Seek help from local Extension offices for the proper planning of manure storage facilities and drainage systems.

c) Destruction of wildlife habitats
1) Activists
(a) Believe that livestock fight with wildlife for scarce resources and thus cause habitat loss
(b) Argue that agricultural enterprises threaten already endangered species
2) Producers

(a) Understand the ramifications of having an endangered species found on their property and what regulations may affect them
(b) Attempt to manage their operations to promote the well-being of both livestock and wildlife

4. Producers and many consumers realize that Americans have a safe food supply. However, when someone dies after consuming an agricultural product like hamburger, concerns are often expressed by the public. Discuss the effect these concerns have on livestock production.

How do food safety issues affect animal agriculture?

a) Concerns about bacterial and chemical contamination of the food supply
   1) Highly publicized cases of bacterial contamination
      (a) *E. coli* in undercooked meat
      (b) Listeria in hot dogs and deli meats
      (c) Salmonella in raw and dried eggs and poultry products
   2) Concern about the presence of chemical residues in meat and milk products
b) Producers
   1) Address concerns about food safety by following proper management practices outlined by livestock associations.
      (a) Quality assurance programs aimed at assuring the wholesomeness of products
      (b) Educate producers about management practices, such as the proper uses, dosages, and withdrawal times for antibiotics, hormones, and vaccines
   2) Promote safe food preparation practices to ensure the safety of consumers.
c) Organic farming
   1) Product produced without the use of chemicals or hormones
   2) Market both meat and milk produced organically
   3) Consumer demand instrumental in the expansion of organic farming

5. Producers need to be aware of new developments in communications and information technology. If they are not, they may find themselves falling behind in production and marketing techniques. Ask students to describe changes, and discuss the impact of these changes on producers.

How will new communication and information technologies affect animal agriculture?

a) Improvements in technology have made it possible to market animals in new ways.
   1) Cattle auctions via satellite feeds - gives the producer an opportunity to sell animals to customers throughout the United States and even internationally
   2) Internet
      (a) Marketing livestock, either by advertising animals they have for sale on special web pages or developing their own web pages to provide information
      (b) Web pages useful for producers who develop niche markets for their products
b) Information technology can also assist producers in becoming better managers.
   1) Easy access to management information on the web sites of college animal science departments, university extension, and livestock associations
   2) Information on animal production regulations available on the Internet

6. Scientific advances in biotechnology will have a big impact on livestock production. Discuss the effect of some of these changes. How has the public responded to biotechnology?

How will scientific advances affect animal agriculture?

a) Advances in biotechnology
   1) Development of supplemental hormones like BST
   2) Development of more effective vaccines for preventing diseases in livestock

3) Various types of cloning, including the cloning of a sheep from a single cell taken from an adult animal

b) Producers
   1) Need to make an effort to remain aware of these advances to ensure that they are producing livestock as effectively and efficiently as possible
   2) Increase their efforts to educate consumers about the effect of these developments on food production
      (a) Consumers in America and especially Europe - questioning the safety of products that have been produced using biotechnology
      (b) Producers - work to assure consumers that biotechnology can be applied to animal agriculture safely

7. A new initiative known as International Standards of Operation (ISO) may affect producers in the future, particularly if they wish to export their products. The adoption of these standards in other countries may affect their marketing. Discuss the ISO standards. Hand out AS 1.1 and AS 1.2.

   How will international standards of operation affect animal agriculture?

   a) ISO 9000 - series of international standards that was developed in the late 1980s based on the input of 91 participating countries
   b) Outline standards to encourage international trade by establishing set standards for quality
   c) Developed in response to pressure from the European Community to set minimum quality standards for imported products
   d) Set guidelines for quality management and quality assurance
      1) Concerned with the quality of the processes used to produce a product and how these processes affect the product's quality
      2) ISO 9000 standards for animal agriculture
         (a) Cover some of the same areas addressed by current quality assurance programs
         (b) Would have to show thorough documentation of adherence to quality assurance processes for producers to be able to export their products to countries that follow ISO 9000 standards

F. ***Other Activities***

1. Have students give an oral synopsis of an article about an issue related to animal agriculture. They should evaluate the article and its purpose, expressing an opinion on its fairness.

2. Have students work in groups to research a new advancement in biotechnology connected with livestock production in more detail, using the Internet and/or print resources. Have them prepare a report for the class.

G. ***Conclusion***

Methods of food production are changing rapidly in the United States. These changes sometimes cause concern with consumers, making agricultural literacy important in order to reassure consumers. The changes also create challenges for producers because they need to keep up with the changes.

H. ***Answers to Activity Sheet***

AS 1.1

The answers will vary depending on the results of the activity.

AS 1.2

The answers will vary depending on the results of the the activity.

I. ***Answers to Evaluation***

1. b
2. c

3. Animal welfare groups support the humane treatment of animals, while animal rights groups believe that animals have the same rights as humans, so human beings do not have the right to use them as a resource.

4. Answers may include any two of the following: development of supplemental hormones, development of more effective vaccines, and various types of cloning.

5. By following proper management practices outlined by livestock associations in quality assurance programs

6. Manure management, water quantity and quality, and destruction of wildlife habitats

7. Producers can market livestock on special web pages or on their own web pages. Web pages may be especially useful for producers who develop niche markets for their products.

8. Agricultural literacy is important for consumers to appreciate the benefits provided by producers and to encourage them to support U.S. agriculture and the producers that provide them with food and fiber.

UNIT I - ISSUES IN ANIMAL AGRICULTURE Name_____

Lesson 1: Current and Future Issues Date_____

EVALUATION

Circle the letter that corresponds to the best answer.

1. Because of the efficiency of producers, the American consumer spends about _____ percent of their disposable income on food.

   a. 9
   b. 14
   c. 20
   d. 24

2. What is ISO 9000?

   a. Series of standards for minimizing the effects of production on the environment
   b. Series of standards setting guidelines for cooking food more completely
   c. Series of standards setting guidelines for quality management and quality assurance
   d. Series of standards for ensuring the welfare of the livestock raised on farms

Complete the following short answer questions.

3. What is the difference between the beliefs of groups that promote animal welfare and groups that promote animal rights?

4. List two examples of scientific advances that have affected or may affect animal agriculture.

   a.

   b.

5. How can producers address concerns about food safety?

6. List three environmental concerns facing the American producer today.

   a.

   b.

   c.

7. How has the Internet made it possible to market the products of animal agriculture in new ways?

8. Why is it important to promote agricultural literacy to consumers?

Lesson 1: Current and Future Issues Name_____

Survey of Consumer's Views of Animal Agriculture

Objective: Determine the views of people in the community about issues related to animal agriculture.

Select twenty people in the community. Ask them to respond to the following statements, and record the number of people agreeing or disagreeing with each statement. After totaling the number of responses, calculate the percentage of respondents that agree or disagree with each statement.

1. I believe that advances in biotechnology should be applied to animal agriculture.

2. I believe that animals have the same rights as people.

3. I believe in animal welfare.

4. I believe that livestock production is harmful to the environment.

5. I believe that using hormones in livestock production will harm the consumer.

Survey Results				
Statement Number	Number of Respondents		Percentage of Respondents	
	Agree	Disagree	Agree	Disagree
1				
2				
3				
4				
5				

Lesson 1: Current and Future Issues Name _____

Current Issues Affecting Animal Agriculture

Objective: Identify and examine current issues that affect animal agriculture today.

By researching media sources (magazines, newspapers, television, etc.), list ten current or future issues related to animal agriculture. After identifying the issues, indicate if it is an issue that has a positive affect on agriculture *or* if it presents agriculture in a negative manner. Explain your reasoning.

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

UNIT II - ENTERPRISES

Lesson 1: Missouri's Livestock Industry

Competency/Objective: Describe the importance of the livestock industry in Missouri.

Study Questions

1. **Why do we raise livestock?**

2. **What types of livestock are raised in Missouri?**

3. **How does livestock production contribute to Missouri's economy?**

Reference

1. *Advanced Livestock Production and Management* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit II.

2. Activity Sheet

   a) AS 1.1: Livestock Production in Missouri

UNIT II - ENTERPRISES

Lesson 1: Missouri's Livestock Industry

TEACHING PROCEDURES

A. ***Introduction***

The production of agricultural commodities is extremely important to Missouri's economy. Livestock production is an important part of Missouri's agricultural industry. People in Missouri raise all sorts of livestock, everything from beef cattle to speciality animals like emu. People may become involved in raising livestock for recreation or as a business, with the goal of producing animals for food, fiber, or work.

B. ***Motivation***

Have students look up the web page for the Missouri State Fair on the Internet at http://www.mda.state.mo.us/i9.htm. They should look for information on the types of livestock shown at the fair.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Have each student in the class write on the board the animals they and their families own or have owned in the past, including family pets. Discuss their reasons for raising these animals.

   Why do we raise livestock?

   a) To provide food, fiber, and work
   b) As a business to make a profit
   c) Recreational purposes

2. Have students list different types of livestock that are raised in Missouri.

   What types of livestock are raised in Missouri ?

   a) Common commercial livestock species
      1) Dairy cattle
      2) Beef cattle
      3) Sheep
      4) Swine
      5) Poultry
         (a) Chickens - including layer hens and broilers
         (b) Turkeys
   b) Other livestock animals
      1) Horses
      2) Mules
      3) Llamas
      4) Rabbits
      5) Dairy and meat goats
      6) Other poultry species
         (a) Bantams
         (b) Ducks
         (c) Geese

(d) Emus
(e) Pigeons

3. Ask students how important they think livestock production is to the people of Missouri and to the state's economy. Discuss the contribution livestock production makes to the state's economy. Have students fill out AS 1.1. They may use the statistics for 1997 given in the student reference or the current copy of *Missouri Farm Facts*.

How does livestock production contribute to Missouri's economy?

a) Farm cash receipts
   1) Thirteenth ranked state in the nation in farm cash receipts in 1997
   2) Total receipts of $5.56 billion
   3) Livestock - $2.8 billion of the receipts
      (a) Meat animals - 60 percent of the total receipts
      (b) Poultry and eggs - 27 percent
      (c) Dairy products - 12 percent
      (d) Speciality livestock farms - 1 percent
b) Farm exports
   1) Eleventh in the nation in farm exports
   2) Cash receipts from exports - $1.54 billion
   3) Important livestock export items - poultry and poultry products and dairy products
   4) Ninth in the nation in poultry-related exports
   5) Eleventh in exports of dairy products
c) Cattle
   1) Second in the nation in the number of cattle operations with 69,000 operations
   2) Second in beef cow operations, beef cow numbers, and calf crop
   3) Eighth in the nation in the number of milk cow operations
   4) 4.3 million head of cattle on Missouri farms as of January 1, 1998
   5) Cash receipts from cattle and calves - $901 million
d) Turkeys
   1) Sixth in the nation in the number of turkeys raised
   2) 22 million turkeys
   3) Value - $235 million
e) Swine
   1) Seventh in the nation in the number of hogs and pigs and the number of hog operations
   2) Cash receipts from hogs and pigs - $778 million
f) Broilers
   1) Tenth in the nation in the number of broiler operations and in broiler production
   2) 1.08 billion pounds produced
   3) Value of production - $403 million
g) Sheep
   1) Twelfth in the nation in the number of sheep operations
   2) Cash receipts from sheep and lambs - $3.5 million
h) Egg production
   1) Fourteenth in the nation in egg production
   2) 1.72 billion eggs
   3) Production value - $84 million
i) Milk production
   1) Sixteenth in the nation in milk production
   2) Cash receipts - $319 million
   3) 2.37 billion pounds of milk
j) Red meat - sixteenth in the nation in red meat production
k) Wool
   1) Twenty-first in the nation in wool production
   2) Value - $228,000

F. ***Other Activities***

1. Have students interview different livestock producers. Have them ask the producers why they raise livestock and what benefits they receive from livestock production.

2. Obtain a copy of the latest edition of the *Missouri Farm Facts* manual. Have students compile statistics about livestock production in Missouri, including the top producing counties for different types of livestock and the numbers of different types of livestock produced in their own county.

G. ***Conclusion***

Livestock are valuable because they provide food, fiber, and work. People in Missouri generally raise livestock as a business or for recreation. Common commercial livestock species are dairy or beef cattle, swine, sheep, and poultry, while other types of livestock raised include horses, mules, llamas, rabbits, and emus. Overall, livestock enterprises bring in half of the farm cash receipts for the state.

H. ***Answers to Activity Sheet***

(Answers to activity sheet is from data from the *1998 Missouri Farm Facts*. Answers will vary if data from other years is used.)

1. Food, fiber, work
2. $2.8 billion, 60, 27, 12
3. Poultry and poultry products, dairy products
4. Second, 69,000
5. Eighth
6. $901 million
7. Sixth; $235 million
8. Seventh, seventh
9. $778 million
10. Tenth, 1.08 billion, $403 million
11. $3.5 million, twelfth
12. 1.72 billion, $84 million, fourteenth
13. Sixteenth, 2.37 billion, $319 million
14. Sixteenth
15. Twenty-first

I. ***Answers to Evaluation***

1. c
2. b
3. b
4. c
5. d
6. Food, fiber, and work

7. Answers may include any three of the following: dairy cattle, beef cattle, sheep, swine, chickens, and turkeys.

8. Answers may include any of the following: horses, mules, llamas, rabbits, dairy and meat goats, and other poultry species, including bantams, ducks, geese, emus, and pigeons.

UNIT II - ENTERPRISES Name _____

Lesson 1: Missouri's Livestock Industry Date _____

EVALUATION

Circle the letter that corresponds to the best answer.

1. In 1997, livestock sales accounted for _____ in farm cash receipts.

   a. $2.8 million
   b. $5 million
   c. $2.8 billion
   d. $5 billion

2. For the rankings given, Missouri ranks lowest among the fifty states in _____.

   a. Milk production
   b. Wool production
   c. Broiler production
   d. Red meat production

3. Missouri ranked _____ in the nation in poultry-related exports in 1997.

   a. Eighth
   b. Ninth
   c. Tenth
   d. Eleventh

4. Missouri achieves its highest ranking among the states in:

   a. Egg production.
   b. Numbers of hogs.
   c. Beef cow numbers.
   d. Turkey production.

5. The majority of farm cash receipts in Missouri comes from:

   a. Dairy products.
   b. Speciality animals.
   c. Poultry and eggs.
   d. Meat animals.

Complete the following short answer questions.

6. List three things that livestock provide for people.

   a.

   b.

   c.

7. List three common commercial livestock species raised in Missouri.

   a.

   b.

   c.

8. What is one other type of livestock animal raised in Missouri?

Lesson 1: Missouri's Livestock Industry Name_____

Livestock Production in Missouri

Objective: Outline the importance of livestock production to the state of Missouri.

Fill in the blanks to outline the importance of livestock production in Missouri.

1. Livestock raised in Missouri provide _____, _____, and _____.

2. Total farm cash receipts from livestock equals $ _____, with _____ percent of receipts from meat animals, _____ percent from poultry and eggs, and _____ percent from dairy products.

3. Important livestock export items in Missouri are _____ and _____.

4. Missouri ranks _____ in cattle operations with _____ operations.

5. It ranks _____ in the number of milk cow operations.

6. Cash receipts from cattle and calves total $_____.

7. Missouri ranks _____ in the number of turkeys raised; the value of turkey production is $_____.

8. The state ranks_____ in the number of hogs and pigs and _____ in the number of hog operations.

9. The cash receipts from hogs and pigs totals $_____.

10. Missouri is _____ in broiler production, producing _____ pounds with a value of $ _____.

11. Cash receipts from sheep and lambs are $_____; in the nation, the state ranks _____ in the number of sheep operations.

12. Laying hens produced _____ eggs at a value of $_____, causing the state to rank _____ in egg production.

13. Missouri is ranked _____ in the nation in milk production, producing _____ pounds of milk at a value of $_____.

14. The state is ranked _____ in red meat production.

15. Missouri ranks _____ in wool production.

UNIT II - ENTERPRISES

Lesson 2: Beef Enterprises

Competency/Objective: Select a beef enterprise based on available resources.

Study Questions

1. **What are the types of beef enterprises?**
2. **What resources are needed for beef enterprises?**
3. **What are the capital requirements for beef enterprises?**
4. **What are the labor requirements for beef enterprises?**
5. **What are the returns for beef enterprises?**
6. **What risks are involved in beef enterprises?**

References

1. *Advanced Livestock Production and Management* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit II.
2. Activity Sheet
   a) AS 2.1: Preparing a Beef Enterprise Budget

UNIT II - ENTERPRISES

Lesson 2: Beef Enterprises

TEACHING PROCEDURES

A. ***Review***

Lesson 1 described the importance of animal agriculture in Missouri. The beef industry is the largest segment of livestock production in the state and is an important part of Missouri's economy. Lesson 2 describes the different enterprises that make up the beef industry and the resources needed for them to be successful.

B. ***Motivation***

Ask students if they can give an estimate of how much it would cost to produce a pound of beef. Then ask if they know what the current market price is (per pound) for a slaughter steer. Have them figure how much profit (or loss) they would incur.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Ask students to list different types of beef enterprises. Discuss the characteristics of the enterprises.

   What are the types of beef enterprises?

   a) Seedstock
      1) Also referred to as a purebred breeder
      2) Raise genetically superior females and herd bulls for sale to cow-calf producers
      3) Usually select a particular breed of beef animals to raise
         (a) Personal preference
         (b) Belief that a particular breed offers some advantage to cattle producers

   b) Cow-calf
      1) Mostly operate in the Plains or Corn Belt states
      2) Generally raise calves for sale to other beef operations; may retain ownership of the cattle until finishing or harvesting
      3) Breed high quality grade cattle
         (a) Cows are bred to calve in late winter or early spring.
         (b) Calves are sold in the fall.
         (c) Natural mating typically is used.
         (d) Artificial insemination is used with more expensive females.

   c) Stocker-yearling/backgrounding
      1) Raising calf from time it is weaned to the feedlot phase
      2) Begins at 400 to 600 pounds and enters the feedlot at 700 to 900 pounds
      3) Essential to add weight to the calf before it enters final feeding phase and sent to a feedlot
         (a) Uses less expensive forages (like annual grasses) to add weight
         (b) May also feed supplemental grain
            (1) Increases the rate of gain.
            (2) Prepares calves to enter feedlot phase earlier.

   d) Feedlot
      1) Completes the grow-out phase of beef production

2) Only a couple of true feedlots in Missouri
3) Feeds out calves to market weight
4) Involves the feeding of more concentrates

2. Have students list the basic resources needed for beef enterprises. Discuss the resources needed for a successful beef enterprise.

What resources are needed for beef enterprises?

a) Markets
   1) Close enough to hold down transportation costs
   2) Avoid large losses from stress during shipping
b) Land
   1) Much of the land in Missouri supports good grazing.
   2) The size and type of operation varies greatly with the potential uses and price of the land.
   3) Most beef production takes place away from the populated and heavily forested areas of the state.
   4) Missouri has very few feedlot operations, in part because the population density conflicts with animal operations that may cause environmental issues.
      (a) Odors in the air.
      (b) Animal waste entering streams.
c) Capital
   1) A number of factors affect the amount of capital needed, including the size and type of operation.
   2) Seedstock producers tend to have higher capital requirements per animal.
   3) Backgrounders typically have the least amount of capital invested in the operation.
   4) Feedlots with large numbers of cattle tend to have large capital requirements, in part because of the cost of the feed purchased.
d) Labor
   1) Labor needs vary depending on factors such as the type of enterprise and herd size.
   2) Backgrounders have the lowest labor requirements.
   3) Operations with breeding herds require more labor to work with breeding and calving.
   4) Because feedlot enterprises may be large, labor requirements can be high.
   5) Using labor-saving equipment whenever possible can reduce the amount of labor needed.
e) Management
   1) Fewer management skills are necessary for stocker-yearling enterprises.
      (a) Skills in buying and selling animals
      (b) Diagnosing and treating illnesses
   2) Seedstock and cow-calf producers must be able to manage breeding and calving efficiently.
   3) Managing a large feedlot requires more management skills.
      (a) Manage labor
      (b) Maintain herd health among concentrated numbers of animals
      (c) Ensure that animals are fed for optimum performance

3. Planning for the financial aspect of a livestock enterprise is probably the most important aspect of beginning production. All other resources are directly connected to the acquisition and use of capital. Describe the capital requirements of beef enterprises.

What are the capital requirements for beef enterprises?

a) Amount of capital needed
   1) Size of the operation
      (a) Average investment of $352 per cow for a producer with herd of 100 cows

(b) Includes costs such as buildings, improvements, and cow-herd share of equipment use
(c) Does not include the cost of land
(d) Increase in number of cows - cost per cow decreases

2) Location
(a) Land - value varies greatly
(b) Affects level of capital investment required

3) Ownership of resources versus leasing
(a) Higher capital investment for a producer who owns land, buildings, and equipment
(b) Lower capital investment for a producer who leases them on a contract basis

4) Type of livestock enterprise
(a) Backgrounding - lowest capital investment on average
(b) Feedlot
(1) Least expensive operation when looking at expenses per animal
(2) Initial capital outlay large but large numbers of animals are produced
(3) Less land, fewer buildings, and less equipment needed per animal sold
(c) Seedstock enterprises
(1) Higher investment per animal
(2) Expensive to purchase purebred animals used for breeding
(3) Additional investment in marketing and advertising
(4) Invest more capital in equipment, facilities, and quality of feed

b) Costs
1) Fixed ownership costs
(a) Interest on loans
(b) Depreciation
(c) Insurance
(d) Property taxes

2) Variable operating costs
(a) Animals
(b) Feed
(c) Labor
(d) Veterinary expenses
(e) Fuel
(f) Utilities
(g) Expenses associated with breeding for operations with breeding herds

c) Feed costs
1) Typically the highest expense for any beef operation
2) Often use pasture to provide feed
3) Should provide additional feed in the form of salt and minerals during the grazing season
4) May supply grain and protein supplements at times to increase production
5) Should provide roughage to cattle during the winter

4. Labor is another important resource to manage in a beef enterprise. Beef producers need to recognize when extra labor is needed, how much, and the cost. Discuss labor requirements for beef enterprises.

What are the labor requirements for beef enterprises?

a) Direct labor - labor directly related to the beef enterprise, such as time spent working with animals during calving, weaning, or feeding
b) Indirect labor - indirectly related to the enterprise, such as time spent repairing fences
c) Determining the total number of hours of labor required
1) Number of direct labor hours per unit of livestock determined on a per animal basis
2) Indirect hours - generally 30 percent of the direct labor
d) Number of hours required per animal

1) Depends on three main factors
   (a) Type of enterprise
   (b) Herd size
   (c) Geographic location
2) Beef cow in a 45-cow herd on a cow-calf operation in the Midwest - about 18 hours of labor per year per cow
3) Cattle herds in the western United States that are larger in size - less labor per cow because less time is spent on management activities for each animal
4) Stocker-yearling operations - require less labor than cow-calf or seedstock operations
5) Large feedlots - may hire 15 to 30 full-time workers

5. One of the most important considerations when planning a beef enterprise is how much profit the enterprise will generate. Discuss expected returns for beef enterprises. Have students complete AS 2.1.

What are the returns for beef enterprises?

a) Returns vary greatly from year to year.
b) Expenses for raising the animals (input costs) vary less than market prices.
c) The goal is to sell the animal for a price that exceeds the break-even price to generate a profit.
d) Some producers may operate on a lower cost basis, increasing the potential profit per animal.

6. As with all businesses, running a beef enterprise involves some risk. A successful producer needs to understand the sources of risk and ways to reduce risk. Ask students to list and discuss the risks in beef production.

What risks are involved in beef enterprises?

a) Risks
   1) Affect profit or loss
   2) Vary with type of enterprise
   3) Determined by looking at revenue and cost risk factors
b) Revenue risk
   1) Price changes and changes in quantity that affect total revenue
   2) Factors
      (a) Animal death rates
      (b) Livestock weight
      (c) Livestock quality
      (d) Available markets
      (e) Weight shrinkage during transportation
c) Cost risk
   1) Increases in costs
   2) Examples
      (a) Feed costs
      (b) Interest rates
      (c) Feeder and breeding livestock prices
      (d) Transportation costs
      (e) Overhead costs - insurance
d) Some risks controlled through good management - health problems that affect death rates
e) Others outside control - weather extremes that reduce feed intake
f) Reducing risk
   1) Diversification - becoming involved in other enterprises
   2) Special marketing strategies
      (a) Forward contracting

(b) Hedging on the futures market

3) Insurance
   (a) Change a small chance of a large loss into a sure chance of a small cost
   (b) Not available for price risks
   (c) Insure against other problems
      (1) Lightning losses
      (2) Accidents involving liability
      (3) Building damages
4) Buildup of cash reserves or credit lines with lending institution
   (a) Allow livestock producers to meet changes in costs of raising livestock
   (b) Allow producers to take advantage of opportunities for profit

F. ***Other Activities***

Have a local producer or Extension livestock specialist speak to the class about labor requirements, expected costs and returns, and risk factors to provide local information for the topics presented in this lesson.

G. ***Conclusion***

Before selecting a beef enterprise, a prospective producer should evaluate his or her situation. Factors to be considered include the type of enterprise that fits the skills and resources of the producer, the amount of investment capital needed, labor requirements, and the expected returns. Operating a successful beef enterprise depends on making informed decisions.

H. ***Answers to Activity Sheet***

Answers will vary.

I. ***Answers to Evaluation***

1. d
2. b
3. c
4. c
5. d
6. By selling the animal for a price that exceeds the break-even price
7. Markets, land, labor, capital, and management
8. Revenue risk and cost risk
9. To feed out calves to market weight

10. Answers may include any three of the following: diversification, special marketing strategies, insurance, and building up cash reserves or lines of credit.

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Lesson 2: Beef Enterprises Date_____

EVALUATION

Circle the letter that corresponds to the best answer.

1. Which type of livestock enterprise requires the least capital investment on a per head basis?

   a. Seedstock
   b. Feedlot
   c. Cow-calf
   d. Backgrounding

2. About how many hours of labor are needed for a cow in a 45-cow herd on a cow-calf operation in the Midwest?

   a. 8
   b. 18
   c. 28
   d. 38

3. Backgrounders

   a. Raise breeding stock for sale to other producers.
   b. Maintain a breeding herd.
   c. Raise the calf from weaning to the feedlot.
   d. Sell calves to cow-calf producers.

4. Which type of operation raises calves for sale to other beef operations?

   a. Seedstock
   b. Feedlot
   c. Cow-calf
   d. Backgrounding

5. What is typically the highest expense for any beef cattle enterprise?

   a. Labor
   b. Depreciation
   c. Utilities
   d. Feed

Complete the short answer questions below.

6. How do producers make a profit from beef enterprises?

7. What are the five resources necessary for a successful beef enterprise?

   a.

   b.

   c.

   d.

   e.

8. What are the two types of risk factors?

   a.

   b.

9. What is the purpose of feedlot enterprises?

10. What are three methods or management practices used to reduce risk in beef enterprises?

    a.

    b.

    c.

Lesson 2: Beef Enterprises Name_____

Preparing a Beef Enterprise Budget

Objective: Select a beef enterprise and prepare a budget for the enterprise.

Select a type of beef enterprise. Obtain information from an Extension *Farm Planning Handbook* or other Extension publications, Internet resources, parents, or records from your own or a fellow student's SAE program about the costs for beef production. Prepare a budget using the form given below. You may use all of the items or only items related to your enterprise.

Type of enterprise: _____

	Per Animal Unit	Source of Information
Purchase price or beginning inventory value	$	
Feed costs		
Hired labor		
Veterinary and medication costs		
Transportation (fuel, etc.)		
Utilities		
Marketing		
Breeding		
Interest on investment		
Taxes (personal property and/or real estate)		
Depreciation		
Equipment		
Other (misc.)		
Total expenses		
Expected receipts		
Return to labor (profit)		

UNIT II - ENTERPRISES

Lesson 3: Dairy Enterprises

Competency/Objective: Select a dairy enterprise based on available resources.

Study Questions

1. **What are the types of dairy enterprises?**
2. **What resources are needed for dairy enterprises?**
3. **What are the capital requirements for dairy enterprises?**
4. **What are the labor requirements for dairy enterprises?**
5. **What are the returns for dairy enterprises?**
6. **What risks are involved in dairy enterprises?**

References

1. *Advanced Livestock Production and Management* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit II.
2. Activity Sheets
   a) AS 3.1: Preparing a Dairy Enterprise Budget
   b) AS 3.2: Considerations for Starting a Dairy Enterprise

UNIT II - ENTERPRISES

Lesson 3: Dairy Enterprises

TEACHING PROCEDURES

A. ***Review***

Lesson 2 described beef enterprises. In contrast to the beef industry's focus on meat, the dairy industry produces milk, which may then be processed into secondary dairy products such as ice cream, butter, cheese, or yogurt. Beef is also a by-product of the dairy industry. Dairy producers must manage their operations effectively to produce milk safely, efficiently, and profitably.

B. ***Motivation***

Have students estimate how many gallons of milk their families drink in a year. List and total the amounts on the board. Calculate how many gallons per year the dairy industry would need to provide for the class to meet their demand.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Ask students to describe a dairy farm. What would it be like? What else is produced on a dairy farm besides milk?

What are the types of dairy enterprises?

a) Dairy farm that produces milk
   1) Number of cows per dairy farm
      (a) Range from less than 30 lactating cows to more than 5,000 cows kept in confinement in a dry lot system
      (b) Average dairy enterprise - 100 milking cows, 30 dry cows, 30 heifers, and 25 calves
   2) Typically own one breed of cows that are bred for high milk production
   3) Usually use artificial insemination instead of natural mating
   4) Average of 250 acres of land
   5) Raise a large percentage of the forages used for feed
   6) May also use a management intensive grazing system, which involves moving or rotating the herd between smaller pastures every two to three days
   7) Average producer - in a partnership agreement with another person, commonly a family member
   8) Market through a cooperative
   9) May either produce Grade A or Grade B milk
      (a) Grade A, Class I milk - drinking
      (b) Grade B or manufacturing (Grade C) milk, Class II to IV - manufactured dairy products
   10) Raise very few male calves to maturity
      (a) Usually sold for meat
      (b) Veal - grow bull calves to between 350 and 420 pounds before selling them
   11) Beef - major by-product of the dairy industry
      (a) Bull calves castrated and fed
      (b) Older cows and heifers not used as replacements
b) Replacement heifer operations

1) May raise replacements to sell to dairy farms if producers do not have the resources to maintain a dairy herd
   (a) Buys heifer calves
   (b) Rears and breeds them
   (c) Sells them just before they give birth
2) May also raise replacement heifers under a contract system
   (a) Animals owned by the dairy producer - pays the grower for services
   (b) Receives heifer calves from the producer and rears and breeds them
   (c) Sends them back to the dairy farm just before they calve

2. Discuss the basic resources needed for livestock operations as they relate to dairy enterprises.

What resources are needed for dairy enterprises?

a) Markets
   1) A dairy producer should make sure that a cooperative marketing association or a processor exists in the area.
   2) Fluid milk sales directly to consumers make up only a small proportion of the milk marketed.

b) Land
   1) Cows should have some pasture to graze on if they are not in a dry lot.
   2) Producers will also need land to raise roughage or grain to feed the cows.
      (a) Producing roughage or grazing the cows
         (1) 3 to 4 acres of excellent pasture per cow
         (2) 4 to 8 acres of marginal land per cow
         (3) 1 to 2 acres of pasture per cow for intensive grazing
      (b) Raising grain - an additional 1½ acres per cow
   3) Some producers raise their cows on small dry lots to minimize the amount of land needed.
   4) Land is also needed for spreading the animal wastes produced by the dairy herd.
      (a) Lagoon system - five cows per acre
      (b) Scraping system - an acre for each cow

c) Labor
   1) The milking process is labor intensive.
      (a) Cows milked two to three times a day, every day
      (b) Milking parlor kept clean and free of manure
   2) Growing and harvesting forages for dairy operations also requires a great deal of work.

d) Capital
   1) A large capital investment is needed to begin a dairy enterprise.
   2) Capital is needed for many aspects of dairy farms.
      (a) Cows
      (b) Land and facilities
      (c) Specialized milking and milk handling equipment
      (d) Equipment for planting and harvesting forages and crops
      (e) Feed
      (f) Labor
      (g) Semen
      (h) Other operating expenses

e) Management
   1) Proper management is essential to the success of a dairy enterprise.
   2) Producers must be knowledgeable about both livestock and crop production.
   3) Successful dairying requires that managers understand the different aspects of dairy production.
      (a) Feeding
      (b) Milking
      (c) Sanitation

(d) Caring for animals
(e) Raising crops

3. Ask students to consider all of the resources just discussed. Have them estimate how much capital it would take to operate a dairy farm given that they may have to purchase some of these resources. Refer to Figure 3.1 in the Student Reference.

What are the capital requirements for dairy enterprises?

a) Average capital investment for a 100-cow operation - $3,000 to $5,000 per cow
b) Capital needed
    1) Investment and expansion
    2) Fixed costs
        (a) Interest
        (b) Taxes
        (c) Depreciation
    3) Operating costs
        (a) Fuel
        (b) Supplies
        (c) Seed
        (d) Fertilizers
        (e) Feed
        (f) Breeding livestock and semen
        (g) Labor
        (h) Other daily expenses
c) Land
    1) Large investment needed to purchase land and use it for growing crops.
    2) Purchase machinery for tilling, planting, and harvesting.
    3) Reduce capital requirement for land ownership by renting rather than purchasing.
    4) Reduce the cost of a fully-owned dairy operation by 20 to 30 percent by raising only forages.
d) Cows
    1) Money needed to buy or raise replacement heifers
    2) Purchase animals from high-producing herds - cows have potential to produce enough milk to make up for extra amount paid
e) Buildings and equipment
    1) Facilities and equipment needed for manure handling, herd housing, feed processing and handling, and milking
        (a) Milking center - milking parlor complete with automatic milking machines, a bulk tank room, and a holding pen for cows waiting to be milked
        (b) Stricter facility requirements for Grade A milk production
    2) Need to upgrade equipment on a regular basis, so the cost of replacement equipment should be considered in financing
f) Feed
    1) Most significant operating cost
    2) Averages around 50 percent of the cost of milk production
    3) Most feed raised on the farm - represents a significant investment because of the equipment and labor required
    4) Supplements - generally account for only a small proportion of feed costs
g) Labor
    1) 15 to 20 percent of the total costs
    2) Increases if employees are offered benefits such as insurance

4. Ask students why dairy enterprises are so labor intensive. Discuss the labor requirements for dairy operations.

What are the labor requirements for dairy enterprises?

a) Dairy herds must be milked at regular intervals two to three times a day throughout the entire year.
b) Variations in milking schedules will decrease milk production because dairy cows are sensitive to abrupt changes in routine.
c) A general estimate of annual labor requirements in dairy enterprises provides the following statistics.
    1) 12.5 hours per cow to clean equipment
    2) 6.5 hours per cow for upkeep and care of the barnyard
    3) 49 hours per cow for milking, feeding, and caring for livestock
    4) 68 hours of labor spent on one cow each year
    5) Does not include time spent on crop production, harvesting, and processing
d) The producer and his or her family provide most of the labor on many dairy operations.
e) Full- or part-time employees may be hired to help with milking and other activities.
    1) Must be well managed for an efficient operation
    2) Must understand proper milking procedures
        (a) Should be trained to provide good sanitation by cleaning equipment and udders thoroughly
        (b) Should also be trained to recognize signs of udder infections and know how to prevent infections from spreading

5. Ask students what factors affect a dairy producer's ability to make a profit in dairying. Have students complete AS 3.1.

What are the returns for dairy enterprises?

a) Major source of income for a dairy producer - sale of milk
b) Other returns - sale of animals for beef or veal
c) Can make a profit if the returns from production exceed the costs of the operation
d) Good management - key to profits
    1) Achieving above average milk production
    2) Managing production efficiently
    3) Managing debt levels and per cow investments carefully
e) Milk prices
    1) Generally set on a hundredweight (cwt) basis at 3.5 percent butterfat
    2) Majority of fluid milk marketed and priced under federal milk marketing orders
        (a) Establish the minimum prices that processors must pay for different classifications of milk for different uses
        (b) Highest prices for Grade A, Class I milk
    3) Also established through bargaining between a milk marketing cooperative and a processor

6. Discuss the risks in dairy production. What risks can be controlled by the producer, and which ones are beyond his or her control? Have students complete AS 3.2.

What risks are involved in dairy enterprises?

a) The potential always exists that the operation may not make enough money to meet its debts and may be forced out of business.
b) Failing to make a profit can be a result of a number of factors.
    1) Some problems can be avoided with good management.
        (a) Inefficient production
        (b) Illnesses in the herd
        (c) Poor management of the costs of operation
    2) Other factors are outside the control of the producer.
        (a) Hot summer that decreases milk production
        (b) Drought affecting feed production

(c) Changes in milk prices
(d) Processor declaring bankruptcy

F. ***Other Activities***

1. Have the students interview different dairy producers. Have students ask about the costs and ability to make a profit.
2. Have the students make a survey of dairy enterprises in the county. Have them determine the average size of the farm and production data. Have them make a bulletin board about dairy farms in the county with their results.

G. ***Conclusion***

The primary product of dairy enterprises is milk. To produce milk, dairy operations need resources such as markets, land, labor, capital, and management. Capital investment is high for dairy enterprises. Specialized milking facilities and equipment are costly but must be purchased to keep up with production. Other significant costs are feed and labor. Dairy enterprises are extremely labor-intensive because cows need to be milked two to three times a day all year. The returns and profits of a dairy enterprise vary from year to year and enterprise to enterprise. Good management can help generate returns and reduce expenses to make a profit. Like any business, running a dairy operation always has risk. The possibility exists that a dairy enterprise will lose money either because of inefficient management or by factors outside the control of the producer.

H. ***Answers to Activity Sheet***

AS 3.1

Answers will vary depending on the results of the activity.

AS 3.2

Answers will vary depending on the results of the activity.

I. ***Answers to Evaluation***

1. d
2. b
3. a
4. c
5. b

6. Answers may include any two of the following: a hot summer that decreases milk production, drought affecting feed production, changes in milk prices, or a processor declaring bankruptcy.

7. Answers may include any of the following: achieving above average milk production, managing production efficiently, and managing debt levels and per cow investments carefully.

8. Milk and animals sold for beef or veal

9. The producer buys heifer calves, rears and breeds them, and sells them just before they give birth.

10. Whether a cooperative marketing association or processor exists in their area

UNIT II - ENTERPRISES Name _____

Lesson 3: Dairy Enterprises Date _____

EVALUATION

Circle the letter that corresponds to the best answer.

1. The largest operating cost in dairying is _____.

   a. Utilities
   b. Labor
   c. Fuel
   d. Feed

2. A producer will need _____ acres of quality pasture per cow to produce forages or graze the cows.

   a. 1½ to 3
   b. 3 to 4
   c. 4 to 8
   d. 8 to 10

3. Labor is _____ percent of the total costs for dairy enterprises.

   a. 15 to 20
   b. 25 to 30
   c. 35 to 40
   d. 45 to 50

4. What is the estimated total number of hours of labor spent on each cow per year?

   a. 48
   b. 58
   c. 68
   d. 78

5. How many milking cows does the average U.S. dairy enterprise have?

   a. 75
   b. 100
   c. 125
   d. 150

Complete the following short answer questions.

6. List two factors that can affect the risk associated with the dairy operation that are beyond the control of the producer.

   a.

   b.

7. List one of the management factors that affects profits in a dairy operation.

8. What are the two main products sold from a dairy operation?

   a.

   b.

9. What basic steps are involved in raising replacement heifers?

10. What should a prospective dairy producer consider when determining if a potential market exists?

Lesson 3: Dairy Enterprises Name _____

Preparing a Dairy Enterprise Budget

Objective: Prepare a budget for a dairy enterprise.

Obtain information from an Extension *Farm Planning Handbook* or other Extension publications, Internet resources, parents, or the records of your or a fellow student's SAE program about the receipts and costs of dairy production. Prepare a budget using this information.

	Per Cow	Source of Information
Gross Receipts	$	
Milk sales		
Cull cow sales		
Young stock sales		
Miscellaneous income		
(1) Total Gross Receipts		
Operating Costs		
Feed		
Grain ration		
Hay and haylage		
Silage and green chop		
Pasture		
Total Feed Costs		
Veterinary and medicine		
Other livestock materials and services		
Machinery costs, feed preparation, etc.		
Utilities		
Other (insurance, property taxes, repairs)		
Operating interest (9%)		
(2) Total Cash Costs (except labor)		
(3) Labor (operator, family, and hired)		
(4) Total All Variable Costs (Line 2 + 3)		

Ownership Costs		
Real estate interest, depreciation, and taxes		
Breeding herd investment		
Machinery and equipment interest and depreciation		
(5) Total Fixed Costs		
(6) Total All Costs (Line 4 + 5)		
Income above All Variable Costs (Line 1 - 4)		
Total Income above Total Costs (Line 1 - 6)		

Lesson 3: Dairy Enterprises Name_____

Considerations for Starting a Dairy Enterprise

Objective: Recognize important factors and resources affecting the success of dairy enterprises.

Imagine that you are a successful dairy producer. One evening, an old friend from your FFA years, David, shows up on your doorstep. After talking about the good old days with him, you begin to discuss what he's doing now. It turns out that he has inherited $700,000 from his long lost Aunt Alice, and he has decided to use the inheritance to go into dairying.

Apparently not much else has changed with David. He has spent the last 15 years in and out of college working on various degrees that he has yet to finish. In the middle of the conversation you begin to feel drowsy because it is getting late. You ask David what time it is, and he tells you that he "doesn't believe in wearing a watch" and that he hasn't worn one since the time he was bored in a high school animal production class. In an effort to entertain himself, he took apart his watch during class and never figured out how to put it back together again.

You begin to question David about his dairying plans. He says he wants to buy land on glamorous (and costly) Long Island and supply the entire island with fresh milk. When you suggest that he may not be able buy enough land to raise feed, David explains that he will simply buy the feed for his cows.

When you suggest that David should work with someone else to run the farm, he begins to lose his patience. He exclaims, "I just don't work well with people, you know? I refuse to share my business. I want it all to myself. I want to do it all by myself, with no help from anyone."

Just then, your spouse steps into the room and offers you both some cookies. You both enjoy the cookies, rehash the good old days a bit more, and call it a night. David promises to stop by for a home-cooked breakfast in the morning.

The next morning, you do the usual morning milking routine. As you stand watching your Holsteins graze before returning to the house to prepare breakfast, David drives up. As he gets out of his car, he asks, " I meant to ask last night . . . what breed are your cows?"

Based on his personality traits and the information David provided, describe why you would or would not suggest that he go into dairying. Base your reasoning on marketing, capital, labor, land, and management resources.

UNIT II - ENTERPRISES

Lesson 4: Swine Enterprises

Competency/Objective: Select a swine enterprise based on available resources.

Study Questions

1. **What are the types of swine enterprises?**
2. **What resources are needed for swine enterprises?**
3. **What are the capital requirements per unit for each type of swine enterprise?**
4. **What are the labor requirements for swine enterprises?**
5. **What are the returns for swine enterprises?**
6. **What risks are involved in swine enterprises?**

References

1. *Advanced Livestock Production and Management* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit II.
2. Activity Sheets
   a) AS 4.1: Describing Swine Enterprises
   b) AS 4.2: Preparing a Swine Enterprise Budget

UNIT II - ENTERPRISES

Lesson 4: Swine Enterprises

TEACHING PROCEDURES

A. ***Review***

Lesson 3 discussed dairy enterprises. Unlike milk production, in which only one basic type of enterprise exists, several different types of enterprises exist in the pork industry. The nature of the industry is changing, however, as vertical integration becomes more common. Markets, land, labor, capital, and management are important resources for all enterprises involved in pork production. They are important for the success of any type of livestock operation.

B. ***Motivation***

Have students research swine production operations in the area. Have them classify the swine producer's system as one of the types of enterprises described in the lesson.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Have students discuss the results of the motivational exercise. If they were producers, which type of operation would they prefer to run? Have them describe their reasons. Discuss the characteristics of the different types of swine enterprises. Hand out AS 4.1 to the class.

What are the types of swine enterprises?

a) Farrow-to-finish enterprises
   1) Most common type of swine enterprise
   2) Keep a breeding herd that are bred to farrow regularly
   3) Raise piglets until they reach a market weight of 240 to 260 pounds
   4) Often raise swine in a confinement system
      (a) Specialized facilities for farrowing, growing young pigs, and finishing animals out to market weight
      (b) May be sophisticated in terms of equipment, with automated ventilation, feeding, and manure handling systems
   5) May also raise pigs on pasture or in low-intensity confinement systems as a supplementary source of income for the agricultural enterprise

b) Feeder pig enterprises
   1) Produce pigs that are sold to other producers who will finish them out for market
   2) Maintain a breeding herd and raise the pigs until they reach 40 to 60 pounds
   3) Large feeder pig producers
      (a) 200 or more sows
      (b) Confinement facilities that provide a controlled environment
   4) Smaller feeder pig operations
      (a) Operated to supplement other earnings of an agricultural enterprise
      (b) Require simpler facilities, including a farrowing house/nursery
      (c) Breeding herd kept in lots

c) Feeder pig finishing enterprises
   1) Raise feeder pigs for market
   2) Purchase pigs from feeder pig producers and finish them out to market weight
   3) Do not maintain a breeding herd

4) Takes place in either environmentally-controlled confinement facilities or open-faced buildings with lots

d) Seedstock enterprises
   1) Raise genetically superior animals to supply commercial pork producers who maintain breeding herds
   2) Select the best animals for sale or addition to the breeding herd
   3) Sell others as feeder pigs or finish them for market

e) Trend away from small independent swine operations to large, vertically integrated corporate enterprises
   1) Large-scale operations whose goal is to efficiently produce pork
   2) May control different phases of production, owning the farrow-to-finish swine operation, feed mills, and even processing plants
   3) Contract production
      (a) Individual producer - contracts with the integrator to farrow or feed out pigs
      (b) Corporation - owns the pigs and supplies feed, medications, and management recommendations
      (c) Producer - provides land, facilities, utilities, labor, and management

f) Contracting options for individual producers
   1) Producer of market hogs - contract with a processor that will buy the hogs produced
   2) Feeder pig producer - contract with a finisher who will purchase his or her pigs
   3) Several producers - network and cooperate with each other to decrease production costs and improve profits

2. Ask students to think about the different enterprises discussed in the previous section. Are there differences in the resources needed for success?

What resources are needed for swine enterprises?

a) Markets
   1) Markets should be accessible for a hog producer.
   2) Farrow-to-finish and feeder pig finishing operations should determine whether a market exists in their area; most are sold to a processor.
   3) Feeder pig producers should make sure they have a finisher market nearby.
   4) Contracting with an integrator may be an option, and producers should check whether a market exists for their production services.

b) Land
   1) Very little land is needed if hogs are kept in complete confinement.
   2) If a producer wishes to raise corn for feed, more land is required.
   3) Location should be considered because of odors caused by swine production.

c) Labor
   1) Amount of labor depends on the size and type of operation and level of automation.
   2) Labor can be reduced by using automation.
   3) Raising hogs in confinement can reduce the amount of handling needed.
   4) Hired labor is necessary in any large swine enterprise.
   5) Smaller enterprises may be able to maintain production using only family labor.

d) Capital
   1) Amount of capital needed depends on the size and type of swine enterprise.
   2) Farrow-to-finish operations generally have higher capital needs because all phases of production are carried out.
   3) High volume confinement operations require more capital.

e) Management
   1) Producers with large operations must be committed because swine production is a demanding, year-round process.
   2) Financial and livestock management skills are important for the successful operation of any swine production system.
   3) Large farrow-to-finish enterprises require more training in management.

3. Ask students to break down the expenses of a swine operation. Discuss the major expenses of swine enterprises. How can capital requirements be reduced?

What are the capital requirements per unit for each type of swine enterprise?

a) Different types of hog production require different levels of investment.
   1) Generally need fewer inputs with each phase of production eliminated
   2) Farrow-to-finish operations - most costly
   3) Feeder pig operations - maintain a breeding herd, so tend to require a higher level of investment than swine finishing by itself

b) The size of the operation will also affect the amount of capital required.
   1) Highest capital requirements for large confinement operations
   2) Expensive to build and maintain confinement facilities because of their sophisticated design and equipment

c) All swine enterprises spend capital on both fixed costs and variable operating costs.
   1) Fixed costs
      (a) Real estate taxes
      (b) Interest
      (c) Insurance
      (d) Depreciation
   2) Operating costs
      (a) Animals
      (b) Feed
      (c) Medical charges
      (d) Labor
      (e) Repairs
      (f) Utilities

d) Highest operating cost is feed costs.
   1) Farrow-to-finish operations - 60 percent of the total costs of production
   2) Feeder pig operations - 50 percent of the total costs
   3) Finishing operations - 70 percent of the total costs
   4) May have the option of growing their own feed
      (a) Allows them to avoid paying the high cost of commercial feeds
      (b) Must have suitable land, equipment, and labor resources for the production of corn or other grains

e) Another significant expense is the animals themselves.
   1) Seedstock producers - more capital to invest in quality purebred breeding stock
   2) Farrow-to-finish and feeder pig producers - purchase quality replacement animals for breeding herds
   3) Feeder pig finishers - significant proportion of operating costs from the purchase of feeder pigs

f) Labor may be another large variable cost.
   1) May only require family labor for smaller operations
   2) Generally depend on hired labor for large operations
   3) Generally require less labor for finishing operations

g) Contracting with an integrator will reduce the amount of capital required.
   1) Contracting firm - supplies feed and animals, which are among the highest costs
   2) Producer - obtains financing to build the facilities required by the integrator for production

4. Ask students what attributes of swine enterprises affect the amount of labor needed for the different enterprises. Discuss the labor requirements for each enterprise.

What are the labor requirements for swine enterprises?

a) Smaller operations may not need to rely on hired labor.

b) A large-scale farrow-to-finish operation must invest in specialized labor to handle different phases of production.
   1) Breeding
   2) Farrowing
   3) Growing
   4) Finishing
c) Feeder pig and seedstock enterprises may also hire specialized labor.
   1) Breeding herd
   2) Farrowing
d) Finishing systems require less specialized labor because fewer activities are involved.
e) In large-scale swine production, labor is reduced through the use of automation and confinement systems.

5. Ask students what factors affect a swine producer's potential to make a profit in the swine industry. Have students complete AS 4.2.

What are the returns for swine enterprises?

a) If the returns for a hog exceed the costs of producing the animal, a producer can make a profit.
   1) Wise management of all of the inputs of production greatly increases the chances of generating returns for any type of swine operation.
   2) Good managers will operate efficiently to maximize production while minimizing costs.
   3) Profits for feeder pig producers depend on their ability to farrow, wean, and grow a large number of feeder pigs.
   4) Profits for finishing enterprises depend on the producer's ability to produce animals of sufficient weight and leanness.
b) Large-scale intensive swine production is often more profitable because production occurs on a large scale.
c) Contracting can guarantee returns for swine operations.
   1) Often provide more regular payments to producers and generate a stable income.
      (a) Returns from feeder pig production are usually paid based on the number of pigs produced.
      (b) Returns for hog finishing are generally paid on a per pound basis.
      (c) Efficiency bonuses may also be available with some contracts.
   2) Producers will not be able to benefit from an increase in market prices because they are paid an agreed price.

6. Ask students what risks exist in swine production. Discuss the risks.

What risks are involved in swine enterprises?

a) Factors beyond the control of the producer can affect ability to operate.
   1) Dropping market prices
   2) Rising feed costs
   3) Increased competition
b) Management decisions can also lead to losses.
   1) Inefficient production
   2) Overextending the operation financially
c) Contract production reduces the risks associated with operating a swine enterprise.
   1) Protected from decreases in market prices for hogs and increases in feed costs
   2) Should be aware of factors that may affect returns
      (a) Financial health of the contractor
      (b) Terms of their contract
         (1) Termination clauses
         (2) Potential underutilization of swine facilities

F. ***Other Activities***

1. Have the students interview different swine producers. Have them discuss costs, resources, and risks.

2. Have the students conduct a survey of swine enterprises in the county. Have them determine what types of enterprises are operating in the area as well as their average size.

G. ***Conclusion***

The pork industry consists of farrow-to-finish, feeder pig, feeder pig finishing, and seedstock operations, but it is changing from independent production to vertically integrated corporations and contract production. Swine production systems need markets, land, labor, capital, and management resources to be successful. Capital requirements may be very high in swine production and are related to the type of operation, the number of head being raised, and the amount of technology used in the operation. Labor requirements will vary based on the same factors. Proper management and wise business practices are necessary to make a profit and reduce risk.

H. ***Answers to Activity Sheet***

AS 4.1

Answers will vary depending on the results of the activity.

AS 4.2

Answers will vary depending on the results of the activity.

I. ***Answers to Evaluation***

1. b
2. d
3. c
4. a
5. a
6. b
7. c
8. d
9. Inefficient production and overextending the operation financially
10. Because of the large scale of production

11. The integrator owns the pigs and supplies feed, medications, and recommendations for management, while the producer provides land, facilities, utilities, labor, and management.

12. More capital is required to invest in quality purebred breeding stock.

UNIT II - ENTERPRISES

Name_____

Lesson 4: Swine Enterprises

Date_____

EVALUATION

Match the enterprise on the right with the description on the left.

1. _____ Maintain a breeding herd and sell weaned pigs
2. _____ Produce genetically superior boars and gilts for sale for breeding herds
3. _____ Raise hogs from a weight of 40 pounds
4. _____ Raise hogs from birth until market weight

a. Farrow-to-finish enterprises
b. Feeder pig enterprises
c. Feeder pig finishing enterprises
d. Seedstock enterprises

Circle the letter that corresponds to the best answer.

5. Why do farrow-to-finish operations generally require a larger capital investment?

   a. They are involved in every phase of production.
   b. They are always large confinement operations.
   c. They require a lot of land.
   d. They use automated feeders and water systems.

6. Which type of swine enterprise requires the least amount of specialized labor?

   a. Farrow-to-finish enterprises
   b. Feeder pig finishing enterprises
   c. Feeder pig enterprises
   d. Seedstock enterprises

7. Which of the following enterprises has the lowest feed costs in terms of the total costs of the operation?

   a. Farrow-to-finish enterprises
   b. Feeder pig finishing enterprises
   c. Feeder pig enterprises
   d. None; feed costs are equal.

8. Raising hogs in confinement can reduce the amount of _____ needed.

   a. Feed
   b. Management
   c. Breeding stock
   d. Handling

Complete the following short answer questions.

9. List two aspects of management that can lead to financial losses.

   a.

   b.

10. Why are large intensive swine enterprises often more profitable than smaller enterprises?

11. What is supplied by an integrator and by the producer in contract production?

12. Why are animals a significant expense for seedstock producers?

Lesson 4: Swine Enterprises Name _____

Describing Swine Enterprises

Objective: Recognize aspects of different types of swine enterprises.

Complete the following table by adding information describing each type of swine enterprise discussed in the lesson.

	Farrow-to-Finish Enterprises	Feeder Pig Enterprises	Feeder Pig Finishing Enterprises	Seedstock Enterprises
Main goal				
Breeding herd? (Y/N)				
Phases of production requiring labor				
Need for skilled labor? (Y/N)				
Vertically integrated? (Y/N)				
Confinement systems? (Y/N)				

Lesson 4: Swine Enterprises Name _____

Preparing a Swine Enterprise Budget

Objective: Select a swine enterprise and prepare a budget for it.

Select a type of swine enterprise. Obtain information from an Extension *Farm Planning Handbook* or other Extension publications, Internet resources, parents, or the records of your or a fellow student's SAE program. Prepare a budget using the form given. You may use all of the items or just the items related to your enterprise.

Type of enterprise: _____

	Per Animal	Source of Information
Operating Costs		
Commercial feed (_____lb. × $ _____/lb.)		
Grain (_____lb. × $ _____/lb.)		
Total Feed Costs		
Veterinary and medicine		
Livestock materials and services		
Equipment operation and machine hire		
Utilities, insurance, and misc.		
Personal property taxes		
Real estate repairs and maintenance		
Operating interest (9%)		
(1) Total Operating Costs (except labor)		
Ownership Costs		
Real estate interest, depreciation, and taxes		
Interest on breeding herd		
Machinery, equip. interest and depreciation		
(2) Total Fixed Costs		
(3) Labor Costs (_____ hrs. @ $_____/hr.)		
(4) Total Costs (Line 1+2+3)		
(5) Income (_____lb. × $ _____/lb.)		
Income over Total Costs (Line 5 - 4)		

UNIT II - ENTERPRISES

Lesson 5: Sheep Enterprises

Competency/Objective: Select a sheep enterprise based on available resources.

Study Questions

1. **What are the types of sheep enterprises?**
2. **What resources are needed for sheep enterprises?**
3. **What are the capital requirements for sheep enterprises?**
4. **What are the labor requirements for sheep enterprises?**
5. **What are the returns for sheep enterprises?**
6. **What risks are involved in sheep enterprises?**

References

1. *Advanced Livestock Production and Management* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit II.
2. Activity Sheets
   a) AS 5.1: Preparing a Sheep Enterprise Budget
   b) AS 5.2: Resources Necessary for Sheep Enterprises

UNIT II - ENTERPRISES

Lesson 5: Sheep Enterprises

TEACHING PROCEDURES

A. ***Review***

Lesson 4 discussed the different types of swine enterprises. Unlike swine, the sheep industry is not yet experiencing a trend toward vertical integration. Instead, many individual producers raise sheep, either on the open range in the western part of the nation or in farm flocks, which are often relatively small. Farm flock commercial lamb enterprises are the most common type of enterprise found in Missouri.

B. ***Motivation***

Ask students how often they eat lamb, in comparison with beef, pork, and poultry products. What effect does this have on the sheep industry? Then ask them how often they wear wool clothing and discuss the demand for wool.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Discuss the different types of sheep enterprises, contrasting range production with the farm flock production commonly carried out in Missouri.

What are the types of sheep enterprises?

a) Range production
   1) Occurs in the western Plains region of the country
   2) Consists of large flocks of sheep grazing on open rangeland
   3) Have a few breeding flocks that produce lambs
   4) Sell lambs following weaning for finishing by other range producers or on a feedlot
b) Farm flock production
   1) Found in Missouri
   2) Consists of smaller flocks that are raised on much less acreage
   3) Seedstock operations
      (a) Produce purebred sheep for sale to commercial producers as commercial rams and replacement ewes
      (b) Maintain a quality purebred breeding flock
      (c) Select the best offspring for addition to breeding herd or for sale to commercial producers
      (d) Lambs culled from the herd as market lambs
   4) Commercial lamb production
      (a) Most common type of sheep enterprise in Missouri
      (b) Concerned with raising quality lambs for meat production
      (c) Maintain a breeding herd of crossbred ewes and purebred rams
      (d) Most commonly raise lambs from birth to market
         (1) Pasture
         (2) Partial confinement system combining pasturing with dry lots
      (e) Raise lambs from birth to weaning and then sell them to feeder lamb finishers
      (f) Market cull ewes and rams
   5) Wool
      (a) Shear sheep and market the wool.

(b) Raise hair breeds to eliminate the need to shear the flock.

2. Ask students to list the basic resources needed for sheep enterprises. Discuss the specific resources needed.

What resources are needed for sheep enterprises?

a) Markets
   1) Larger producers will need markets where they can sell large numbers of lambs to processors at one time.
   2) Producers with smaller flocks can sell a limited number of lambs directly to consumers by working with a local meat processor.

b) Land
   1) The amount of land needed depends on the size and type of enterprise.
   2) Ewe flocks may be on pasture four to eight months of the year and either forage on residue or occupy a dry lot for the rest of the year.
   3) Land does not have the same forage quality requirements as the pasture needed for other livestock; sheep graze on shrubs and other plants that cattle or horses may find unpalatable.
   4) The number of ewes per acre depends on pasture quality and management and the amount of rainfall.

c) Labor
   1) Amount of labor depends on the type and intensity of the production system.
   2) Labor needs can be high, particularly during lambing.

d) Capital
   1) Land and labor requirements affect the amount of capital needed.
   2) Amount of capital increases as the number of head increases.

e) Management
   1) Wise management is required to oversee the other resources of the operation and to prevent large death losses.
   2) Management is especially important in purebred operations to ensure the production of quality animals.

3. Ask students what aspects of production would require capital. Discuss the costs of sheep enterprises.

What are capital requirements for sheep enterprises?

a) Sheep generally require a lower initial investment to begin production in comparison to other livestock species.
   1) Require adequate but relatively simple facilities
   2) Supply most of their feed from pasture
   3) Relatively low annual operation costs
   4) Capital requirements - depend on type of enterprise, number of head per farm, and cost of feed and labor

b) Sheep enterprises have both fixed ownership costs and variable operating costs.
   1) Fixed costs
      (a) Real estate taxes
      (b) Depreciation
      (c) Interest
      (d) Breeding stock
   2) Variable costs
      (a) Feed
      (b) Labor
      (c) Medical costs
      (d) Marketing
      (e) Fuel

(f) Equipment repair and maintenance
(g) Utilities

c) Feed costs can equal up to 60 percent of the total costs of the operation.
   1) Utilize pasture as their primary feed supply
   2) Usually do not require large amounts of purchased feeds
   3) May further reduce feed costs by the production of forages and grains on site

d) Purchasing breeding stock is another significant expense.
   1) Purebred seedstock operations
      (a) Buy and maintain quality purebred breeding stock
      (b) Higher costs per animal than those of commercial lamb operations
   2) Commercial lamb producers - reduce the cost of breeding stock by purchasing older ewes of four to seven years of age

4. Ask students what time of the year would be the most labor intensive for sheep operations. Discuss labor needs for sheep operations.

What are labor requirements for sheep enterprises?

a) Generally not labor-intensive animals
   1) Relatively small
   2) Content on pasture

b) Able to maintain the operation using only family labor if the sheep enterprise is not large

c) May require hired labor for larger operations

d) May require additional labor on a seasonal basis
   1) Lambing
      (a) Someone may need to check on ewes and lambs three to five times a day, sometimes in the middle of the night.
      (b) Having an attendant present during lambing is especially important for purebred operations because of the potential value of the lambs.
   2) Shearing

5. Ask students what factors contribute to the profits of a sheep enterprise. Discuss returns for operations raising sheep.

What are the returns for sheep enterprises?

a) Commercial lamb enterprises
   1) Must generate enough returns from lambs, wool, and cull animals to exceed their expenses
   2) Most important profit factor - number of lambs weaned per ewe
   3) Other factors
      (a) Weaning percentage for the flock
      (b) Age at culling
      (c) Production costs
      (d) Death losses

b) Seedstock operations
   1) Require more time and capital to make a profit than a commercial operation
   2) May take up to five years
   3) Will need to keep better quality ewe lambs to build flock quality and quantity

6. Ask students to list risks for sheep operations. What is one risk for sheep enterprises that is not generally a concern with other types of livestock operations? Hand out AS 5.2.

What risks are involved in sheep enterprises?

a) Risk that they may not make a profit and may lose money

1) Inefficient management of either the animals or the financial aspects of an operation may result in losses.
2) Some factors that may affect profits are outside the control of even good managers.
   (a) Extremely hot weather affecting conception rates and pasture quality
   (b) Decreases in market prices

b) Risk of predation by dogs and coyotes
1) Sheep are easy prey because they have no way to defend themselves.
2) If predators are a problem, producers should provide protection for the flock.
   (a) Specially trained guard dogs
   (b) Electric fencing

F. *Other Activities*

Have students research sheep production in the United States to learn more about where sheep production is concentrated and the differences between open range and farm flock production.

G. *Conclusion*

Sheep are raised in Missouri in relatively small farm flocks in purebred seedstock operations and commercial lamb operations. Seedstock operation produce breeding stock for sale to commercial lamb operations that produce market lambs. Both types of operations produce wool. The basic resources needed by any sheep operation are markets, land, labor, capital, and management. Sheep production generally requires less capital than other livestock operations. However, additional workers may be needed, particularly during labor-intensive periods such as lambing and shearing. Sheep producers can make a profit, but they do experience some risk. A major area of risk that does not generally affect most other types of livestock operations is the threat of losses to predators.

H. *Answers to Activity Sheet*

AS 5.1

Answers will vary depending on the results of the activity.

AS 5.2

												1 M				
											2 L	A	N	D		
												R				
										3 F		K				
					4 C		5 L		6 R		E		E			
				7 M	A	N	A	G	E	M	E	N	T			
					P		B		T		D		8 S	I	X	T	Y
			9 C		I		O		U								
10 P			O		T		R		11 R	I	S	K					
R			Y		A				N								
O		12 W	O	O	L				13 S	E	A	S	O	N	A	L	
F			T														
14 I	N	T	E	R	E	S	T										
T																	
S																	

I. ***Answers to Evaluation***

1. b
2. c
3. c
4. d
5. b
6. d
7. Predation by dogs or coyotes
8. Because sheep graze on shrubs and other plants that cattle and horses may find unpalatable
9. To produce purebred sheep for sale to commercial producers as commercial rams and replacement ewes

UNIT II - ENTERPRISES Name_____

Lesson 5: Sheep Enterprises Date_____

EVALUATION

Circle the letter that corresponds to the best answer.

1. Feed costs can equal up to _____ percent of the total costs of the operation.

   a. 50
   b. 60
   c. 70
   d. 80

2. Up to how long may it take for seedstock operations to make a profit?

   a. 3 years
   b. 4 years
   c. 5 years
   d. 6 years

3. What is the most common type of sheep enterprise in Missouri?

   a. Range operation
   b. Feedlot
   c. Commercial lamb operation
   d. Seedstock operation

4. How can commercial lamb producers reduce capital expenses for breeding stock?

   a. Eliminate different phases of production
   b. Use commercial feed
   c. Purchase purebred animals
   d. Buy older ewes

5. Sheep enterprises require more labor to observe sheep during _____.

   a. Shearing
   b. Lambing
   c. Pasturing
   d. Marketing

6. What is the most important profit factor for commercial lamb enterprises?

   a. Death losses
   b. Weaning percentage for the flock
   c. Production costs
   d. Number of lambs weaned per ewe

Complete the following short answer questions.

7. What is a significant risk for sheep operations because sheep cannot defend themselves?

8. Why can the forage quality of some pastures be used for grazing sheep but would not be suitable for cattle or horses?

9. What is the purpose of seedstock enterprises?

Lesson 5: Sheep Enterprises Name_____

Preparing a Sheep Enterprise Budget

Objective: Select a sheep enterprise and prepare a budget for it.

Select either a commercial lamb operation or a seedstock operation. Obtain information from an Extension *Farm Planning Handbook* or other Extension publications, Internet resources, parents, or the records of your or a fellow student's SAE program. Prepare a budget for the operation. You may use all of the items or just the items related to your enterprise.

Type of enterprise: _____

	Per Animal	Source of Information
Gross Receipts		
Animal Sales (_____lbs. x $ _____/lb.)		
Wool Sales (_____lbs. x $ _____/lb.)		
Miscellaneous Income		
(1) Total Gross Receipts		
Operating Costs		
Feed		
Commercial, purchased		
Raised (grain)		
Pasture		
Total Feed Costs		
Veterinary and medicine		
Other livestock materials and services		
Machinery costs, feed preparation, etc.		
Utilities		
Other (insurance, property taxes, repairs)		
Operating interest (9%)		
(2) Total Operating Costs (Except Labor)		
(3) Labor (Operator, family, hired)		
(4) Total All Variable Costs (Line 2 + 3)		

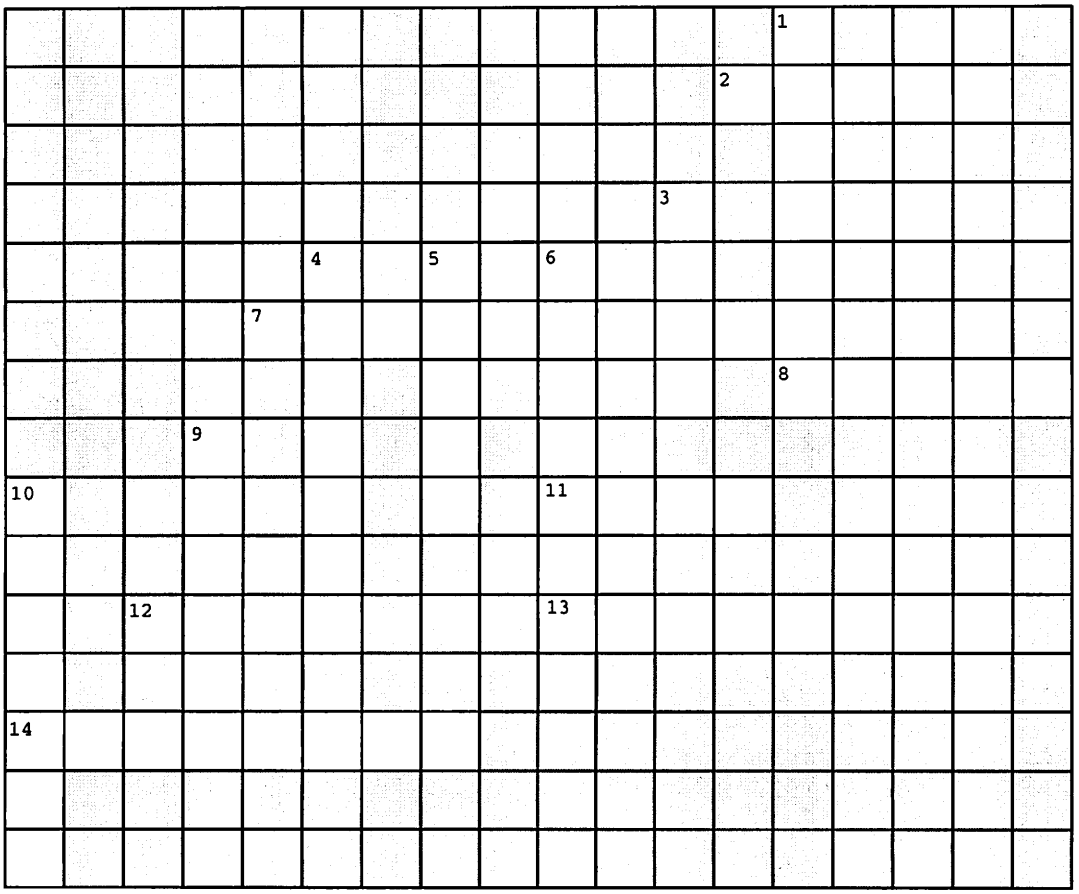
	Per Animal	Source of Information
Ownership Costs		
Real estate interest, depreciation, and taxes		
Breeding herd investment		
Machinery and equipment interest and depreciation		
(5) Total Fixed Costs		
(6) Total All Costs (Line 4 + 5)		
(7) Income above All Variable Costs (Line 1 - 4)		
Total Income above Total Costs (Line 1 - 6)		

Lesson 5: Sheep Enterprises Name_____

Resources Necessary for Sheep Enterprises

Objective: Identify important resources that are necessary for a successful sheep enterprise.

Complete the crossword puzzle below.



Across:

2. Range producers require more of this than farm flocks
7. Term applied to making business decisions
8. Percentage of total costs spent for feed
11. Factor that may affect profit or loss for an operation
12. Secondary product or income of the sheep industry
13. Type of hired labor for a sheep enterprise
14. Example of a fixed cost

Down:

1. Place where animals are sold
3. Largest variable cost
4. Money needed to finance a sheep enterprise
5. May be supplied by the family or hired
6. What is left after subtracting all costs from cash receipts
9. Major predator of sheep
10. Another word for returns

UNIT II - ENTERPRISES

Lesson 6: Horse Enterprises

Competency/Objective: Select a horse enterprise based on available resources.

Study Questions

1. **What are the types of horse enterprises?**
2. **What resources are needed for horse enterprises?**
3. **What are the capital requirements for horse enterprises?**
4. **What are the labor requirements for horse enterprises?**
5. **What are the returns for horse enterprises?**
6. **What are the risks involved in horse enterprises?**

References

1. *Advanced Livestock Production and Management* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit II.
2. Activity Sheets
   a) AS 6.1: Interviewing a Horse Producer
   b) AS 6.2: Horse Breeds

UNIT II - ENTERPRISES

Lesson 6: Horse Enterprises

TEACHING PROCEDURES

A. ***Review***

Lesson 5 described different types of sheep enterprises. Unlike the other animals discussed in this unit, horses are not raised for food in the United States. Usually people in the United States raise horses for recreation. Commercial horse enterprises are therefore more rare. However, some people do work with horses in breeding enterprises, boarding stables, training farms, and horse racing.

B. ***Motivation***

Have the students look through the phone book to find the number of horse enterprises in their area. What types of enterprises are they?

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Ask students how people can make a profit from raising or working with horses. Discuss different types of horse enterprises.

   What are the types of horse enterprises?

   a) Breeding enterprises
      1) Typically raise a specific breed of horse to sell
      2) Maintain a number of purebred breeding animals
      3) Raise the young horses until they are old enough to be sold, typically at two or three years of age or less
      4) Provide stud services
   b) Breeding and raising horses for racing
      1) Require more resources for production because of the specialized activities
      2) Keep a breeding herd
      3) Sell their yearlings to people interested in raising and racing their own horses
      4) Keep and race their horses themselves
      5) Provide stud services to owners of broodmares
   c) Other types of horse enterprises
      1) May not involve ownership of horses
      2) Provide special services for other people's animals
      3) Training farms - centers for training horses for specialized purposes, such as racing or show
      4) Boarding stables - house and often care for horses whose owners cannot or do not want to do so

2. Ask students what resources are needed to maintain a horse or group of horses. What special needs do horses have?

   What resources are needed for horse enterprises?

a) Markets
   1) Breeding enterprises
      (a) Determine the potential sales for the breed of horses they choose to raise
      (b) Breeders of race horses - must determine whether a market exists because they are more expensive
   2) Horse trainers - decide whether a market exists for their specialized services
   3) Boarding stables - tend to be located near urban areas
b) Land
   1) Varies depending on the nature and size of the horse enterprise
   2) Require a certain amount of land to meet the needs of horses that graze and exercise on pasture
   3) Less land needed if other sources of feed and exercise are supplied
c) Labor
   1) Depends on number of horses being maintained and the amount of land owned
   2) Needed to provide exercise for horses on a daily basis with less land
d) Capital
   1) Depends on the type of horse enterprise
   2) Initial investment for a horse - often expensive, especially purebred animals used for racing, showing, or breeding
   3) May require a sizable investment for land, facilities, and equipment
e) Management - must keep losses to an absolute minimum because of the capital outlay needed to purchase and maintain a horse

3. Ask students how much they think the price of a horse varies. What other costs are involved in raising horses?

What are the capital requirements for horse enterprises?

a) Can vary greatly
   1) Operations for breeding or raising racehorses - average of about $250,000 in investments in land, facilities, equipment, and horses
   2) Horse training operations - average investments of $183,000
   3) Horse businesses - average investment of $80,000 in facilities, equipment, and supplies, which did not include land and horse investment
   4) Owners with hobby interests - investments in facilities, equipment, and supplies that averaged $20,000
b) Variety of fixed ownership costs and variable operating costs
   1) Operating costs
      (a) Feed
      (b) Medical costs
      (c) Utilities
      (d) Tack and supplies
      (e) Bedding
      (f) Labor
      (g) Fuel
      (h) Repairs on equipment
   2) Fixed ownership costs
      (a) Insurance
      (b) Taxes
      (c) Interest
      (d) Depreciation
c) Feed
   1) Feed costs lower with suitable pasture or cropland for growing forages for harvest
   2) Reduce amount of expensive commercial feed purchased
d) Facilities
   1) Provide safe, well-maintained, functional facilities

(b) May provide more elaborate barns with a number of individual stalls for stabling horses, depending on the size and nature of the operation

2) Special facilities like tracks for exercising horses on operations with racehorses

e) Maintaining a breeding herd
   1) Quality registered purebred animals - $3,000 to $5,000 for the least expensive
   2) Annual cost of maintaining a broodmare in commercial production - estimated at $3,500
   3) Yearling production - between $5,000 and $6,000

f) Boarding stables
   1) Varying levels of expenses depending on the level of services
   2) Full-care board - stall cleaning, feeding, grooming, and exercise, perhaps even training
   3) Self-care stables - services provided by horse owners, as well as paying for their own feed and bedding

4. Ask students what special needs of horses contribute to the amount of labor involved in maintaining a horse. Discuss the labor needed to care for horses.

   What are the labor requirements for horse enterprises?

   a) Labor needs involve exercising, feeding, and grooming the animals.
   b) Pasture management and upkeep will require some labor, as will harvesting hay for feeding.
   c) In many cases, the owner carries out these activities.
   d) Larger operations and operations with special services may hire workers.
   e) Speciality animals require greater amounts of labor for training.
   f) Employees in horse enterprises should be skilled in working with horses.

5. Discuss the returns generated by horse enterprises.

   What are the returns for horse enterprises?

   a) Produce returns that are higher than the amount paid out for expenses.
   b) Racehorse owners and some participants in equestrian competitions have the potential to earn valuable show winnings.
   c) Specialty breeders can make a large profit.

6. Ask students what the risks of horse production are. Why is performance such an important factor? Have students complete AS 6.1 and AS 6.2.

   What are the risks involved in horse enterprises?

   a) Any horse enterprise can suffer large financial losses because of poor management of horses and unsound business practices.
      1) Poor care can result in a horse that is unable to perform, leading to a loss of the capital invested in the animal.
      2) Good financial management is also necessary to avoid overextending the horse operation.
   b) Owners of speciality animals face additional risk that a horse may not perform well enough to cover the high cost of their training and care.

F. ***Other Activities***

Have students interview different horse producers in the area. Have them discuss the reasons they decided to become involved in the business and what the benefits are.

G. ***Conclusion***

In the United States, horses are primarily raised on a small scale for recreation, but some people do raise or work with horses as a business. Resources such as markets, land, labor, capital, and management are needed for horse enterprises. Capital is necessary; horses themselves are expensive, as well as the facilities and feed. Horses need special care, so the labor needs of horse enterprises can be high. In some cases, specialty breeders, racers, and equestrians can make a large profit from show winnings. The biggest risk involved in horse ownership is losing money, which may occur if horses are not managed effectively and perform poorly.

H. ***Answers to Activity Sheet***

AS 6.1

Answers will vary depending on the results of the activity.

AS 6.2

Answers will vary depending on the results of the activity.

I. ***Answers to Evaluation***

1. b
2. b
3. Poor management of horses and unsound business practices

4. Because of the capital outlay needed to purchase and maintain a horse, good management is necessary to keep losses to a minimum.

5. Answers may include any three of the following: feed, medical costs, utilities, tack and supplies, bedding, labor, fuel, and repairs on equipment.

6. The goal for any horse enterprise is to produce returns that are higher than the amount paid out for expenses.

7. Grooming, feeding, and exercising

8. Maintaining a number of purebred breeding animals, raising the young horses until they are old enough to be sold, and providing stud services

UNIT II - ENTERPRISES Name_____

Lesson 6: Horse Enterprises Date_____

EVALUATION

Circle the letter that corresponds to the best answer.

1. In a 1992 study, the horse businesses surveyed had an average investment of _____ in facilities, equipment, and supplies.

   a. $10,000
   b. $80,000
   c. $180,000
   d. $250,000

2. What is the estimated annual cost of maintaining a broodmare in commercial production?

   a. $3,000
   b. $3,500
   c. $4,000
   d. $4,500

Complete the following short answer questions.

3. List two factors that can contribute to the risk of financial losses for a typical horse enterprise.

   a.

   b.

4. Why is good management a very important resource for horse enterprises?

5. List three operating costs of horse enterprises.

   a.

   b.

   c.

6. What is the goal for returns for horse enterprises?

7. What are three general horse care activities that require labor?

   a.

   b.

   c.

8. What three activities are involved in running a typical breeding enterprise?

   a.

   b.

   c.

Lesson 6: Horse Enterprises Name _____

Interviewing a Horse Producer

Objective: Understand the requirements for a successful horse enterprise.

Select a horse producer in your area. Arrange an appointment to interview the producer, either in person or over the telephone. Seek answers to the following questions. Be sure to thank the producer for his or her time.

1. What is your horse enterprise like? (Size, type of operation, etc.)

2. How did you become involved in this type of horse enterprise?

3. What markets exist in your area for horse enterprises?

4. What challenges face a horse enterprise?

5. Do you hire any labor for your enterprise? If so, what qualifications and/or experience do you look for in an employee?

6. How much time each week would you estimate is spent on management activities for your enterprise? (The answer may be described as a percentage.)

7. What are your busiest times during the year? Why?

8. What advice would you give a young person thinking of beginning a horse enterprise?

Lesson 6: Horse Enterprises Name _____

Horse Breeds

Objective: Prepare a report about a chosen breed of horse.

Select a horse breed and prepare a report about that breed using various sources, such as the Internet, textbooks, and encyclopedias. The report should include the information listed below. List the sources of the information in the report.

- Name of the breed
- History of its development
- Characteristics (coloring, size, etc.)
- Uses (racing, show, working, etc.)
- Importance to the horse industry (giving numbers, if possible)
- Main geographic location (if any)
- Location of the breed association

UNIT II - ENTERPRISES

Lesson 7: Poultry Enterprises

Competency/Objective: Select a poultry enterprise based on available resources.

Study Questions

1. **What types of poultry enterprises exist?**
2. **What types of resources are needed for poultry enterprises?**
3. **What are the capital requirements for poultry enterprises?**
4. **What are the labor requirements for poultry enterprises?**
5. **What are the returns for poultry enterprises?**
6. **What risks are involved in poultry enterprises?**

References

1. *Advanced Livestock Production and Management* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit II.
2. Activity Sheet
   a) AS 7.1: Poultry Enterprise Internet Search

UNIT II - ENTERPRISES

Lesson 7: Poultry Enterprises

TEACHING PROCEDURES

A. ***Review***

Lesson 6 described the enterprises that make up the horse industry. The poultry industry is very different; rather than having many independent producers, production is concentrated in large vertically integrated corporations. A few smaller farms exist that produce poultry products for niche markets. However, most poultry producers work with the integrators.

B. ***Motivation***

Have students go to the grocery store and determine how many different brands of poultry and processed poultry products are available to them. Discuss vertical integration as it relates to their findings.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Have students list the major poultry products they saw in the grocery store. What sorts of enterprises would produce such products?

   What types of poultry enterprises exist?

   a) Commercial egg production
      1) Production involves maintaining a flock of laying hens.
      2) Range in size from 5 thousand to 2 million hens.
      3) Collect and store the eggs at the operation before being shipped for market.
      4) Keep hens until egg production becomes unprofitable then sell as souper chickens.
   b) Broiler and turkey production
      1) Involves raising large batches of birds until they reach market weight
      2) Sold for their meat
      3) 25,000 to 170,000 birds per flock with five to six flocks produced annually
   c) Almost all egg and meat production
      1) Done under contract in a vertically integrated poultry operation; a poultry processor or egg producing firm contracts with individual producers who manage the birds
      2) Provides contract growers the opportunity to participate in poultry production while allowing integrators to ensure a steady supply of their product and invest more money in processing and marketing
      3) Responsibilities
         (a) Grower - buildings, equipment, litter, utilities, and labor
         (b) Contracting firm - birds, feed, medication, and supervisory personnel to oversee production
      4) Advantages
         (a) Less risk
         (b) Fewer management responsibilities
         (c) Less operating capital
         (d) Management decisions and costs covered by the integrator

5) Disadvantages
   (a) Large investment required to begin production
   (b) Will need to make improvements in feeding, heating, watering, and ventilation systems to keep up with technological changes and increasing costs
   (c) Limited control over the birds and feeding system supplied to his or her operation
   (d) Less independence for the producer in the management of the operation

2. Ask students what resources are used to produce poultry. Discuss the resource requirements of the poultry industry.

What types of resources are needed for poultry enterprises?

a) Markets
   1) Markets for poultry products are generally dominated by the large integrated poultry operations.
      (a) Producers consider whether a market exists for their services with an integrated operation.
      (b) Integrators are more interested in contract growers located close to their centers of operation.
   2) Producers who plan to sell their products in niche markets must be sure that their product is marketable in their area.

b) Land
   1) Poultry production systems require relatively little land.
      (a) Birds fairly small
      (b) Raised in large poultry houses
   2) Locating the operation away from populated areas is desirable.

c) Labor
   1) Producer's family may be able to provide sufficient labor.
   2) Additional employees may need to be hired by the producer, depending on the type and size of the operation.

d) Capital
   1) Capital requirements for poultry operations can be high.
   2) Specialty phases of production such as breeding and hatcheries require expensive incubation systems and breeding equipment.

e) Management
   1) Poultry producers must be good managers to make a profit.
   2) Some assistance in management is provided by the supervisory personnel assigned to the grower by the integrator.
   3) Service people may assist the grower in making management decisions not covered by the contract.

3. Ask students what expenses a producer should have to begin production. Describe the capital requirements for poultry enterprises.

What are the capital requirements for poultry enterprises?

a) Capital is required to purchase land, build facilities, and buy the equipment needed for production.

b) Capital is needed to meet the annual fixed ownership and variable operating costs of the operation.
   1) Ownership costs
      (a) Interest
      (b) Taxes
      (c) Depreciation
   2) Operating costs
      (a) Labor

(b) Litter
(c) Fuel
(d) Utilities
(e) Supplies
(f) Repairs

c) Costs of an enterprise will vary depending on the type and size.
   1) Broiler house with 20,000 square feet of space equipped with fans and feeding, watering, and brooding equipment
      (a) Costs between $100,000 and $110,000
      (b) Five or six houses on a typical operation
      (c) Annual costs of running each house between $20,000 and $25,000
   2) Commercial egg operations with 50,000 hens - may require more than $1 million

4. Have students describe the activities involved in poultry production. Discuss the labor needs of poultry enterprises and the effect of automation.

What are the labor requirements for poultry enterprises?

a) The poultry producer and his or her family may be able to provide all of the labor required for some enterprises.
b) Automation can reduce the amount of labor required per bird.
   1) One person with automated equipment - 20,000 broilers per hour
   2) One person with mechanical feeding and egg collection equipment - more than 100,000 layers
c) Full- or part-time hired labor may be required for larger operations and during management-intensive phases of production.
d) The producer should provide any training required by workers to ensure they perform their duties efficiently and safely.

5. Discuss the returns generated by poultry enterprises.

What are the returns for poultry enterprises?

a) Most contracts set a rate at which producers are paid.
   1) Egg producers
      (a) Paid a fixed amount per layer or per dozen eggs produced
      (b) Bonuses for efficient feed conversion, low death losses, or high numbers of salable eggs
   2) Broiler producers
      (a) Paid a return based on the number of birds or the number of pounds of usable meat produced
      (b) Bonuses for good feed conversion rates, low mortality, and high numbers of usable broilers
b) Bonuses depend on good management skills.

6. Ask students what sorts of risks a poultry producer may face. Hand out AS 7.1.

What risks are involved in poultry enterprises?

a) Contracts
   1) Reduced risks for production and loss of income
   2) Provide a fixed minimum income
   3) Insulate producers somewhat from price changes in the market
b) Must rely on the contract being renewed to be able to pay off loans and other debts

F. ***Other Activities***

1. Have students create a profile of a poultry producer in their area.

2. Have students research a major poultry corporation in the United States or Missouri. Have them determine which corporation generates the most income, has the highest production, and is the oldest.

G. ***Conclusion***

The three most common types of poultry operations are commercial egg, broiler, and turkey enterprises. For all three enterprises, production most commonly occurs under contract with an integrator. Capital requirements are generally high, while automation tends to reduce the labor requirements. Returns for contract growers are based on production, with minimum returns guaranteed and a possibility to receive bonuses. Risks are reduced in contract production, but the contract must be renewed for the producer to pay off debts.

H. ***Answers to Activity Sheet***

Answers will vary depending on the results of the activity.

I. ***Answers to Evaluation***

1. b
2. d
3. b

4. They provide a fixed minimum income and insulate producers somewhat from price changes in the market.

5. They need to consider whether a market exists for their services with an integrated operation because integrators are usually only interested in contract growers located close to their centers of operation.

6. Raising large batches of birds until they reach market weight and are sold for their meat

7. Because the birds are fairly small and are raised in large poultry houses

8. Answers may include any two of the following: buildings, equipment, litter, utilities, and labor.

UNIT II - ENTERPRISES

Name_____

Lesson 7: Poultry Enterprises

Date_____

EVALUATION

Circle the letter that corresponds to the best answer.

1. Annual costs of running a broiler house may range between:

   a. $10,000 and $15,000.
   b. $20,000 and $25,000.
   c. $30,000 and $35,000.
   d. $40,000 and $45,000.

2. With mechanical feeding and egg collection equipment, one person is able to care for _____ layers.

   a. 25,000
   b. 50,000
   c. 75,000
   d. 100,000

3. In egg production, contract growers may be paid a fixed amount per _____.

   a. Death loss
   b. Dozen eggs produced
   c. Pound of eggs produced
   d. Pound of meat produced

Complete the following short answer questions.

4. How do contracts decrease risks for production and loss of income?

5. What do prospective poultry producers need to consider if they are interested in marketing their services to an integrator?

6. What is involved in broiler and turkey production?

7. Why do poultry production systems require relatively little land?

8. List two components the grower is responsible for providing under contract production.

   a.

   b.

Lesson 7: Poultry Enterprises Name_____

Poultry Enterprise Internet Search

Objective: To research poultry enterprises using the Internet.

Searching the Internet, look for four websites that contain useful information relating to poultry enterprises. Write a brief summary of the information found at each site.

Website: www._____

Information provided:

Website: www._____

Information provided:

Website: www._____

Information provided:

Website: www._____

Information provided:

UNIT III - SELECTION

Lesson 1: Livestock Terminology

Competency/Objective: Use correct terminology for each species.

Study Questions

1. **What are the basic parts and terms for beef cattle?**
2. **What are the basic parts and terms for dairy cattle?**
3. **What are the basic parts and terms for swine?**
4. **What are the basic parts and terms for sheep?**
5. **What are the basic parts and terms for horses?**
6. **What are the basic parts and terms for poultry?**

References

1. *Advanced Livestock Production and Management (Student Reference).* University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit III.
2. Transparency Masters
   a) TM 1.1a: Parts of a Beef Steer
   b) TM 1.1b: Parts of a Beef Steer
   c) TM 1.2a: Parts of a Dairy Cow
   d) TM 1.2b: Parts of a Dairy Cow
   e) TM 1.3a: Parts of a Pig
   f) TM 1.3b: Parts of a Pig
   g) TM 1.4a: Parts of a Sheep
   h) TM 1.4b: Parts of a Sheep
   i) TM 1.5a: Parts of a Horse
   j) TM 1.5b: Parts of a Horse
   k) TM 1.6a: Parts of a Chicken
   l) TM 1.6b: Parts of a Chicken
3. Activity Sheet
   a) AS 1.1: Livestock Terminology

UNIT III - SELECTION

Lesson 1: Livestock Terminology

TEACHING PROCEDURES

A. ***Introduction***

Farm managers must have the ability to select sound livestock and poultry. Selection of sound, productive animals will contribute to the overall production and well-being of the herd or flock.

B. ***Motivation***

Ask students to break into groups and assign each group a livestock species. Have them do research to identify the terminology of external body parts. Give each group a piece of poster board on which to draw their species and label the parts. Then have them present their findings to the class.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Ask students to list the parts of beef cattle that are obvious to them, such as the muzzle or neck. Move on to areas that are less familiar, such as the heart girth.

   What are the basic parts and terms for beef cattle?

   a) Head region - muzzle, face, forehead, poll, neck, and throat
   b) Along the spine back from the head - top of shoulder, crops, foreribs, back, loin, hip or hook, pin bones, rump, tail head, and switch
   c) Body - dewlap, brisket, shoulder, foreflank, barrel, belly, ribs, heart girth, cod (or udder, in the female), rear flank, quarter, and twist
   d) Front leg - forearm, knee, cannon, dewclaw, pastern, and hoof
   e) Rear leg - hock, pastern, dewclaw, and hoof

2. Discuss the differences between the commercially important external parts of a dairy cow and beef cattle. What are the similarities?

   What are the basic parts and terms for dairy cattle?

   a) Head region - muzzle, face, forehead, poll, neck, and throat
   b) Back along the spine - back, chine, loin, hip or hook, rump, thurl, pin bones, tail head, and switch
   c) Body - dewlap, brisket, shoulder, barrel, ribs, heart girth, and rear flank
   d) Front leg - forearm, knee, cannon, dewclaw, pastern, and hoof
   e) Rear leg - hock, pastern, dewclaw, and hoof
   f) External milk-yielding parts - teats, fore udder, fore udder attachment, rear udder, rear udder attachment, mammary veins, and milk wells

3. Ask students which body parts of swine they think the average lay person who does not study agriculture would be able to identify. Which can they (as future agriculture experts!) describe?

   What are the basic parts and terms for swine?

   a) Head area - neck, jowl, snout, face, and poll

b) Down the spine from the head - top of shoulder, back, loin, rump, and tail
c) Along the side - shoulder, side, and ham
d) Along underside - foreflank, belly, rear flank, and stifle
e) Front leg - knee, pastern, dewclaw, and toe
f) Rear leg - hock, dewclaw, pastern, and toe

4. Discuss the basic parts of sheep in comparison with the other species already discussed. What are the similarities and differences?

What are the basic parts and terms for sheep?

a) Head region - poll, forehead, face, muzzle, and neck
b) Along the spine - top of shoulder, back or rack, loin, hip, rump, and dock
c) Midsection of the body: breast or brisket, shoulder, side or middle, thigh, and twist
d) Underside - foreflank, belly, and rear flank
e) Front leg - forearm, cannon, pastern, dewclaw, and hoof
f) Rear leg - hock, pastern, dewclaw, and hoof

5. Discuss the complex structure of a horse's legs and body. Ask students what similarities and differences exist between horses and other livestock.

What are the basic parts and terms for horses?

a) Head and neck region - neck, throat latch, muzzle, cheek, face, forehead, poll, and crest
b) Along the spine - withers, back, loin, rump or croup, and tail
c) Midsection - point of shoulder, shoulder, chest, forearm, heart girth, barrel, point of hip, thigh, and buttock
d) Underside - abdomen, flank, and stifle
e) Front leg - elbow, forearm, chestnut, knee, cannon, ergot, fetlock, pastern, coronet, and hoof
f) Back leg - gaskin, hock, cannon, fetlock, pastern, coronet, and hoof

6. Discuss the simple parts of a chicken first, then move on to the more complex external parts. What are the similarities and differences of chickens in comparison to mammalian livestock? After completing the discussion, have students work on AS 1.1.

What are the basic parts and terms for poultry?

a) Head - ears, earlobes, beak, comb, and wattles
b) Parts of comb - base, points, and blades
c) Neck - hackle
d) Back area - cape, back, and saddle
e) Wing feathers - primary, or flight, feathers and secondary feathers
f) Body parts - breast, shoulder, wing bow, and the main tail feathers
g) Leg - thigh, shank, hock, spur, feet, toes, and toenails

F. ***Other Activities***

1. Use the diagrams made by the students for the motivation to play a game. Lay the diagrams on the floor and cover up the labels. Have students break into teams and take turns tossing chips or coins onto the diagrams. Wherever the chip lands, the student has to name the external body part for one point. If the chip lands outside the actual diagram then they have to name the part that the chip is closest to. If the chip lands completely off the poster board, they lose their turn.

2. Play Body-Part Bingo. Have students make up their own bingo cards that have names of the external body parts of a particular species in each square. To play, instead of calling off the names of the parts, point to the parts on an unlabeled diagram, slides, pictures of livestock, etc.

3. Have students perform an agricultural literacy quiz on their peers who are not in agriculture classes. Have them break into teams, assign each team a livestock species, and have each member of the team ask his or her peers who are not involved in agriculture what the names of the parts are. Have the teams combine their data and give a brief presentation about what was common knowledge and the most common mistakes.

G. ***Conclusion***

While some species have the same body parts, they often have parts that are distinct to their species. Familiarity with the basic body parts and terms of livestock and poultry is necessary to better select animals. Better selection can improve the herd or flock and ultimately improve production.

H. ***Answers to Activity Sheet***

Refer to the figures in the Student Reference for the answers.

I. ***Answers to Evaluation***

1. a
2. a
3. d
4. b
5. d
6. Chicken's comb
   a) x
   b) y
   c) z
7. Swine
   a) d
   b) b
   c) a
   d) c
   e) e
8. Dairy cow
   a) b
   b) a
   c) c
9. Horse
   a) a
   b) c
   c) e
   d) d
   e) b
10. Sheep
    a) a
    b) d
    c) c
    d) e
    e) b

UNIT III - SELECTION

Name _____

Lesson 1: Livestock Terminology

Date _____

EVALUATION

Circle the letter that corresponds to the best answer.

1. When observing a dairy cow, in what region is the poll located?

   a. Head
   b. Udder
   c. Foreleg
   d. Midsection

2. In beef and dairy cattle, which of the following parts is found on the rear legs but not on the front legs?

   a. Hock
   b. Pastern
   c. Hoof
   d. Dewclaw

3. Which of the following is located along the spine of a beef steer?

   a. Cod
   b. Brisket
   c. Flank
   d. Loin

4. In poultry, what is the neck area called?

   a. Cape
   b. Hackle
   c. Sickle
   d. Crest

5. Which of the following is a type of feather found in the wing's of a chicken?

   a. Hackle
   b. Sickle
   c. Saddle
   d. Primary

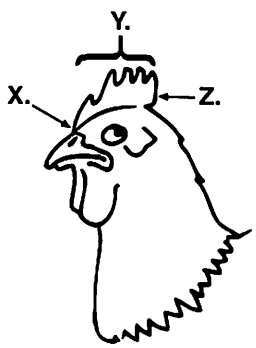
For each of the diagrams below, write the letter of the part in the blank next to the name of that part.

6. Chicken's comb

   a. _____ Base

   b. _____ Points

   c. _____ Blade



7. Swine

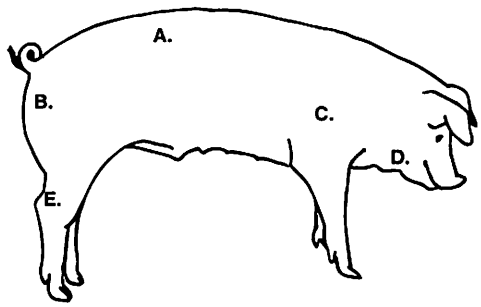
a. _____ Jowl

b. _____ Ham

c. _____ Loin

d. _____ Shoulder

e. _____ Hock

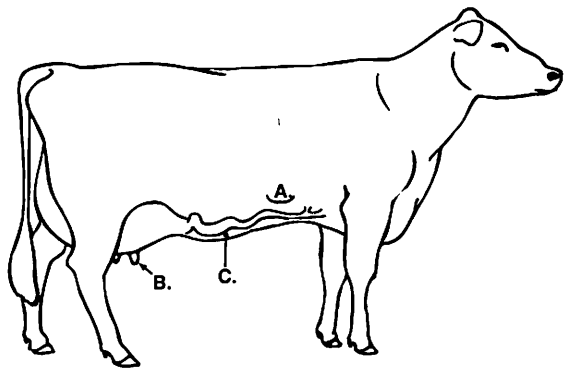


8. Dairy cow

a. _____ Teat

b. _____ Milk well

c. _____ Mammary vein



9. Horse

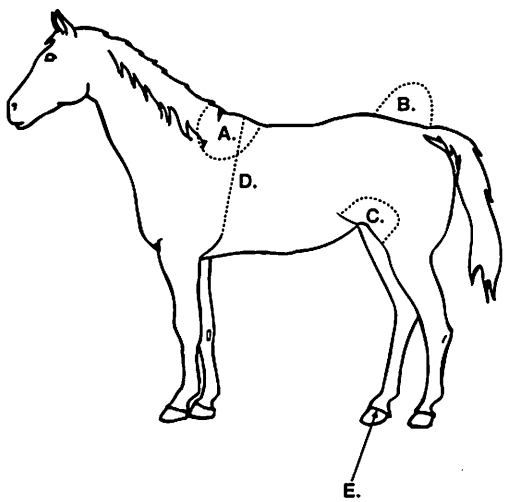
a. _____ Withers

b. _____ Stifle

c. _____ Coronet

d. _____ Girth

e. _____ Croup



10. Sheep

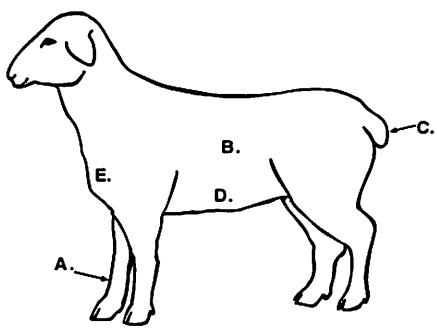
a. _____ Cannon

b. _____ Belly

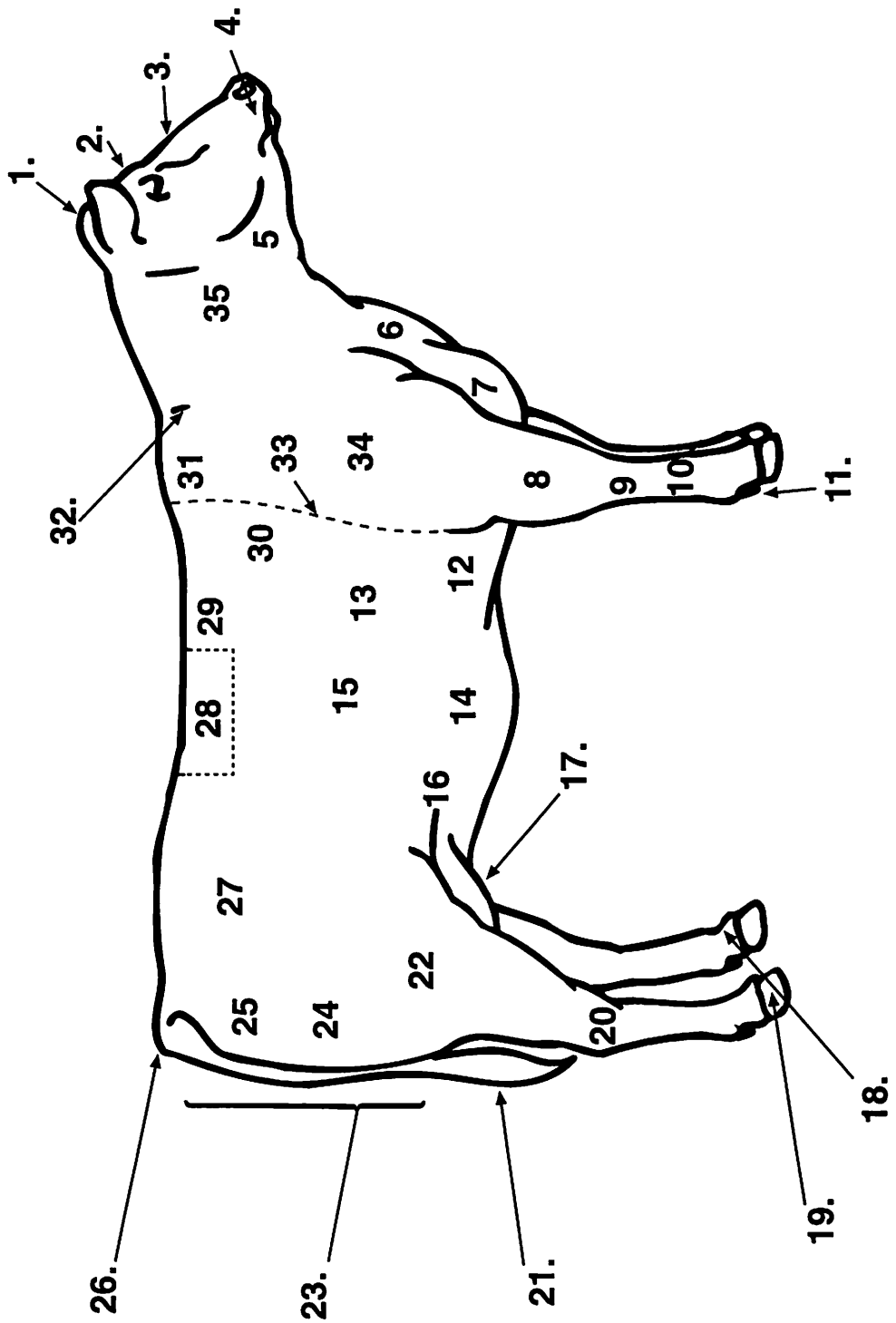
c. _____ Dock

d. _____ Breast

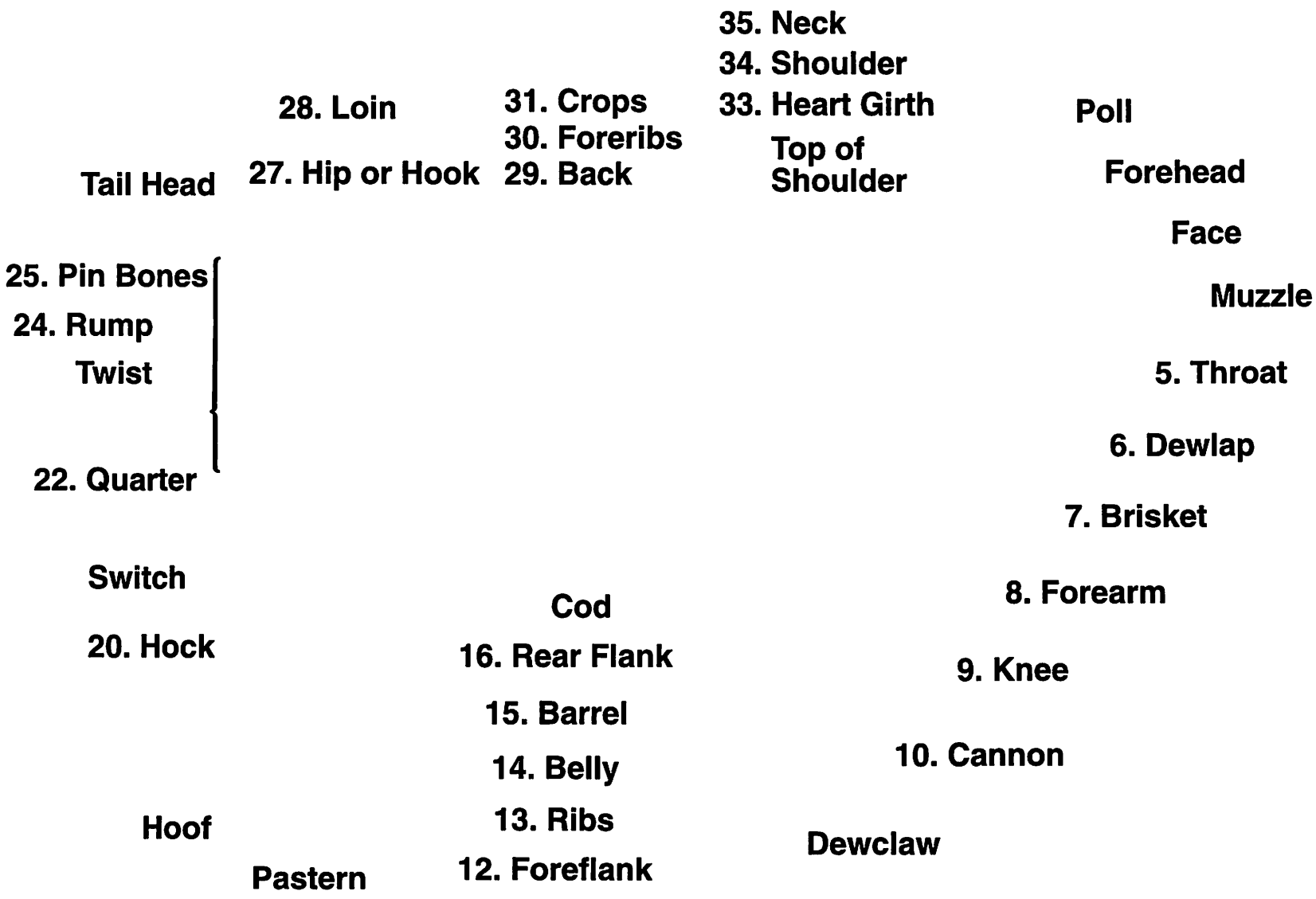
e. _____ Side



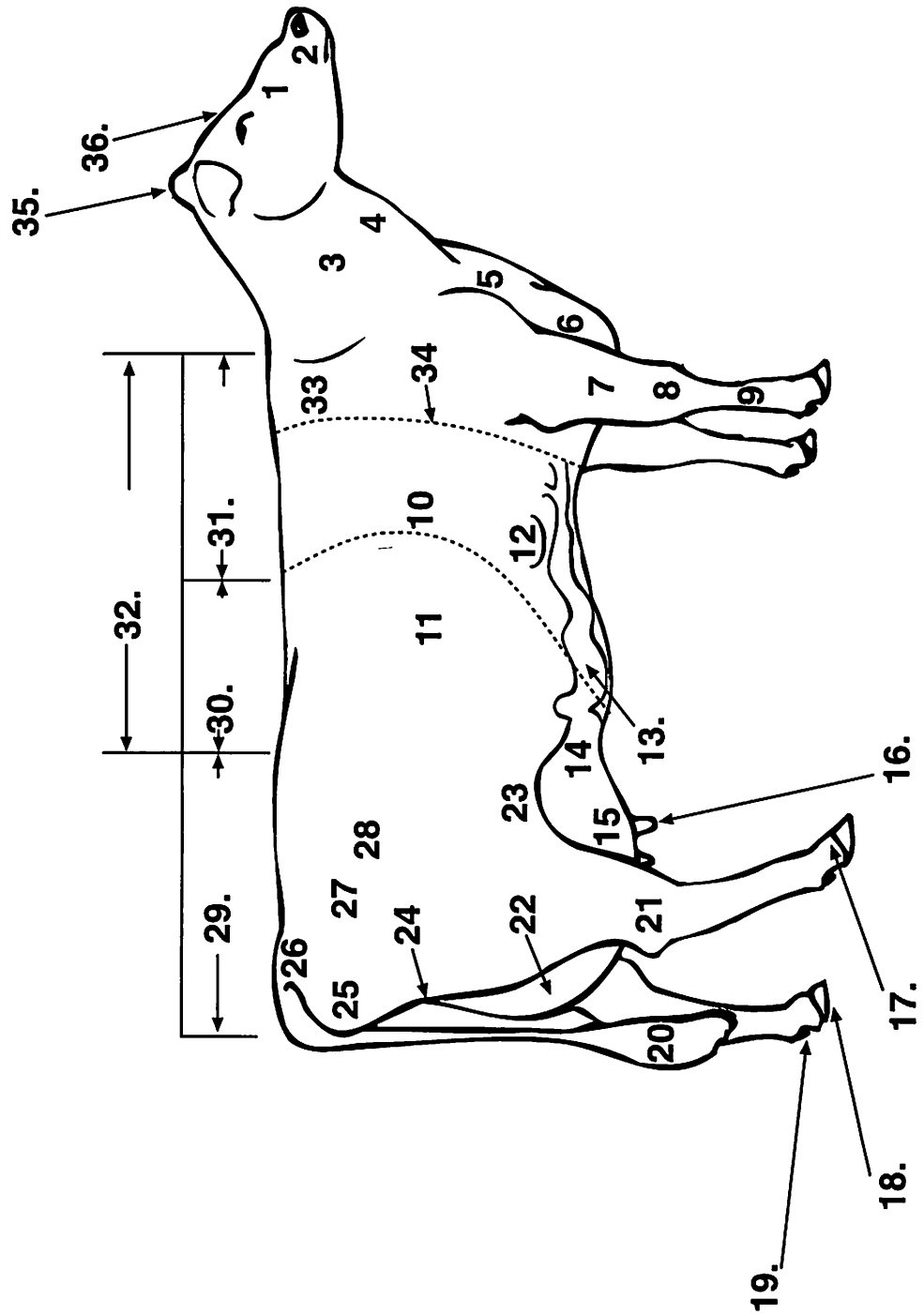
Parts of a Beef Steer



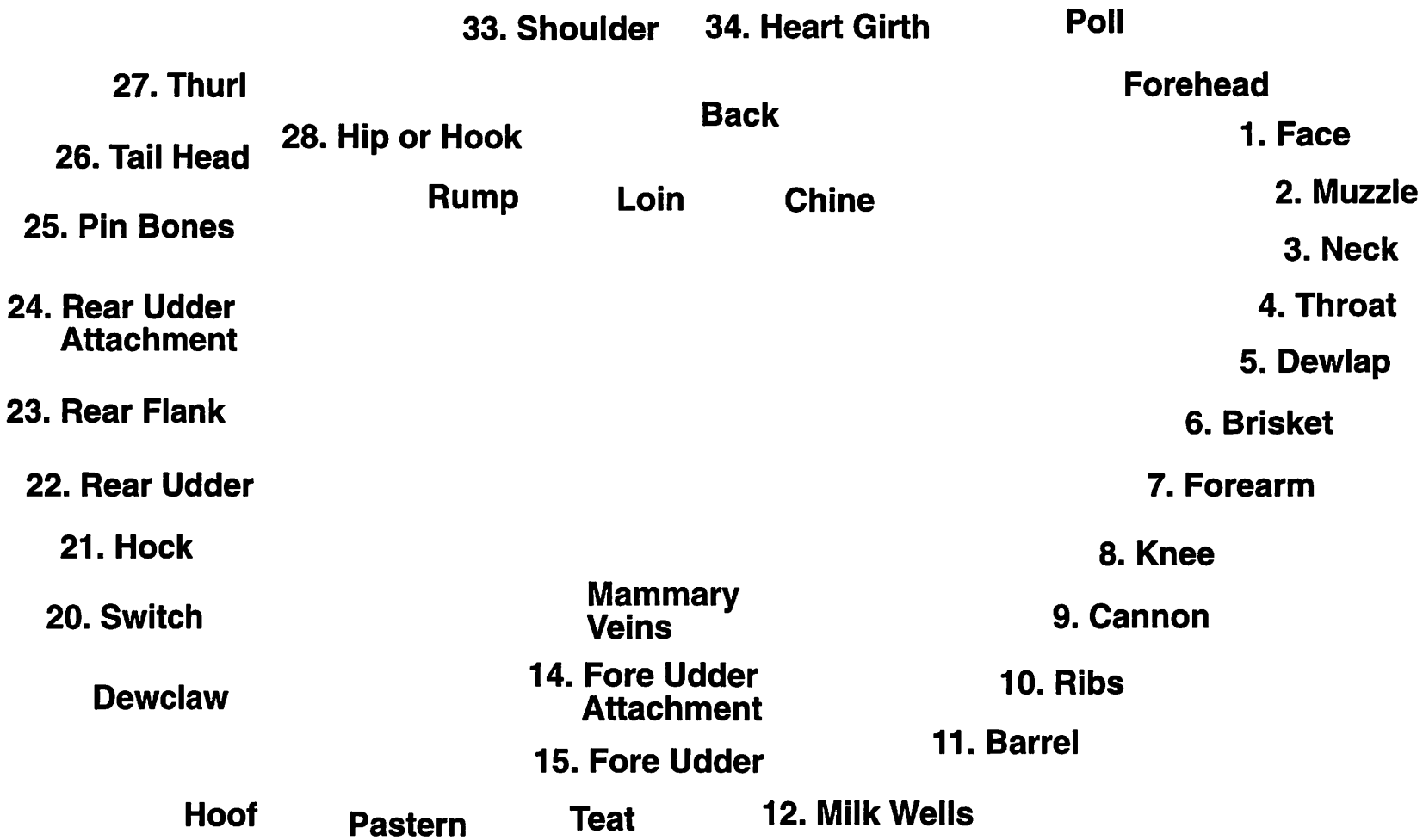
Parts of a Beef Steer



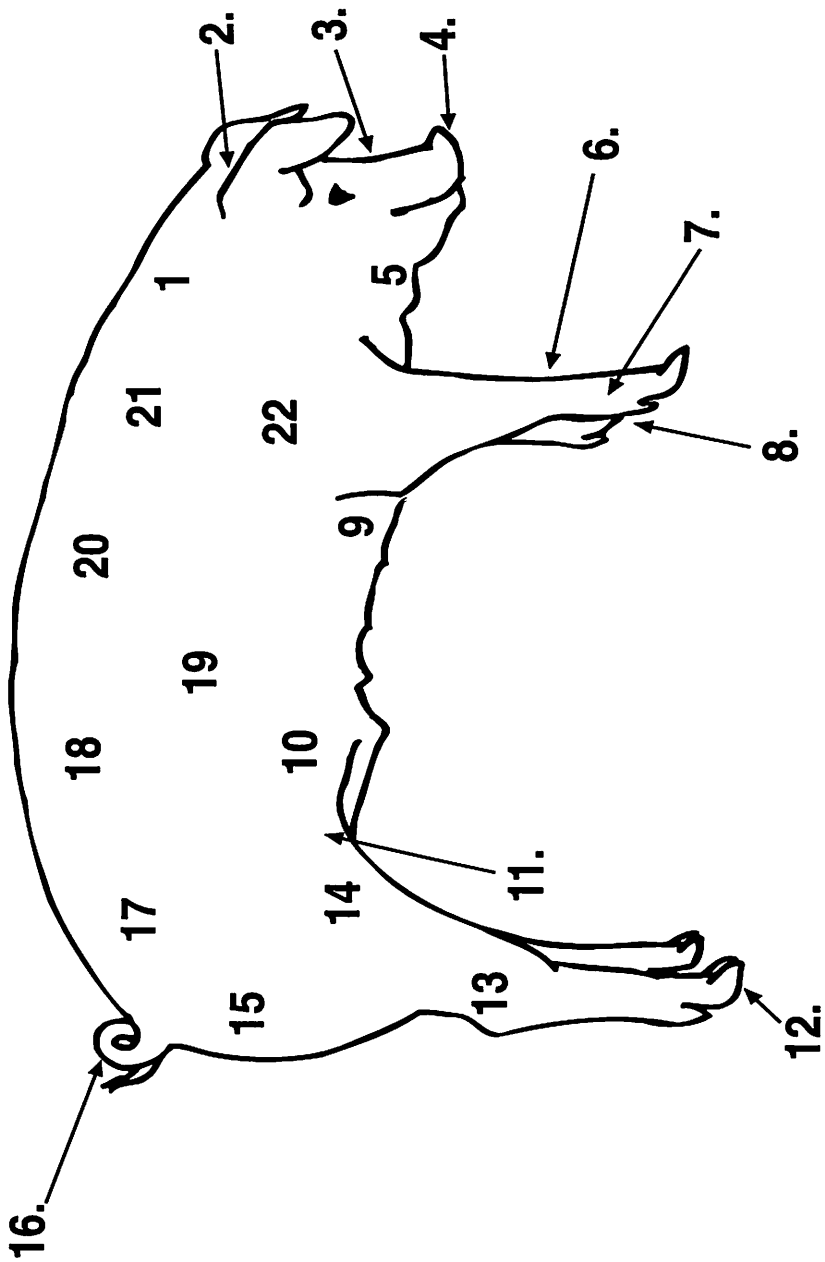
Parts of a Dairy Cow



Parts of a Dairy Cow

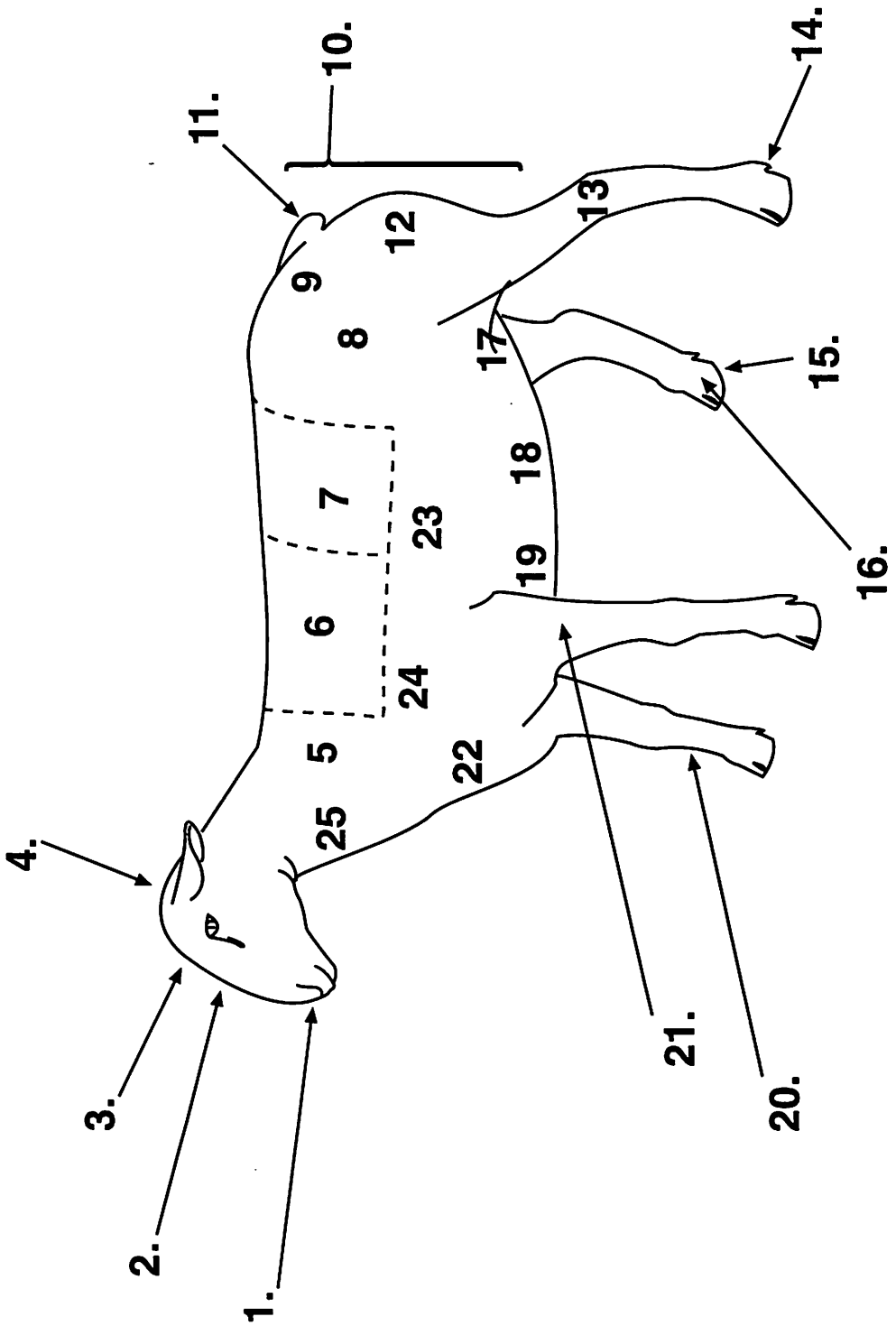


Parts of a Pig

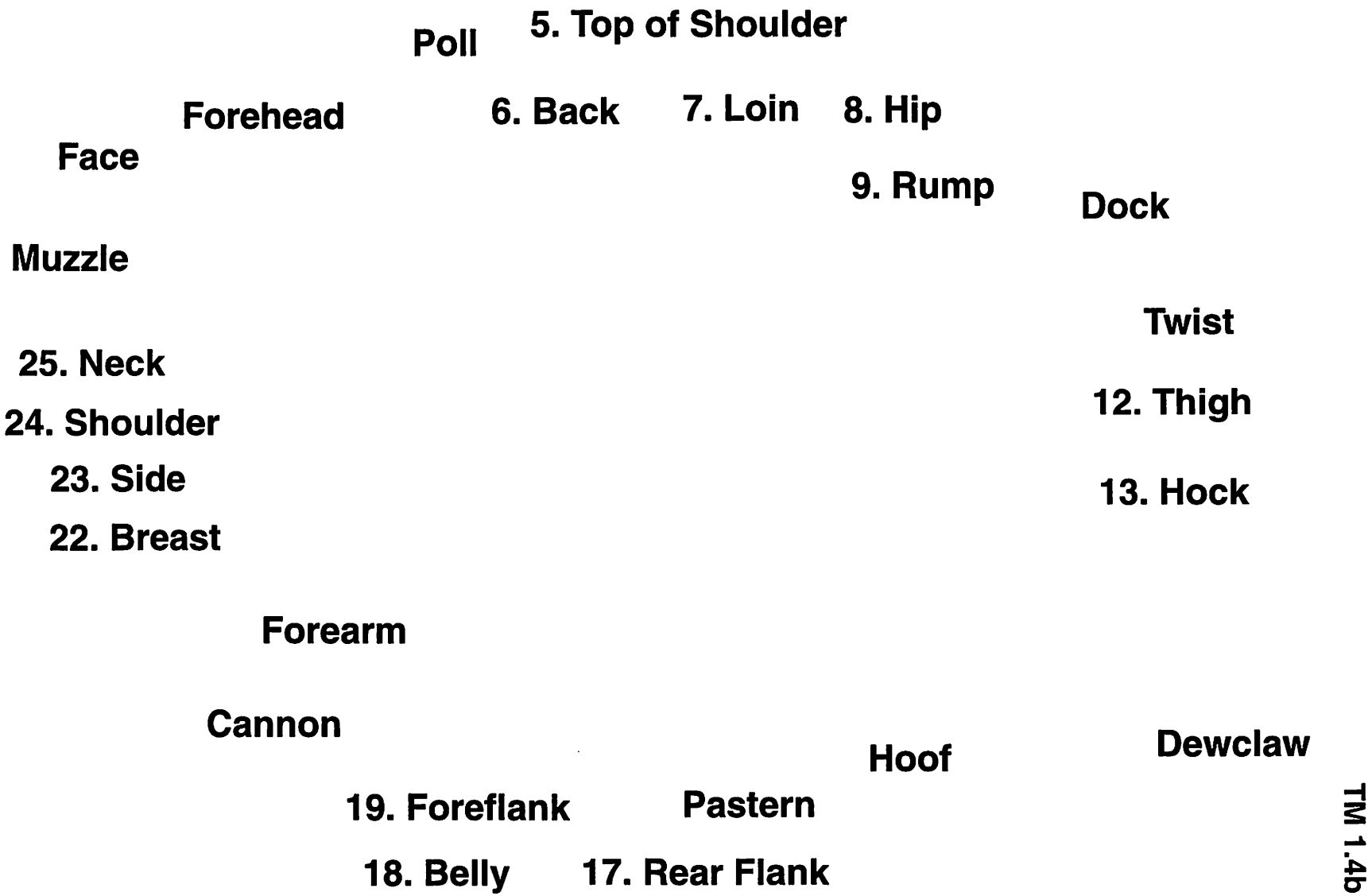


Parts of a Pig

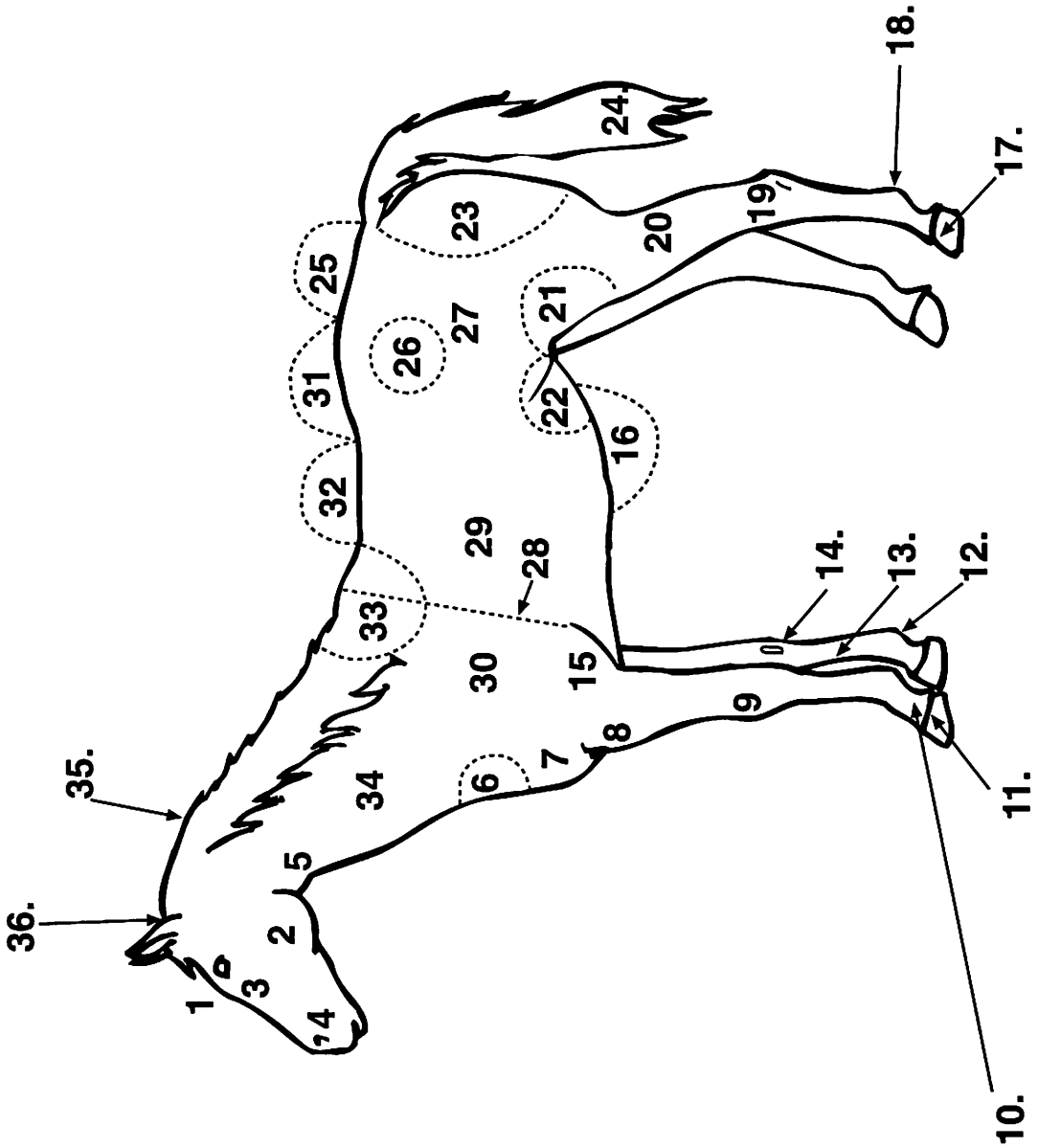
Parts of a Sheep



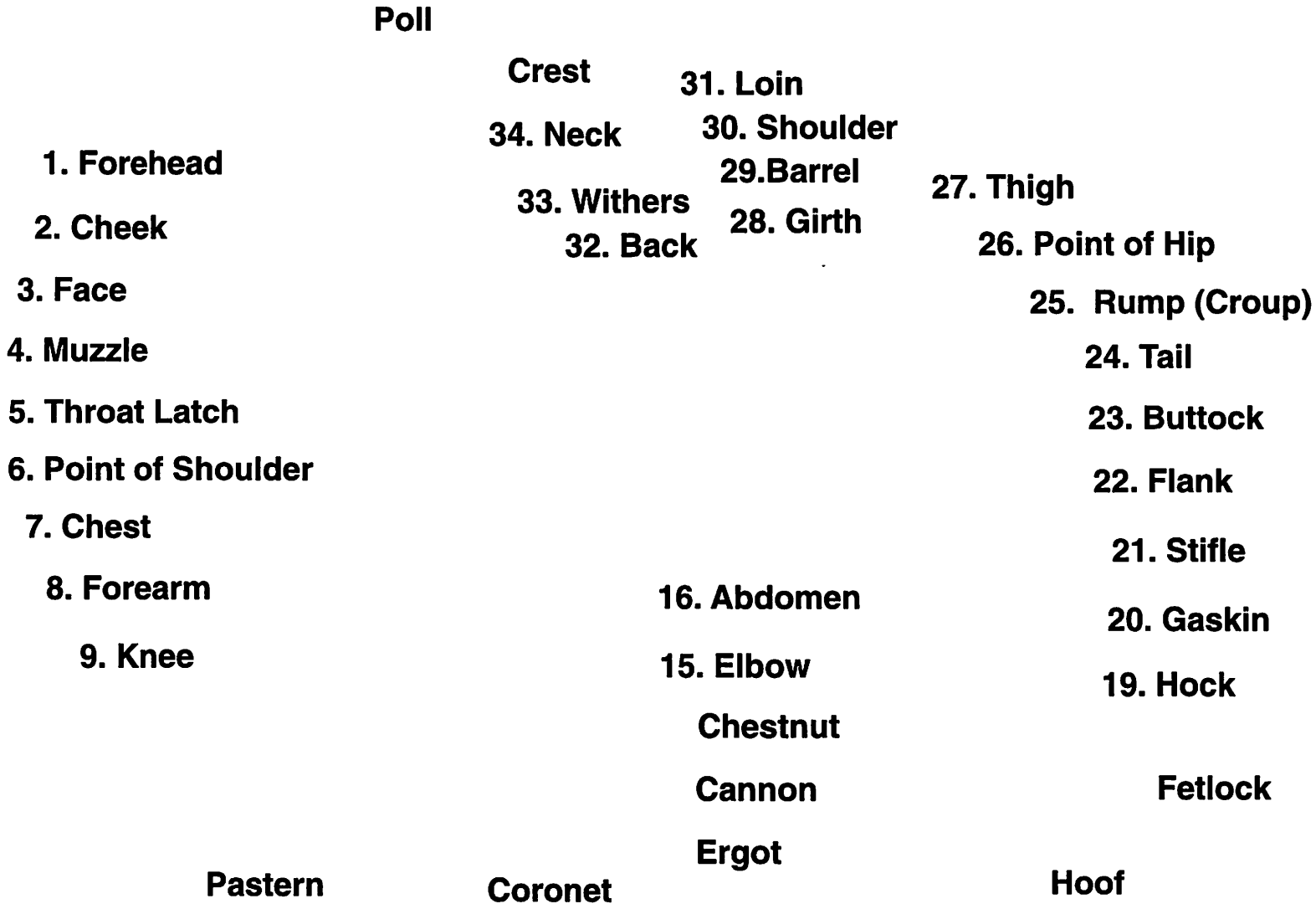
Parts of a Sheep



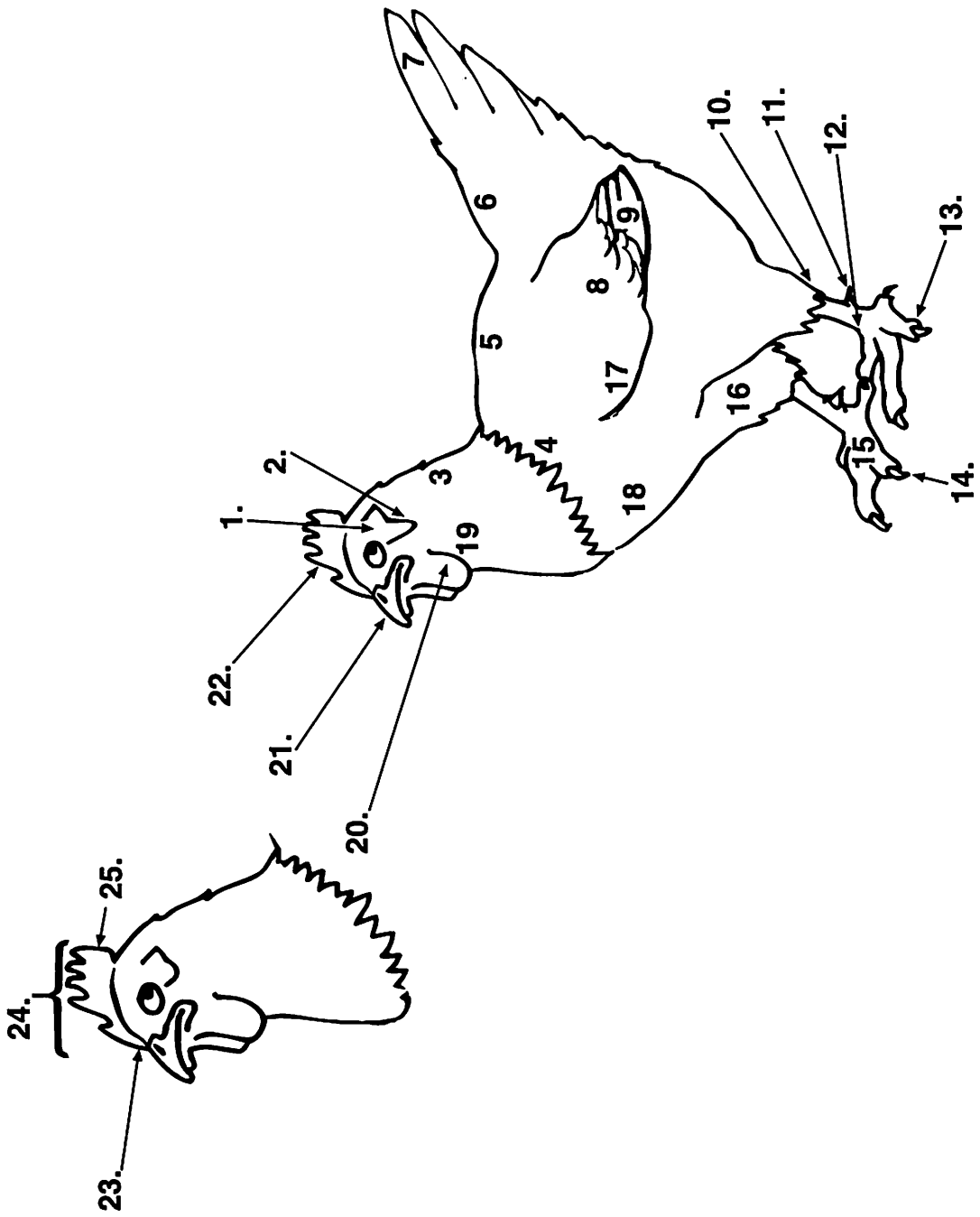
Parts of a Horse



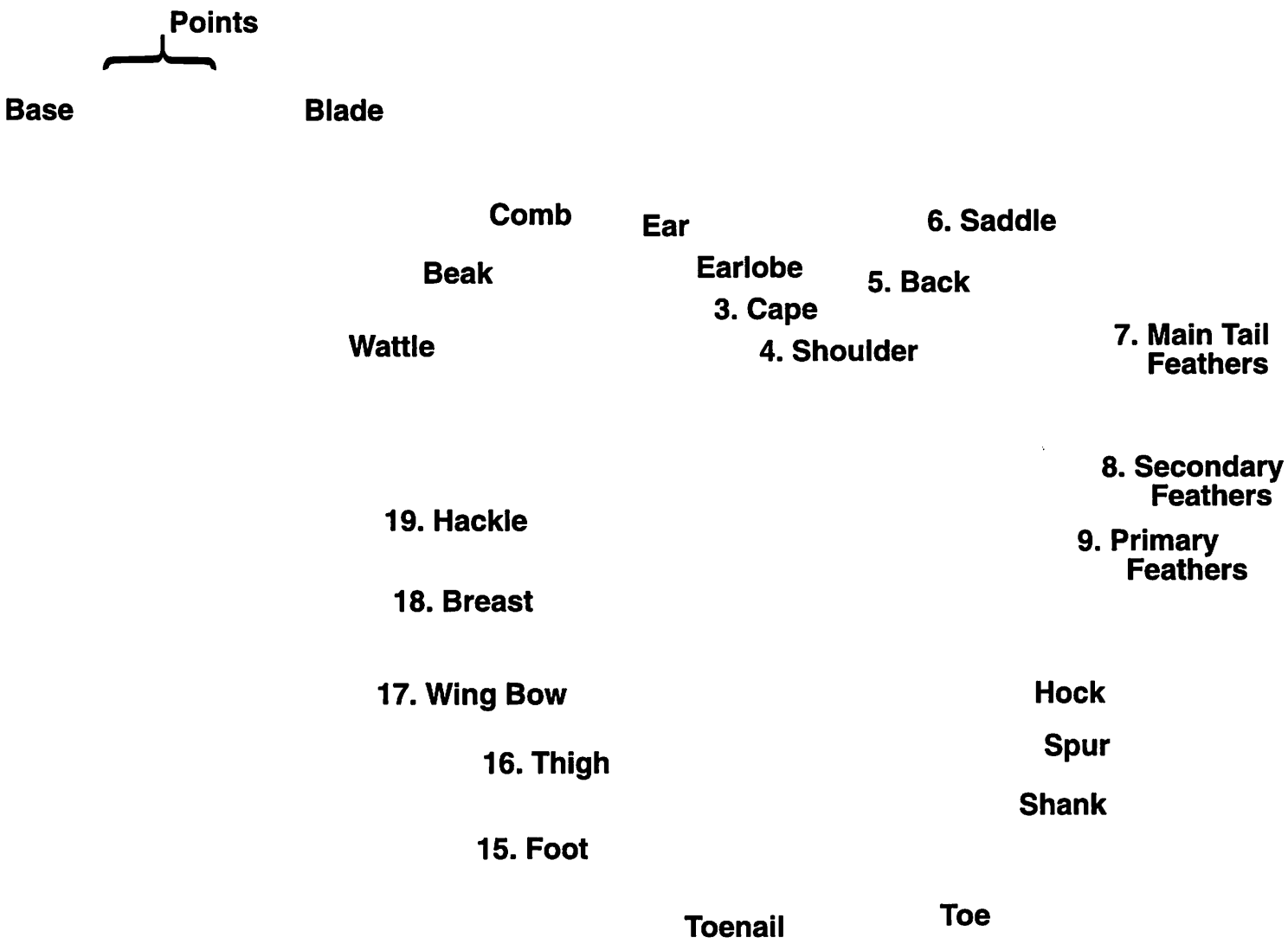
Parts of a Horse



Parts of a Chicken



Parts of a Chicken



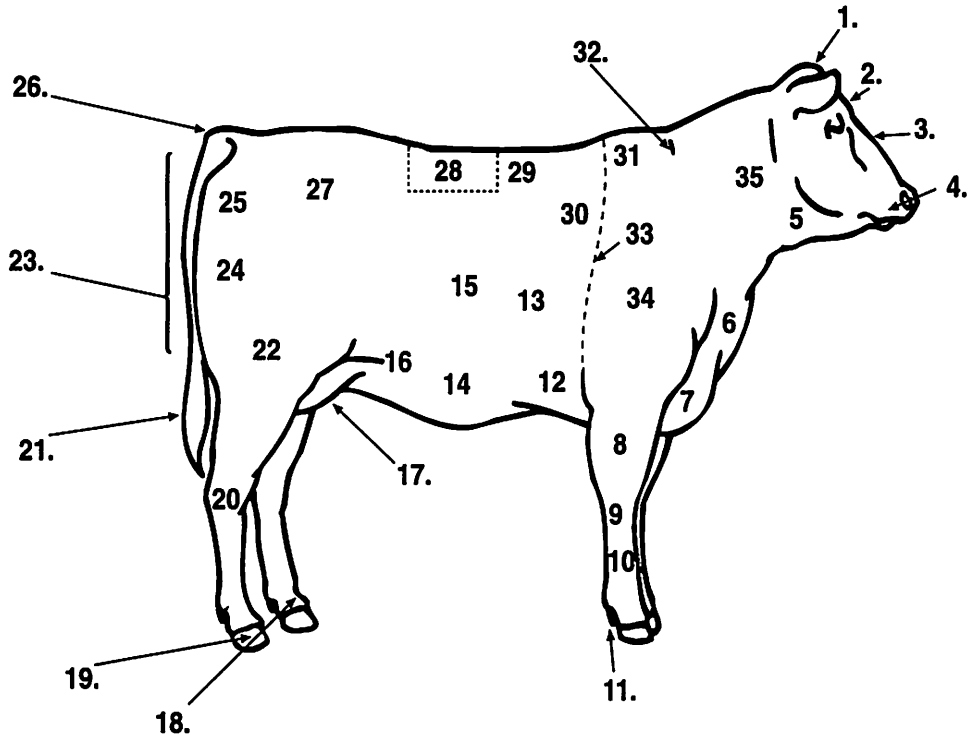
Lesson 1: Livestock Terminology Name _____

Livestock Terminology

Objective: Use the correct term for the body parts of each species.

Label the following diagrams with the corresponding external parts. A diagram of each animal discussed in the lesson will be provided with the external body parts listed.

Beef Steer



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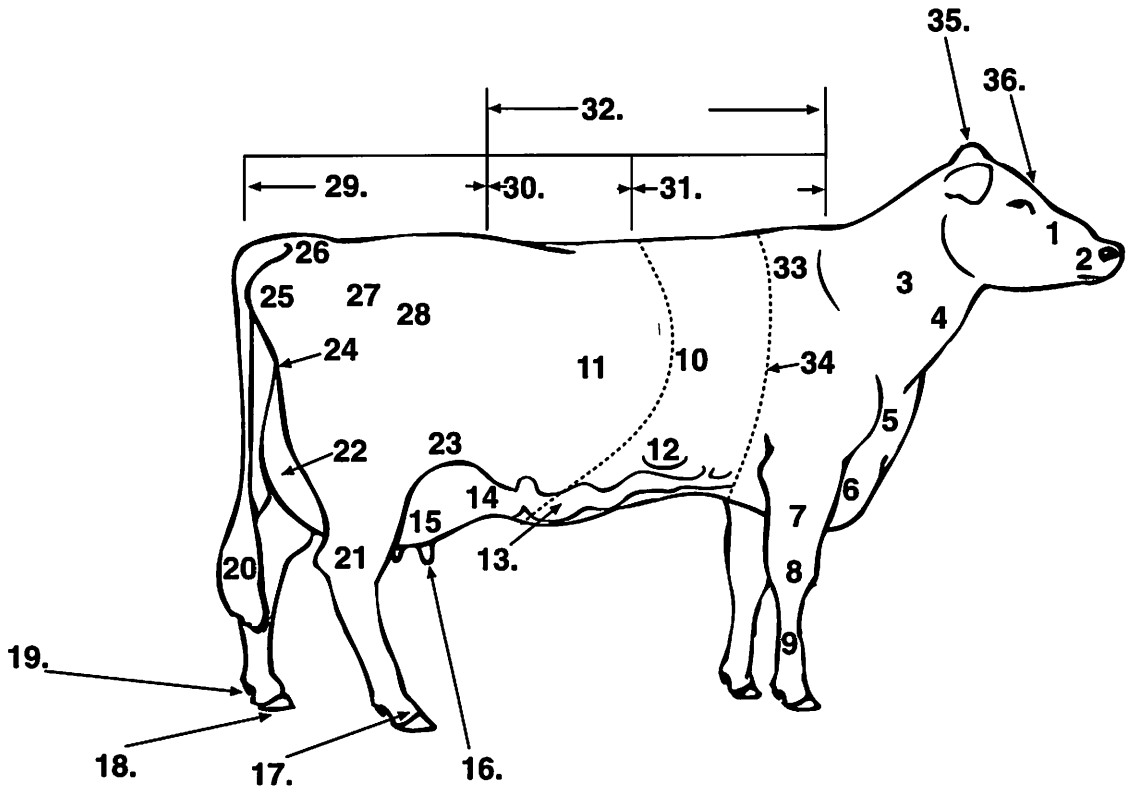
Dairy Cow



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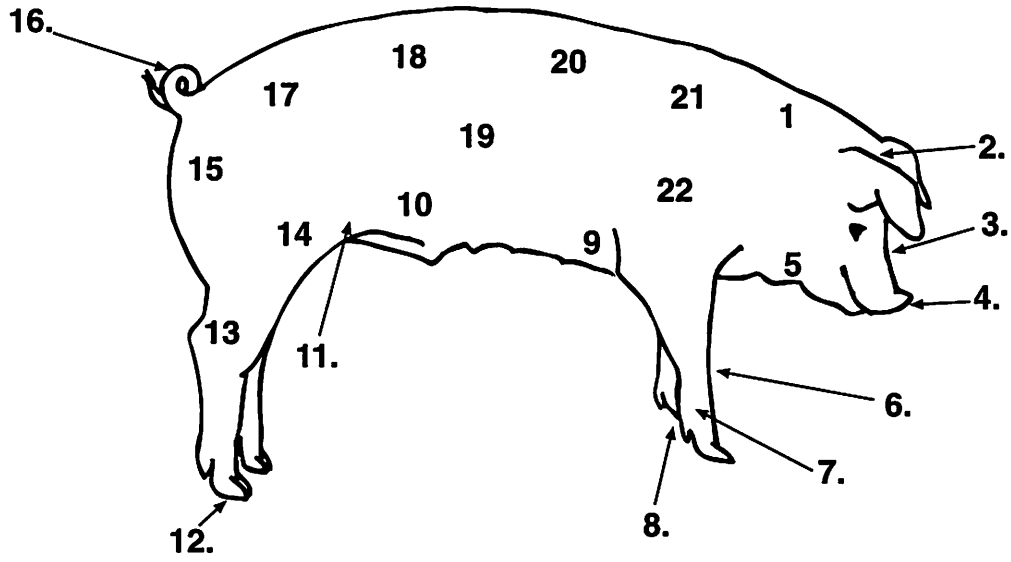
Swine



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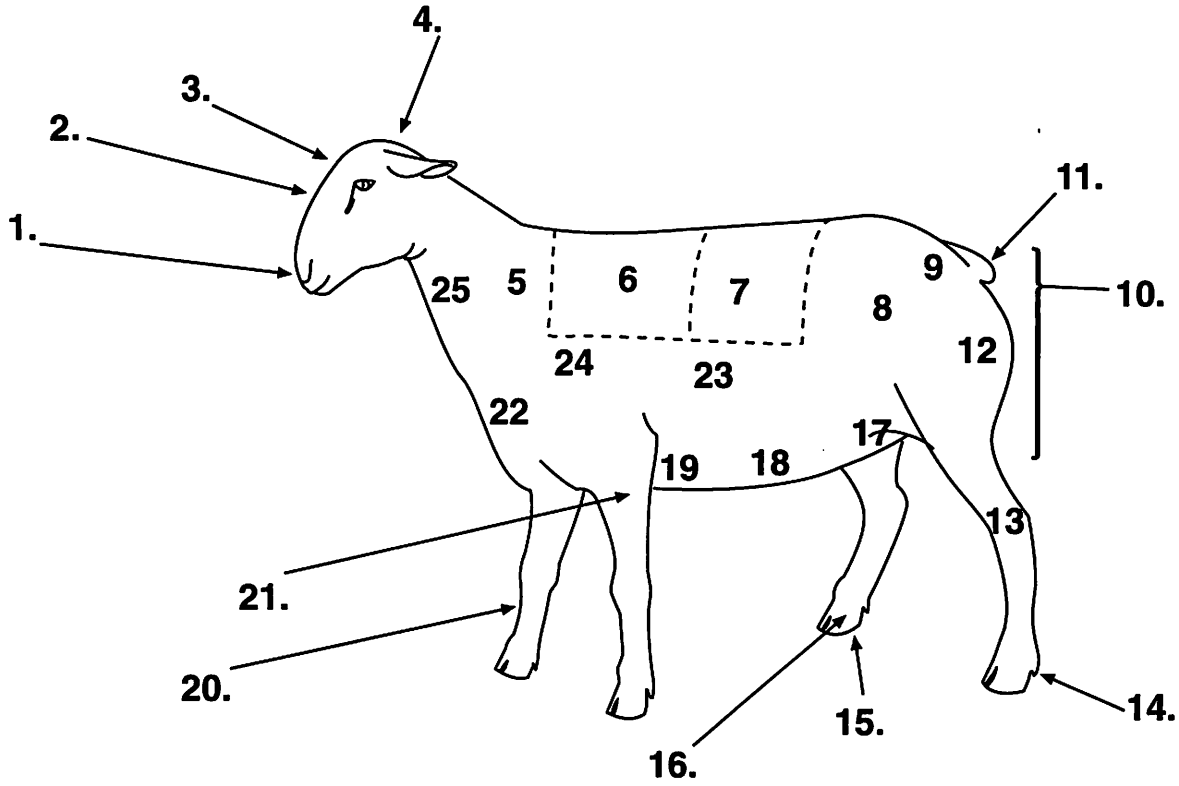
Sheep



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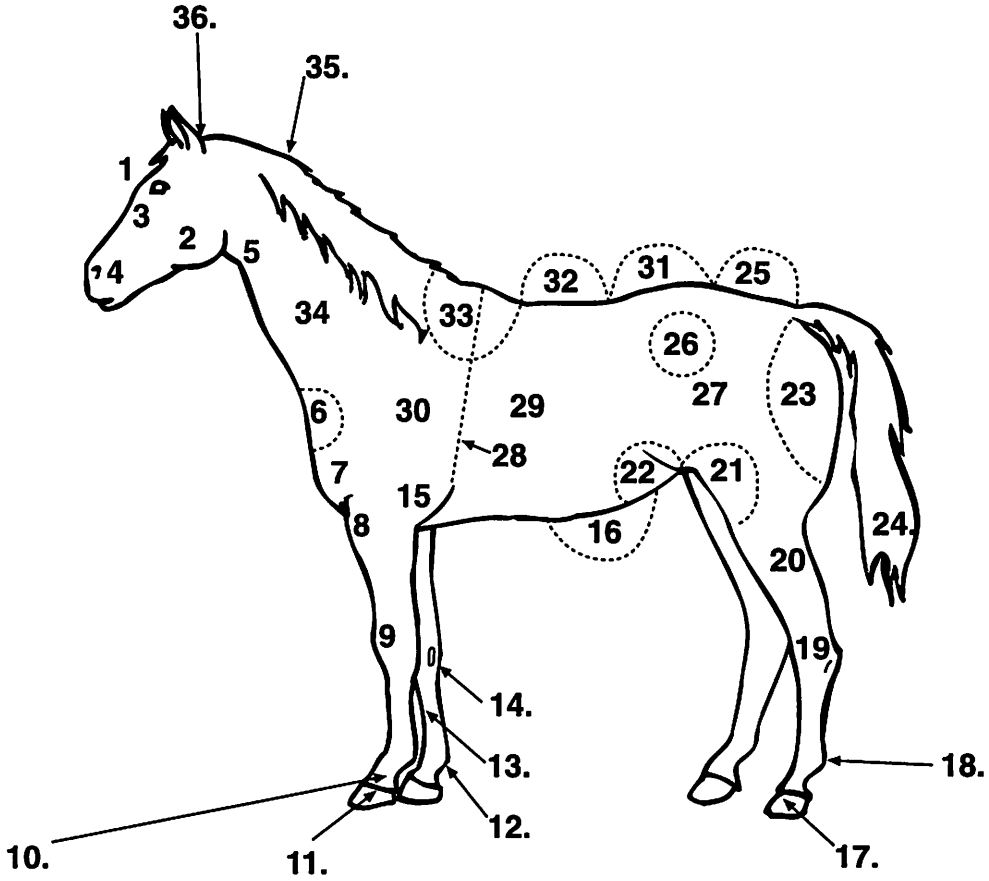

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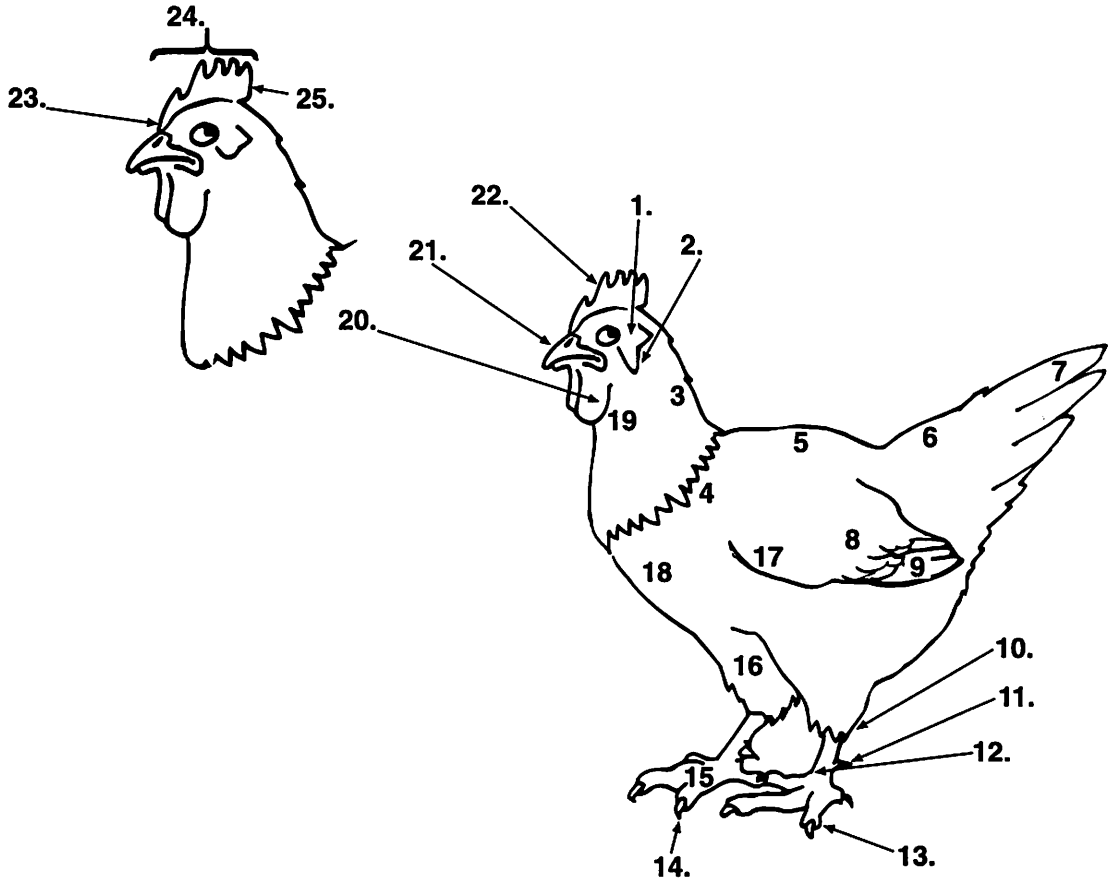
Chicken



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UNIT III - SELECTION

Lesson 2: Selecting Livestock

Competency/Objective: Identify important factors in livestock and poultry selection.

Study Questions

1. **Why is selection important?**

2. **What are important selection factors for breeding purposes?**

3. **What are important selection factors for production?**

References

1. *Advanced Livestock Production and Management* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit V.

2. Activity Sheet

   a) AS 2.1: Selecting Livestock Based on Performance Data

UNIT III - SELECTION

Lesson 2: Selecting Livestock

TEACHING PROCEDURES

A. ***Review***

Producers must have the ability to select high-quality animals for breeding and production. The first step in selection is recognizing the basic body parts of livestock and poultry, as discussed in Lesson 1, because proper conformation is an important aspect of selection. Selection is important because it contributes to the economic success of the operation through increased production and efficiency.

B. ***Motivation***

Ask students to describe how they would select an animal from a herd or flock to use for breeding or production. Discuss factors that they would consider in their decision.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Ask students why they would cull an animal or keep it. Discuss the importance of selecting animals wisely.

   Why is selection important?

   a) Improved overall performance of livestock and poultry
      1) Producers have selected animals for specific desired traits for breeding.
      2) They have culled undesirable animals that produce poorly.
      3) The animals selected pass on their genetic traits to their offspring, while undesirable characteristics are phased out.
   b) Increase profits
      1) Farm managers can improve the overall quality of the product and the efficiency of production.
      2) Selecting animals that will be productive will increase profits.

2. Ask students to identify important factors when selecting animals for breeding.

   What are important selection factors for breeding purposes?

   a) Conformation
      1) Good conformation - more likely to produce more desirable offspring
      2) Refers to the type, form, and shape of the animal
      3) High-performing animal - selected by looking at its skeletal structure, muscling, and fat deposits
      4) Can provide an estimate of fertility
      5) Can indicate longevity of production
      6) May use ultrasound to show what is below the skin of an animal
         (a) Mainly used to measure the loin eye area and fat thickness of beef, swine, and sheep
         (b) Helpful in selecting breeding stock with good meat characteristics
   b) Pedigree
      1) Record of a purebred animal's ancestry

2) Use accurate breeding and performance records of registered animals that are kept by breed associations
3) Usually includes three generations
4) Should include performance information about the animal's ancestors
5) Useful in making decisions about selection
   (a) When the animal to be selected has not yet reached its full level of performance
   (b) When examining long-term factors such as longevity or abnormalities revealed when the animal is older
   (c) When evaluating traits expressed in only one gender (e.g., milk production)

c) Performance data
1) Production records for an animal and related animals including data such as weaning weight, yearling weight, and growth rate
2) Performance testing carried out by central test stations
   (a) Involves evaluating differences in performance under uniform conditions
   (b) Various information obtained for different species of livestock; may include gain over a specified period and efficiency of feed conversion
3) Progeny testing - measures the performance of the offspring of an animal against the performance of the progeny of other animals

3. Discuss how the selection of animals for breeding differs from selection for production.

What are important selection factors for production?

a) Conformation
1) Skeletal structure, muscling, and fat deposition - affect the level of production
2) Animals with good conformation
   (a) Most likely produce more of the valuable products for a particular species
   (b) Tend to be healthier and more productive

b) Health
c) Size or weight - may affect the quantity and quality of the product produced
d) Sex - may affect whether the animal is selected for production or kept for breeding

F. ***Other Activities***

Have students interview producers who raise different types of livestock and ask them how they select animals for breeding and production.

G. ***Conclusion***

By selecting animals that display desirable traits, livestock and poultry producers can improve the production of the herd or flock. Good conformation is important when selecting animals for either breeding or production. However, for breeding animals, an animal's pedigree and performance data are equally important because they can indicate traits that will be passed on to its offspring. Other factors for selecting animals for production include health, size or weight, and sex.

H. ***Answers to Activity Sheet***

Calf Number	Adjusted Weaning Weight	Rank	Adjusted Yearling Weight	Rank
801	491.5 pounds	2	689.1 pounds	2
802	480.4 pounds	3	670.7 pounds	3
803	442.4 pounds	5	627.6 pounds	5
804	466.9 pounds	4	651.4 pounds	4
805	501.9 pounds	1	693.1 pounds	1

Example equation for 205-day adjusted weaning weight:

$$491.5 \text{ pounds} = \frac{(515 - 90)}{216} \times 205 + 90$$

Example equation for 365-day adjusted weaning weight:

$$689.1 \text{ pounds} = \frac{(717 - 90)}{382} \times 365 + 90$$

I. ***Answers to Evaluation***

1. d
2. c
3. For the improved overall performance of livestock and poultry and increase profits
4. To select breeding stock with good meat characteristics
5. Conformation, health, size or weight, and sex

6. Answers may include any of the following: when the animal has not yet reached its full level of performance, when examining long-term factors such as longevity or abnormalities revealed when the animal is older, and when evaluating traits expressed in only one gender.

UNIT III - SELECTION Name _____

Lesson 2: Selecting Livestock Date _____

EVALUATION

Circle the letter that corresponds to the best answer.

1. Which of the following is an important factor in selection for both breeding and production?

   a. Weight
   b. Pedigree
   c. Performance data
   d. Conformation

2. What measures the performance of the offspring of an animal against the performance of the offspring of other animals?

   a. Pedigree
   b. Production records
   c. Progeny testing
   d. Performance testing

Complete the following short answer questions.

3. What are two reasons that selection is important?

   a.

   b.

4. Why would ultrasound be used when selecting breeding stock?

5. What are four factors examined when selecting animals for production?

   a.

   b.

   c.

   d.

6. What is one occasion when it might be especially useful to look at an animal's pedigree?

Lesson 2: Selecting Livestock Name_____

Selecting Livestock Based on Performance Data

Objective: Select the best animal using the performance data presented.

Rank the animals below according to their weaning weight by using the following formula to find the 205-day adjusted weaning weight for each calf. Show your work in the space below the chart.

$$\textit{205-day adj. weaning wt.} = \frac{(\textit{actual weaning wt. - birth weight})}{\textit{Age in days}} \times 205 + \textit{birth wt.}$$

$$\textit{365-day adj. yearling wt.} = \frac{(\textit{actual yearling wt. - birth weight})}{\textit{Age in days}} \times 365 + \textit{birth wt.}$$

Calf Number	Birth Date	Birth Weight	Weaning Date	Weaning Weight	205-Day Adjusted Weaning Weight	Yearling Date	Yearling Weight	Adjusted Yearling Weight
801	2/10/99	90	9/15/99	515		2/27/00	717	
802	2/12/99	79	9/15/99	500		2/27/00	695	
803	2/12/99	82	9/15/99	460		2/27/00	650	
804	2/15/99	85	9/15/99	480		2/27/00	670	
805	2/18/99	88	9/15/99	510		2/27/00	708	

Calf Number	Weaning Weight Ranking	Yearling Weight Ranking
801	_____	_____
802	_____	_____
803	_____	_____
804	_____	_____
805	_____	_____

UNIT III - SELECTION

Lesson 3: Selecting Beef Cattle

Competency/Objective: Select beef animals for production and breeding.

Study Questions

1. **How should beef cattle be selected for breeding?**

2. **How should beef animals be selected for production?**

3. **What records need to be kept?**

References

1. *Advanced Livestock Production and Management* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit III.

2. Transparency Masters

   a) TM 3.1: Frame Sizes
   b) TM 3.2: Expected Progeny Difference (EPD)
   c) TM 3.3: Feeder Steer Grades

3. Activity Sheet

   a) AS 3.1: Selecting Bulls Using EPDs

UNIT III - SELECTION

Lesson 3: Selecting Beef Cattle

TEACHING PROCEDURES

A. ***Review***

Lesson 2 discussed the importance of selecting animals for breeding and production. In beef breeding programs, visual evaluation of the animal along with evaluation of performance data is essential to ensure proper selection. When selecting animals for production, performance data is not used. Selection is based almost totally on visual evaluation of the animal.

B. ***Motivation***

Provide three examples of beef cattle for students to appraise visually, either by taking a field trip to a cattle production system or showing slides or pictures. Have the students form groups and rank the animals according to their traits. Discuss the groups' rankings in class and have them give their reasons.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Refer back to the motivation, and ask the students why they ranked the animals as they did. Ask them what they think a consumer of beef wants or expects from the product, and how the industry provides it. Ask them what traits would be commercially important in the beef cattle industry. If possible, obtain a poster on body condition scoring from MFA to show cattle with different scores. Use TMs 3.1 and 3.2 to illustrate frame sizes and EPDs. Have students complete AS 3.1.

How should beef cattle be selected for breeding?

a) Conformation
   1) Beef cattle should be structurally correct.
      (a) Relatively long neck
      (b) Long, wide, and deep body
      (c) Level and wide top and rump
      (d) Good body capacity, indicated by wide-sprung ribs, wide heart girth, and deep chest floor
      (e) Wide round with good depth
      (f) Well-balanced shoulder that gradually slopes down toward the front legs
      (g) Strong definition and no signs of swelling in the joints
      (h) Legs set squarely at each corner of the body
      (i) Strong pasterns
      (j) Toes equal in size
      (k) Big and round hooves, with a deep and strong heel
      (l) From the front, legs set wide with the hooves pointing straight forward
      (m) From the rear, legs equally wide at the pasterns and the hock
      (n) Rear legs turn outward subtly from the pasterns down
      (o) No signs of structural incorrectness in the feet and legs
         (1) Sickle-hocked
         (2) Calf-kneed
         (3) Post-legged

(4) Buck-kneed
(5) Splay-footed
(6) Pigeon-toed
(7) Cow-hocked
(8) Bowlegged

2) The animal should not have any excess fat and should be checked for fat deposition, especially in the rear flank, foreflank, underline, and brisket.
3) Muscling should be smooth, balanced, and heavy throughout the body, especially the forearm.
4) Higher priced cuts should be fully developed; these parts include the round, rump, loin, and ribs.
5) A common method of muscle conformation evaluation used within the beef industry involves range of seven specific scores.
   (a) Exceptionally thin (1)
   (b) Very light muscled (2)
   (c) Light muscled (3)
   (d) Average muscling (4)
   (e) Heavy muscled (5)
   (f) Very heavy muscled (6)
   (g) Double muscled (7)
6) In a simplified method of grouping beef animals according to their body condition, producers estimate the amount of fat and give the animal a body condition score.
   (a) Emaciated (1)
   (b) Very thin (2)
   (c) Thin (3)
   (d) Borderline (4)
   (e) Moderate (5)
   (f) Good (6)
   (g) Very good (7)
   (h) Fat (8)
   (i) Extremely fat (9)

b) Size and scale
   1) Animals are classified according to frame size, which refers to the size of the animal's skeleton in relation to its age.
   2) Seven body type scores developed by the University of Wisconsin indicate frame size in beef cattle.
   3) Desirable frame size depends on the breed of cattle.
      (a) English breeds - between 1 and 5
      (b) Exotic breeds - between 3 and 7
   4) The Beef Improvement Federation (BIF) has developed the most accurate means of measuring frame size, with a measurement taken at the hip at 205 days of age.

c) Sex character
   1) Certain characteristics should be present in cows and heifers.
      (a) Feminine, with a graceful, angular look
      (b) Relatively long and smooth neck and some refinement in the head
      (c) Slight slope from the hooks to the pins, since animals with this characteristic tend to have fewer problems when calving
      (d) Wide at the pin bones because animals that are narrow are prone to calving problems
      (e) For younger females, proper udder development and a sound vulva
   2) Bulls should also have some identifiable traits.
      (a) Masculine and rugged in the head and neck areas
      (b) Strong muscling in the arm and forearm in animals older than one year of age
      (c) Properly developed testicles contained in a scrotal sac that hangs to about hock level
      (d) Scrotal circumference - indicator of the potential production of semen, with a scrotal circumference between 25 and 40 centimeters in yearling bulls

d) Breed character - distinguishing characteristics of specific breeds, including hair color, head shape, overall body shape, polled or horned, etc.
e) Temperament - nervousness, carrying the head very high, charging and bucking, and frequent urination being signs of bad temperament
f) Performance data
    1) Sire summaries are developed by the different breed associations, which update and distribute the summaries on an annual basis.
        (a) Traits evaluated in all sire summaries - birth weight, yearling weight, and weaning weights
        (b) Milk - evaluates the female progeny of the sire for milk production
    2) Sire summaries use the term expected progeny difference (EPD) to indicate the ability of a sire to pass on traits.
        (a) EPDs - specific to a particular breed
        (b) Number that may either be expressed as a positive or negative figure using the unit of measurement for the particular trait being evaluated
        (c) Indicates the expected amount of difference from the average bull's offspring that the offspring of a bull will show for a particular trait

2. Ask students what traits they should look for when they buy animals for production. Why? Show students TM 3.3 to illustrate feeder cattle grades.

How should beef animals be selected for production?

a) Sex
    1) When comparing steers and heifers, differences in performance depend on the system of feeding.
        (a) If the animals are fed to the same degree of finish, heifers tend to reach the desired weight about 80 percent faster than steers of the same frame size because heifers mature faster.
        (b) Heifers require fewer days of feed to reach the point of slaughter.
        (c) Little difference is found in performance levels between steers and heifers when fed to the same degree of finish.
        (d) If animals are fed for the same amount of time, steers will gain faster and more efficiently; they are more efficient in gain during the last phases of finishing.
    2) Young bulls are not recommended for finishing.
        (a) Bullocks gain faster than steers and heifers, they require less feed, and have a higher cutability.
        (b) They also require more management since they tend to be temperamental.
        (c) To ensure the meat is tender, they need to be marketed at 18 months of age.
        (d) They tend to mature late, so they usually do not have a sufficient degree of marbling by 18 months to be graded as choice.
b) Frame size
    1) In general, large-framed feeder cattle gain more rapidly and more efficiently than small-framed cattle.
    2) Larger-framed cattle need to reach larger weights and thus require more feed.
    3) The producer is able to recognize the different frame sizes of cattle and feed them accordingly.
    4) The Wisconsin frame size standards are used to classify the animals by frame size.
c) Grade
    1) Thriftiness is defined as the ability of feeder cattle to gain weight normally and maintain health.
    2) Frame size is graded as large, medium, or small.
    3) Muscling refers to thickness and development in relation to frame size and is classified as 1, 2, or 3.
    4) An animal with a thicker, muscular system has a higher ratio of muscle to bone, which leads to a better yield grade.

d) Body condition
   1) Feeder cattle are assigned a body condition score (BCS) ranging from 1 to 9.
   2) A thin and thrifty beef animal has a better potential of producing a higher price per hundredweight than fat animals.

3. Ask students what types of information might be useful when selecting animals. Discuss records that could be needed.

What records need to be kept?

a) Birth date
b) Birth weight
c) Weaning weight
d) Yearling weight
e) Fat thickness
f) Hip height
g) Scrotal circumference at 365 days of age for breeding bulls
h) Health records

F. ***Other Activities***

1. Use sire summaries for sire selection by evaluating EPDs.

2. If possible, obtain a copy of the video "Profit by Using EPDs" from the American Hereford Association or the video "Expected Progeny Differences" from the North American Limousin Foundation.

3. Have students evaluate which beef cattle breed would best fit their environment.

4. Have students practice selection by participating in judging activities.

5. Disuss the pros and cons of purchasing heifers versus steers for a feedlot operation.

G. ***Conclusion***

Careful selection of beef cattle carefully is important for both breeding and production. When evaluating beef animals for breeding, traits that can be evaluated visually and performance data are the basis for proper selection. Visual appraisal is used to evaluate structural correctness, sex character, size and scale, conformation, breed character, and temperament. The general types of performance data used in beef animal selection include production, progeny, and performance testing. Sire summaries are useful in the selection of genetically superior sires. Sire summaries use expected progeny differences (EPDs) to express the likelihood of bulls to pass on important economic traits such as birth weight, weaning weight, yearling weight, and maternal breeding value. To evaluate feeder cattle for production, selection is basd on sex, age and weight, frame size, grade, and body condition.

H. ***Answers to Activity Sheet***

1. Bull A
2. 23.9 pounds
3. Bull A
4. 7.5 pounds
5. Bull B. The bull with lower birth weights should cause fewer calving problems with first calf heifers.
6. Bull A

I. ***Answers to Evaluation***

1. a
2. d
3. The rear legs should turn outward subtly from the pasterns down, while the front hooves point straight forward.

4. Female cattle with this characteristic tend to have fewer problems when calving.

5. Scrotal circumference is an indicator of the potential production of semen.

6. Answers may include any three of the following: birth date, birth weight, weaning weight, yearling weight, fat thickness, hip height, scrotal circumference at 365 days of age for breeding bulls, and health records.

7. The number indicates the expected amount of difference from the bull's average offspring for a particular trait.

8. Sex, frame size, grade, and body condition

UNIT III - SELECTION Name _____

Lesson 3: Selecting Beef Cattle Date _____

EVALUATION

Circle the letter that corresponds to the best answer.

1. In which areas are beef cattle most likely to deposit excess fat?

   a. Rear flank, foreflank, underline, and brisket
   b. Round, rump, and loin
   c. Dewlap, back, and forearm
   d. Ribs, chest, and heart girth

2. What measurement is used when determining frame size?

   a. Shoulder
   b. Withers
   c. Rump
   d. Hip

Complete the following short answer questions.

3. When viewing a beef animal from the rear, how should the rear legs look different from the front legs?

4. Why do many farm managers select female beef cattle that have a slight slope from the hooks to the pins?

5. Why do farm managers measure scrotal circumference of breeding bulls?

6. What are three items of record information that may be useful in selecting animals?

   a.

   b.

   c.

7. What does the EPD value indicate?

8. What four factors should be considered when selecting beef animals for production?

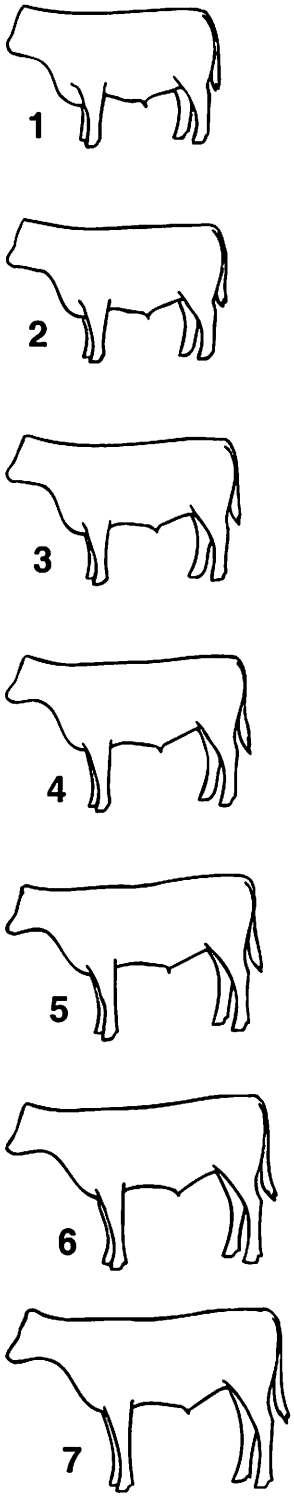
   a.

   b.

   c.

   d.

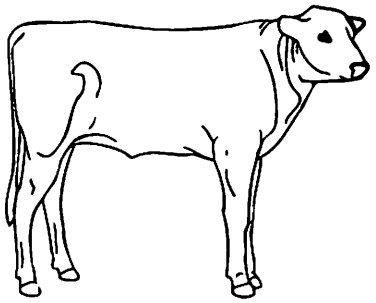
Frame Sizes



Expected Progeny Difference (EPD)

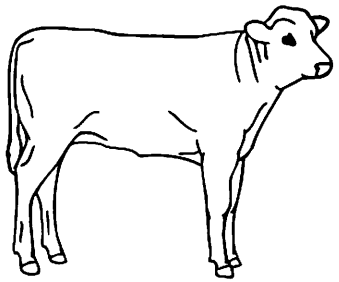
Report								
	Birth Weight		Weaning Weight		Yearling Weight		Maternal Milk	
	EPD	ACC	EPD	ACC	EPD	ACC	EPD	ACC
Bull A	-1.6	0.81	-2.7	0.79	-3.2	0.72	+10.0	0.80
Bull B	+2.4	0.90	+39.1	0.91	+70.0	0.83	+16.0	0.76
Bull C	+8.3	0.97	+53.8	0.97	+80.4	0.89	-5.0	0.66
ACC = accuracy								

Feeder Steer Grades



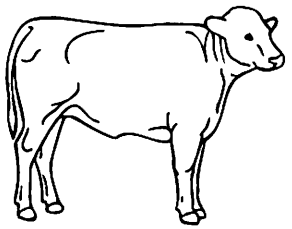
Large Frame

- Tall and long for age
- At a half-inch of fat,
  steers will be 1200 lbs. or more
  heifers will be 1000 lbs. or more



Medium Frame

- Slightly tall and slightly long for age
- At a half-inch of fat,
  steers will be 1000-1200 lbs.
  heifers will be 850-1000 lbs.



Small Frame

- Small frame and shorter-bodied for age
- At a half-inch of fat,
  steers will be less than 1000 lbs.
  heifers will be less than 850 lbs.

No. 1

- Slightly thick throughout
- Moderate width between legs
- High proportion of beef breeding

No. 2

- Narrow throughout
- Legs set close together
- Back and loin have sunken appearance

No. 3

- Less thickness than No. 2
- Legs closer together than No. 2

Lesson 3: Selecting Beef Cattle Name _____

Selecting Bulls Using EPDs

Objective: Select the best animal using the performance data presented.

Examine the EPDs of the two bulls below and answer the following questions.

1. Which bull (A or B) should have offspring with heavier weaning weights?

2. What would be the expected difference in weaning weight (in pounds) between the offspring of the two bulls?

3. Which bull should have offspring with heavier birth weights?

4. What would be the expected difference (in pounds) between the offspring of the two bulls at birth?

5. Which of the two bulls should you use when breeding a group of first calf heifers? Why?

6. Which of the two bulls would sire heifers that would supply less milk to their offspring?

Report								
	Birth Weight		Weaning Weight		Yearling Weight		Maternal Milk	
	EPD	ACC	EPD	ACC	EPD	ACC	EPD	ACC
Bull A	+ 7.7	.93	+ 29.6	.91	+ 42.3	.78	- 20.3	.85

Bull B	+ 0.2	.67	+ 5.7	0.7	+ 29.1	.42	+ 4.9	0.4

UNIT III - SELECTION

Lesson 4: Selecting Dairy Cattle

Competency/Objective: Select dairy animals for production and breeding.

Study Questions

1. **How should dairy cows be selected for production and breeding?**

2. **How should dairy sires be selected for breeding?**

3. **What records need to be kept?**

References

1. *Advanced Livestock Production and Management* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit III.

2. Transparency Masters

   a) TM 4.1: Dairy Cow Unified Score Card
   b) TM 4.2: Ideal Udder

3. Activity Sheets

   a) AS 4.1: A Dairy Selection Puzzle
   b) AS 4.2: Udder Characteristics

UNIT III - SELECTION

Lesson 4: Selecting Dairy Cattle

TEACHING PROCEDURES

A. ***Review***

Lesson 3 discussed factors that should be considered when selecting beef cattle for breeding and production. Although beef and dairy cattle are the same species, many differences are found in the criteria used when selecting dairy cattle because the focus is on traits related to efficient milk production. The desired appearance and genetics of dairy cattle thus differ from those of beef cattle. Another difference in selection between beef and dairy cattle is that dairy production requires all dairy cows to be used for breeding, since calving precedes milk production. Therefore, both breeding and production must always be considered when selecting cows.

B. ***Motivation***

Show students several pictures of different dairy cows. Ask them what they would look at if they were trying to choose between the cows for breeding.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Ask students what traits are important for high milk production. Why? Refer to the Dairy Cow Unified Score Card. Have students complete AS 4.1 and 4.2.

How should dairy cows be selected for production and breeding?

a) Dairy type - evaluation based on the Dairy Cow Unified Score Card
   1) Frame - evaluation of skeletal structure, except for the feet and legs
      (a) Rump
         (1) Pin bones slightly lower than the hips
         (2) Wide and long rump
         (3) Tail head located evenly between pins and set moderately high
      (b) Frame stature - the height of the animal, including the leg bones, measured at withers or hips; should be well proportioned
      (c) Front end
         (1) Legs set straight and square, with adequate width between them
         (2) Well-developed crops
         (3) Gracefully joined neck and withers
      (d) Back - straight, with a healthy and adequate loin
      (e) Breed characteristics - traits that distinguish a breed
         (1) Shape of head and neck
         (2) Overall style and balance
   2) Dairy character - evaluation of traits that are a physical indication of high milk production
      (a) Ribs - adequate space between flat and wide bones that slant to the rear
      (b) Long and lean thighs, with plenty of space between them
      (c) Long neck that blends into the shoulders gracefully
      (d) Sharp withers with a pronounced chine
      (e) Pliable skin

3) Body capacity - evaluation of traits indicating that the animal can take in the amount of feed needed for high milk production and has adequate space for proper development of the heart and lungs
   (a) Deep and wide chest
   (b) Deep, wide, and long barrel
4) Feet and legs
   (a) Rear legs observed from the side and rear to check for poor structure
   (b) Strong pasterns
   (c) No swelling of hocks
5) Udder - weighed more heavily than any other category; evaluation of traits that contribute to high milk productivity
   (a) Fore udder with good capacity that blends smoothly into the underline and hangs at the same level as the rear udder
   (b) Strong suspensory ligament that creates a slight division in the floor of the udder
   (c) Rear udder with a pronounced division by a strong suspensory ligament
   (d) Rounded and balanced quarters
   (e) Soft, elastic, and flexible udder tissue
   (f) Teats that are 1.5 to 2.5 inches long, of even size, and hang straight down when udder full
   (g) Large udders more desirable
      (1) Associated with higher milk production, although a very large udder is more likely to be injured
      (2) Floor of the udder - slightly above the point of the hock
      (3) Other measures of udder capacity - width and height of the udder at the point of attachment
   (h) Large mammary veins desirable

b) Performance Data
1) Dairy Herd Improvement Association (DHIA) testing plan
   (a) Official tester from the DHIA
      (1) Visits the dairy production system one day per month
      (2) Takes samples of milk from each cow
      (3) Examines feed and production records
      (4) Weighs the milk produced by each cow
   (b) Summary sent to producer
      (1) Herd summary
      (2) Information on individual cows -daily milk weights, percent butterfat, milk protein, somatic cell count, reproductive potential, value of the milk produced, amount of concentrates fed, and 305-day ME (mature equivalent) milk yields
      (3) Allows producers to compare individual cows within the herd
2) Owner-sampler testing programs - similar to the DHIA tests, but the herd owner takes the samples and records the milk weights

c) Pedigree
1) Provides the production records of an individual cow or heifer, including information on her production potential as well as the production potential of her offspring
2) Provides the production records of ancestors
3) Emphasis placed on the performance of the parents because approximately 50 percent of an animal's genetic makeup is inherited directly from the sire and dam

d) Health and vigor
1) Should come from healthy herds
   (a) Evaluated by examining the number of cows in production, the calving records of cows in the past year, and the amount of milk being produced
   (b) Healthy herd - fertile with high milk production
2) Should check medical records before purchasing cows

(a) Should have tested negative for tuberculosis, leptospirosis, and brucellosis; must be retested if testing was performed more than thirty days prior to purchase
(b) Should not select animals with problems such as mastitis, sterility, and udder problems

2. Ask students what information should be used when selecting sires.

How should dairy sires be selected for breeding?

a) Pedigree - provides information about the milk production of the bull's ancestors
b) Progeny testing
    1) Sire indexes - based on comparing the performance of the daughters of a sire with other animals
    2) Predicted Transmitting Ability (PTA) of certified sires published biannually by the USDA
    3) Values of the indexes
        (a) Indicate the bull's ability to pass on economically important traits, such as pounds of milk produced, protein, milk fat, and body conformation
        (b) Represent the expected amount of difference from the bull's average offspring for a particular trait
    4) Net Merit index
        (a) Economic index that involves using the PTA's for milk, fat, protein, somatic cell score, and productive life
        (b) Starts with the milk-fat-protein economic index
            (1) Milk price of $12.30 per hundredweight
            (2) 3.5 percent fat and 3.2 percent protein
        (c) Subtracts the costs associated with feed and somatic cell counts
        (d) Includes the value of productive life
        (e) Gives a weighting of 10 for yield, 4 for productive life, and -1 for somatic cell score
        (f) Reflects the net contribution that these traits make to income
        (g) Expressed as a dollar value

3. Ask students what sort of information would be required for producers to select animals for production and breeding. Discuss the types of records that need to be kept.

What records need to be kept?

a) Health records
b) Production records from the DHIA or owner-sampler records
c) Freshening dates
d) Breeding dates
e) Drying dates

F. ***Other Activities***

1. Have a guest speaker involved with the dairy industry come speak to the class about selection.

2. Have students contact the different dairy cattle breed associations and find out what criteria are considered to be the most important in the selection of that particular breed.

3. Use the Dairy Cow Unified Score Card to select or evaluate different dairy cattle.

4. Evaluate sire summaries for dairy bulls.

5. Examine selection information on the Holstein Association's website at http://www.holsteinusa.com.

G. ***Conclusion***

Selection of dairy cows is based on four factors: type or physical appearance, production records, pedigree, and health and vigor. Evaluation of appearance is generally based on the Dairy Cow Unified Score Card, which focuses on frame, dairy character, body capacity, feet and legs, and udder. Dairy sires are selected for their ability to pass on traits that will increase milk production in their offspring. Pedigree indexes (sire and total performance) help in predicting the potential production value of a sire.

H. ***Answers to Activity Sheet***

AS 4.1

EEARANPPAC — APPEARANCE (10, 4)

RMAYMMA — MAMMARY (19, 5)

LULC — CULL (6, 9)

RCHAETACR — CHARACTER (2, 16, 17, 18)

PETY — TYPE (12, 8)

PNTOURIOCD — PRODUCTION (7, 1, 11, 13, 14, 15)

TACPACYI — CAPACITY (3)

DAIRY (1 2 3 4 5) COW (6 7) SELECTION (8 9 10 11 12 13 14 15) TERMS (16 17 18 19)

AS 4.2

Answers may vary when students explain their reasoning.

1. c
2. c
3. b
4. a

I. ***Answers to Evaluation***

1. b
2. c
3. d
4. c
5. Frame, dairy character, body capacity, feet and legs, and udder, the most important
6. Approximately 50 percent of an animal's genetic makeup is inherited directly from the sire and dam.
7. Information on individual cows allows producers to compare cows within the herd.
8. Answers may include any one of the following: health records, production records from the DHIA, owner-sampler records, freshening dates, breeding dates, and drying dates.
9. Economic index for evaluating sires that involves using the PTA's for milk, fat, protein, somatic cell score, and productive life.

UNIT III - SELECTION Name _____

Lesson 4: Selecting Dairy Cattle Date _____

EVALUATION

Circle the letter that corresponds to the best answer.

1. In dairy cows, the pin bones should be slightly _____ the hip.

   a. Higher than
   b. Lower than
   c. Inside
   d. Above

2. Which part of the cow's body is evaluated when considering whether an animal has the ability to take in the amount of feed needed for high milk production?

   a. Rump
   b. Mouth
   c. Barrel
   d. Chine

3. A sire index is a type of:

   a. Pedigree.
   b. Health record.
   c. Score card.
   d. Progeny testing.

4. How long should a cow's teats be?

   a. .5 to 1.5 inches
   b. 1 to 2 inches
   c. 1.5 to 2.5 inches
   d. 2 to 3 inches

Complete the following short answer questions.

5. What five categories does the Dairy Cow Unified Score Card measure? Which is most important?

   a.

   b.

   c.

   d.

   e.

6. When evaluating a pedigree, why is emphasis placed on the sire and dam of the animal?

7. How is DHIA testing useful in selecting dairy cows?

8. What is one item of information that should be kept in records used for selection?

9. What is the Net Merit index?

Dairy Cow Unified Score Card

DAIRY COW UNIFIED SCORE CARD

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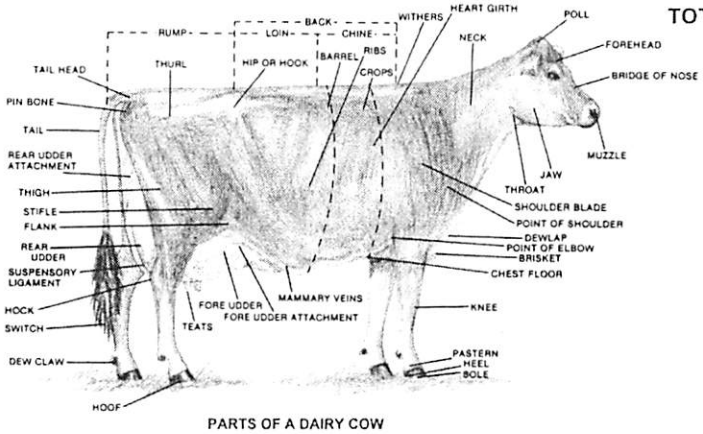
Breed characteristics should be considered in the application of this score card

MAJOR TRAIT DESCRIPTIONS

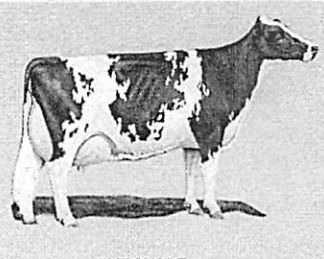
There are five major classification traits on which a classifier bases a cow's score. Each trait is broken down into body parts to be looked at and ranked.

	Perfect Score
1) Frame - 15%	15
The skeletal parts of the cow, with the exception of feet and legs, are evaluated. Listed in priority order, the descriptions of the traits to be considered are as follows:	
Rump - long and wide throughout with pin bones slightly lower than hip bones. Thurls need to be wide apart and centrally placed between hip bones and pin bones. The tailhead is set slightly above and neatly between pin bones, and the tail is free from coarseness. The vulva is nearly vertical. **Stature** - height, including length in the leg bones. A long bone pattern throughout the body structure is desirable. Height at the withers and hips should be relatively proportionate. **Front End** - adequate constitution with front legs straight, wide apart and squarely placed. Shoulder blades and elbows need to be firmly set against the chest wall. The crops should have adequate fullness. **Back** - straight and strong; the loin - broad, strong, and nearly level. **Breed Characteristics** - overall style and balance. Head should be feminine, clean-cut, slightly dished with broad muzzle, large open nostrils and a strong jaw is desirable.	
Rump, Stature, and Front End receive primary consideration when evaluating Frame.	
2) Dairy Character - 20%	20
The physical evidence of milking ability is evaluated. Major consideration is given to general openness and angularity while maintaining strength, flatness of bone and freedom from coarseness. Consideration is given to stage of lactation. Listed in priority order, the descriptions of the traits to be considered are as follows:	
Ribs - wide apart. Rib bones are wide, flat, deep, and slanted toward the rear. **Thighs** - lean, incurving to flat, and wide apart from the rear. **Withers** - sharp with the chine prominent. **Neck** - long, lean, and blending smoothly into shoulders. A clean-cut throat, dewlap, and brisket are desirable. **Skin** - thin, loose, and pliable.	
3) Body Capacity - 10%	10
The volumetric measurement of the capacity of the cow (length x depth x width) is evaluated with age taken into consideration. Listed in priority order the descriptions of the traits to be considered are as follows:	
Barrel - long, deep, and wide. Depth and spring of rib increase toward the rear with a deep flank. **Chest** - deep and wide floor with well-sprung fore ribs blending into the shoulders.	
The Barrel receives primary consideration when evaluating Body Capacity.	
4) Feet and Legs - 15%	15
Feet and rear legs are evaluated. Evidence of mobility is given major consideration. Listed in priority order, the descriptions of the traits to be considered are as follows:	
Feet - steep angle and deep heel with short, well-rounded closed toes. **Rear Legs. Rear View** - straight, wide apart with feet squarely placed. **Side View** - a moderate set (angle) to the hock. **Hocks** - cleanly molded, free from coarseness and puffiness with adequate flexibility. **Pasterns** - short and strong with some flexibility.	
Slightly more emphasis placed on Feet than on Rear Legs when evaluating this breakdown.	
5) Udder - 40%	40
The udder traits are the most heavily weighted. Major consideration is given to the traits that contribute to high milk yield and a long productive life. Listed in priority order, the descriptions of the traits to be considered are as follows:	
Udder Depth - moderate depth relative to the hock with adequate capacity and clearance. Consideration is given to lactation number and age. **Teat Placement** - squarely placed under each quarter, plumb and properly spaced from side and rear views. **Rear Udder** - wide and high, firmly attached with uniform width from top to bottom and slightly rounded to udder floor. **Udder Cleft** - evidence of a strong suspensory ligament indicated by adequately defined halving. **Fore Udder** - firmly attached with moderate length and ample capacity. **Teats** - cylindrical shape and uniform size with medium length and diameter. **Udder Balance and Texture** - should exhibit an udder floor that is level as viewed from the side. Quarters should be evenly balanced; soft, pliable and well collapsed after milking.	
TOTAL	100

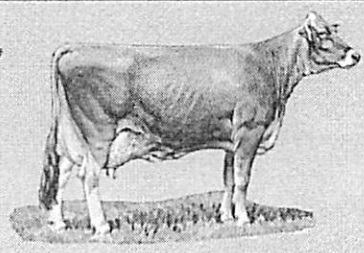


PARTS OF A DAIRY COW

Courtesy of The Purebred Dairy Cattle Association

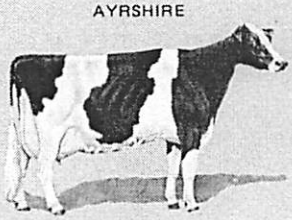


AYRSHIRE

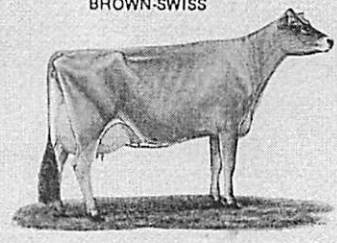


BROWN-SWISS

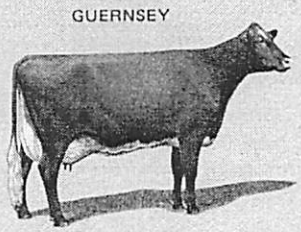
GUERNSEY



HOLSTEIN-FRIESIAN



JERSEY



MILKING SHORTHORN

BREED CHARACTERISTICS

Except for differences in color, size and head character, all breeds are judged on the same standards as outlined in the Unified Score Card. If any animal is registered by one of the dairy breed associations, no discrimination against color or color pattern is to be made.

AYRSHIRE

Strong and robust, showing constitution and vigor, symmetry, style and balance throughout, and characterized by strongly attached, evenly balanced, well-shaped udder.

HEAD-clean cut, proportionate to body; broad muzzle with large, open nostrils, strong jaw; large, bright eyes; forehead, broad and moderately dished; bridge of nose straight; ears medium size and alertly carried.

COLOR-light to deep cherry red, mahogany, brown, or a combination of any of these colors with white, or white alone, distinctive red and white markings preferred.

SIZE-a mature cow in milk should weigh at least 1200 lbs.

HOLSTEIN

Rugged, feminine qualities in an alert cow possessing Holstein size and vigor.

HEAD-clean cut, proportionate to body; broad muzzle with large, open nostrils; strong jaw; large, bright eyes; forehead, broad and moderately dished; bridge of nose straight; ears medium size and alertly carried.

COLOR-black and white or red and white markings clearly defined.

SIZE-a mature cow in milk should weigh a minimum of 1500 lbs.

MILKING SHORTHORN

Strong and vigorous, but not coarse.

HEAD-clean cut, proportionate to body; broad muzzle with large, open nostrils; strong jaw; large, bright eyes; forehead, broad and moderatly dished; bridge of nose straight; ears, medium size and alertly carried.

COLOR-red or white or any combination. (No black markings allowed)

SIZE-a mature cow should weigh 1400 lbs.

BROWN SWISS

Strong and vigorous, but not coarse. Size and ruggedness with quality desired. Extreme refinement undesirable.

HEAD-clean cut, proportionate to body; broad muzzle with large, open nostrils; strong jaw; large, bright eyes; forehead, broad and slightly dished; bridge of nose straight; ears medium size and alertly carried.

COLOR-solid brown varying from very light to dark. Muzzle is black encircled by a mealy colored ring, and the tongue, switch and hooves are black

SIZE-a mature cow in milk should weigh 1500 lbs.

GUERNSEY

Size and strength, with quality and character desired.

HEAD-clean cut, proportionate to body; broad muzzle with large, open nostrils; Strong jaw; large, bright eyes; forehead, broad and slightly dished; bridge of nose straight; ears medium size and alertly carried.

COLOR-a shade of fawn with white markings throughout clearly defined. When other points are equal, clear (buff) muzzle will be favored over a smoky or black muzzle.

SIZE-a mature cow in milk should weigh at least 1150 lbs.

JERSEY

Sharpness with strength indicating productive efficiency.

HEAD-proportionate to stature showing refinement and well chiseled bone structure. Face slightly dished with dark eyes that are well set.

COLOR-some shade of fawn with or without white markings. Muzzle is black encircled by a light colored ring, and the tongue and switch may be either white or black.

SIZE-a mature cow in milk should weigh about 900 lbs.

FACTORS TO BE EVALUATED

The degree of discrimination assigned to each defect is related to its function and heredity. The evaluation of the defect shall be determined by the breeder, the classifier or the judge, based on the guide for discrimination and disqualifications given below.

HORNS
No discrimination for horns.

EYES
1. Blindness in one eye: *Slight discrimination.*
2. Cross or bulging eyes: *Slight discrimination.*
3. Evidence of blindness: *Slight to serious discrimination.*
4. Total blindness: *Disqualification.*

WRY FACE
Slight to serious discrimination.

CROPPED EARS
Slight discrimination.

PARROT JAW
Slight to serious discrimination.

SHOULDERS
Winged: *Slight to serious discrimination.*

TAIL SETTING
Wry tail or other abnormal tail settings: *Slight to serious discrimination.*

CAPPED HIP
No discrimination unless effects mobility.

LEGS AND FEET
1. Lameness - apparently permanent and interfering with normal function: *Disqualification.* Lameness - apparently temporary and not affecting normal function: *Slight discrimination.*
2. Evidence of crampy hind legs: *Serious discrimination.*
3. Evidence of fluid in hocks: *Slight discrimination.*
4. Weak pastern : *Slight to serious discrimination.*
5. Toe out: *Slight discrimination.*

UDDER
1. Lack of defined having: *Slight to serious discrimination.*
2. Udder definately broken away in attachment: *Serious discrimination.*
3. A weak udder attachment: *Slight to serious discrimination.*
4. Blind quarter: *Disqualification.*
5. One or more light quarters, hard spots in udder, obstruction in teat (spider): *Slight to serious discrimination.*
6. Side leak: *Slight discrimination.*
7. Abnormal milk (bloody, clotted, watery): *Possible discrimination.*

LACK OF SIZE
Slight to serious discrimination.

EVIDENCE OF SHARP PRACTICE
(Refer to PDCA Code of Ethics)
1. Animals showing signs of having been tampered with to conceal faults in conformation and to misrepresent the animal's soundness: *Disqualification.*
2. Uncalved heifers showing evidence of having been milked: *Slight to serious discrimination.*

TEMPORARY OR MINOR INJURIES
Blemishes or injuries of a temporary character not affecting animal's usefullness: *Slight to serious discrimination.*

OVERCONDITIONED
Slight to serious discrimination.

FREEMARTIN HEIFERS
Disqualification.

Ideal Udder

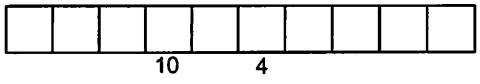
Lesson 4: Selecting Dairy Cattle Name _____

A Dairy Selection Puzzle

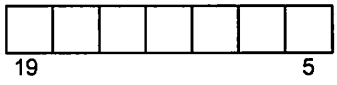
Objective: Demonstrate a knowledge of terms used in selecting dairy animals

Unscramble the clue words. Copy the letters in the numbered cells to other cells with the same number to discover the phrase below.

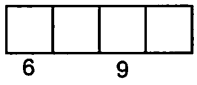
EEARANPPAC



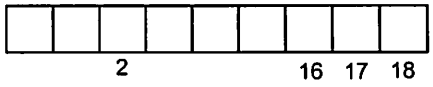
RMAYMMA



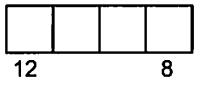
LULC



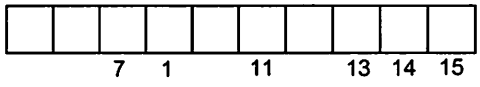
RCHAETACR



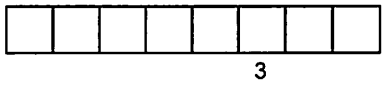
PETY

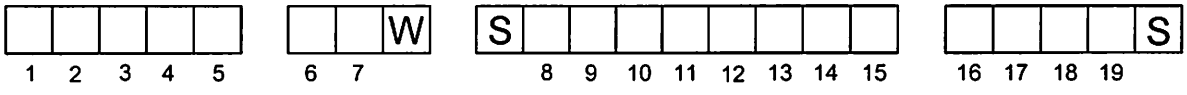


PNTOURIOCD



TACPACYI





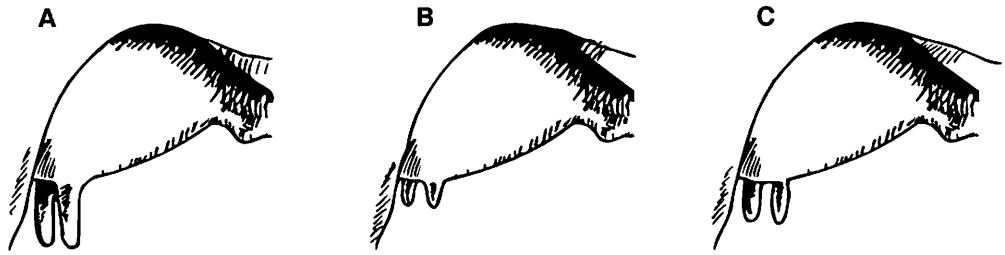
Lesson 4: Selecting Dairy Cattle Name _____

Udder Characteristics

Objective: Select udder with characteristics indicating productivity.

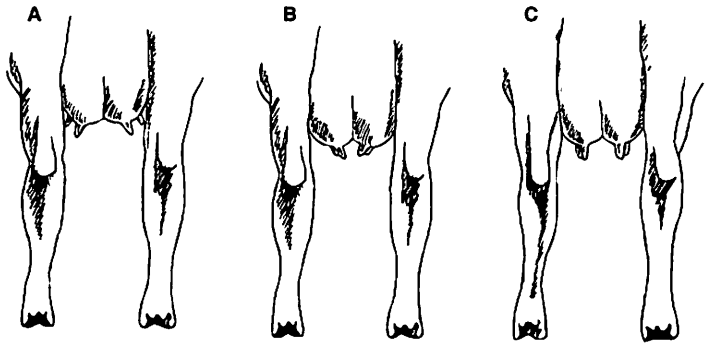
From the pictures below, circle the letter next to the udder that best illustrates the traits indicating high milk productivity. Then, explain your reasoning in the space provided.

1. Teat length

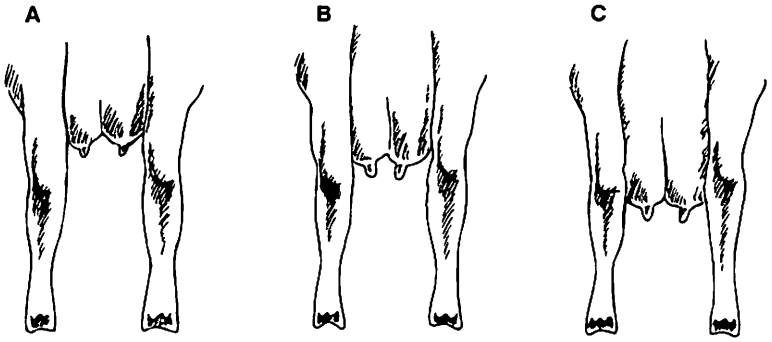


2.5-3 inches **1-1.5 inches** **1.5-2.5 inches**

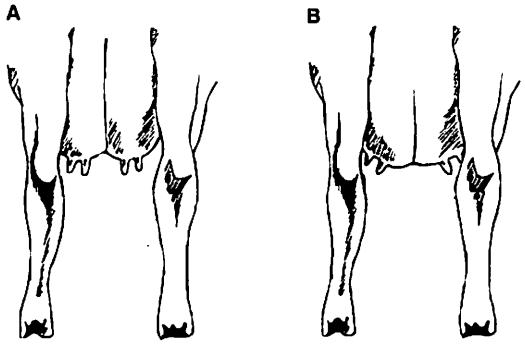
2. Front teat placement



3. Udder cleft



4. Udder depth



UNIT III - SELECTION

Lesson 5: Selecting Swine

Competency/Objective: Select swine for production and breeding.

Study Questions

1. **How should swine be selected for breeding?**

2. **How should swine be selected for production?**

3. **What records need to be kept?**

References

1. *Advanced Livestock Production and Management* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit III.

2. Transparency Master

   a) TM 5.1: Lean and Fat Hogs
   b) TM 5.2: Rear View of a Hog

3. Activity Sheet

   a) AS 5.1: Determining the Sow Productivity Index and Ratio
   b) AS 5.2: Selecting the Best Boar
   c) AS 5.3: Identifying Productive Gilts

UNIT III - SELECTION

Lesson 5: Selecting Swine

TEACHING PROCEDURES

A. ***Review***

Lesson 4 described how dairy cattle are selected for breeding and milk production. In the swine industry, managers must also make important decisions when selecting animals for breeding and production. They must be able to identify quality boars and gilts or sows to eliminate undesirable traits from the herd and emphasize the traits that are in demand in the marketplace.

B. ***Motivation***

Provide students with examples of swine (pictures, slides, live animals on a field trip, etc.) with good and poor conformation. Have students discuss the differences between the animals.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Ask students what factors may influence selection of swine for breeding. Why? Use TMs 5.1 and 5.2 to illustrate muscling and leanness. Hand out AS 5.1 and AS 5.2.

How should swine be selected for breeding?

a) Conformation
   1) Skeletal correctness
      (a) Flat and even top with a balanced and level rump
      (b) Shoulders that slope gradually toward the front feet, with front legs that blend well at the shoulder
      (c) Long, sloping pasterns that enable the animal to walk with long and graceful strides
      (d) When viewed from the front - should have straight legs
      (e) When viewed from the rear - should stand squarely on the hind legs, which should toe out a bit below the pastern
      (f) Even toes
      (g) Should not have unsound legs, such as buck knees, pigeon toes, splayed feet, or cow hocks
   2) Long, large-framed bodies
   3) Body capacity
      (a) Should be adequate for proper development of the lungs and heart.
      (b) Should support a high rate of breeding and feed intake
   4) Muscling
      (a) Wide back, wide loin, and deep rump
      (b) Thick, deep, and smooth ham, which should always be the widest part of the body
      (c) Wide chest and shoulders
      (d) Back that is thinner than the width across the shoulder and ham, creating an hourglass shape.
      (e) Loin eye area
         (1) Measured at the tenth rib
         (2) Indicates the amount of muscling

(3) Loin eye area of more than 6 square inches at 240 pounds for a meaty hog

5) Leanness
   (a) Has an hourglass shape
   (b) Trim through the lower body
   (c) From the rear - arched top of the back rather than squareness indicates fat deposits
   (d) Backfat
      (1) Best indicator of leanness
      (2) Adjusted backfat scans at 240 pounds - between .6 and 1.1 inches

b) Reproductive soundness
   1) Boars
      (a) Should show strong reproductive potential
      (b) Well-developed testicles that are equal in size
      (c) Aggressive disposition
      (d) Strong desire to mate
   2) Sows and gilts
      (a) Should exhibit a well-developed reproductive system
      (b) Vulva
         (1) Indicator of reproductive potential
         (2) Should not use gilts with a small vulva for breeding - symptom of defects in the internal reproductive system
   3) Underline of the animals
      (a) At least six well-developed and sound teats per side in both males and females
      (b) Should not have inverted nipples or uneven spacing

c) Health
   1) Should check an animal's health records to be sure that it has tested negative for brucellosis, leptospirosis, and pseudorabies
   2) Should avoid animals that have watery or infected eyes, are bloated, or are having trouble breathing
   3) Should not select gaunt or listless animals

d) Gain - fast-gaining gilts used for breeding replacements

e) Litter size
   1) Should choose replacement gilts from large litters
   2) Should cull sows that show little mothering ability, such as poor milking ability

f) Performance tests
   1) Swine performance testing stations - test hogs and calculate production information
      (a) Days to 230 pounds
      (b) Backfat depth
      (c) Adjusted average daily gain
      (d) Feed efficiency
      (e) Carcass quality of litter mates
      (f) Loin eye areas
   2) Swine Testing and Genetic Evaluation System (STAGES)
      (a) Developed to evaluate the Expected Breeding Value (EBV) of both boars and sows
      (b) Ranks individual breeding swine, along with their sires and dams, among the rest of the registered animals within a specific breed
      (c) Combines data about backfat thickness, feed efficiency, sow productivity, growth, and carcass merit to determine the genetic superiority of swine
      (d) Reported in the form of Expected Progeny Differences, or EPDs
      (e) Also provides information about pedigrees.
   3) Performance testing systems set up by breed associations
      (a) Production Registry - will accept a litter if it meets certain requirements, including having a group of eight or more litter mates meet the standards for rate of gain for that breed

(b) Certified litter program - incorporates Production Registry standards along with carcass evaluation standards

4) Sow productivity
   (a) Evaluated by looking at data
      (1) Litter size
      (2) Number of pigs weaned per litter
      (3) 21-day litter weight
      (4) Number of litters per sow per year
   (b) Sow Productivity Index (SPI)
      (1) Compares a sow to other farrowing sows in a herd
      (2) Combines values for number born alive and 21-day litter weight into a single value using a formula
      (3) Establishes a ratio by dividing the individual sow's index value by the average index for the herd and multiplying it by 100; average set at 100
      (4) Sows with above average SPI numbers - produce daughters that have larger and heavier litters
5) Maternal and paternal indexes
   (a) Terminal Sire Index (TSI)
      (1) Uses data on leanness and growth, looking at EPDs for the number of days to reach 230 pounds and backfat at 230 pounds
      (2) Used to select terminal sires
   (b) Maternal Line Index (MLI)
      (1) Looks at EPDs for 21-day litter weight, number born alive, days to 230, and backfat at 230 pounds
      (2) Used to select replacement gilts

2. Ask students what characteristics they think are important when selecting swine for production.

How should swine be selected for production?

a) Health
   1) Wormed and castrated
   2) Docked tails
   3) No visible indications of external parasites
b) Size
   1) Selected when between 35 and 80 pounds
   2) Appropriate size for their age
c) Conformation
   1) Meaty feeder pigs - capable of producing the carcass quality that is demanded by consumers
   2) Should be extremely lean and show muscle expression at 50 pounds to maintain their leanness until they reach market weight
   3) Large-framed animals - desirable because they mature later and are leaner at higher weights
   4) Short, fat feeder pig - tend to be overfinished at market weight
   5) Should avoid animals with problems with their legs and feet
d) Uniformity - relatively uniform group in size, age, and condition

3. Ask students what records should be kept for swine production. How about the records needed for swine breeding?

What records need to be kept?

a) Animal health records - can be used for selection for breeding or production
   1) Vaccination dates
   2) Parasite treatments
   3) Past illnesses and their treatments

4) General observations of swine health

b) Reproductive records - for selecting breeding stock
   1) Date of birth
   2) Number of pigs per litter
   3) 21-day litter weights
   4) Farrowing problems
   5) Number of pigs weaned per litter
   6) Number of litters born per sow per year

c) Production records - for selecting breeding stock
   1) Number of days to 230 pounds
   2) Backfat thickness at 230 pounds
   3) Loin-eye area at 230 pounds
   4) Feed efficiency

F. *Other Activities*

1. Have students research different breeds of swine and give a brief presentation about the characteristics of the breed. Discuss when that breed might be selected for production. Would the breed be suitable for the climate of their area?

2. Have students practice judging swine.

G. *Conclusion*

Selecting quality stock for breeding and production is necessary for a profitable operation. When selecting swine for breeding, important criteria include health, conformation, reproductive soundness, and performance testing, such as that provided by the Swine Testing and Genetic Evaluation System (STAGES) and productivity indexes. Other factors affecting selection of sows and gilts is rate of gain and litter size. Feeder pigs are selected according to health, size and conformation, and uniformity. Accurate health, reproductive, and production records can all be an important part of selection in swine production systems.

H. *Answers to Activity Sheet*

AS 5.1

Sow I.D. Number	Number of Pigs Born Alive	21-Day Adjusted Litter Weight	SPI	Ratio
101	10	220.5 lbs.	230.5	107.0
102	8	168.0 lbs.	176.0	81.7
103	11	207.0 lbs.	218.0	101.2
104	12	220.0 lbs.	232.0	107.7
105	9	211.5 lbs.	220.5	102.4

SPI average: 215.4

Sow productivity ranking:

Sow Number

#1 104

#2 101

#3 105

#4 103

#5 102

AS 5.2

1. B
2. +.04 + -.11 = -.15, .15 × $15 = $2.25
3. 100 litters × 8 pigs/litter × $2.25 = $1,800

AS 5.3

Gilt No.	Days from Birth to Weighing	Wt.	Unadjusted BF	Unadjusted LEA	Visual Appraisal	Days to 230	Adjusted BF	Adjusted LEA
8-1	171	215	1.1	4.75	OK	178.5	1.17	4.9
8-2	171	198	1.4	4.70	OK	187	1.58	5.1
8-3	169	210	1.2	4.87	OK	179	1.30	5.1
8-4	170	212	1.5	4.67	Ruptures	179	1.61	4.9
8-5	170	214	1.0	4.78	OK	178	1.06	5.0

Gilt 8-5 should be selected because she takes the fewest days to reach 230 pounds and has the thinnest backfat and a large loin eye.

I. ***Answers to Evaluation***

1. d
2. d
3. a
4. c
5. a
6. An arch

7. Answers may include any two of the following: vaccination dates, parasite treatments, past illnesses and their treatments, and general observations of swine health.

8. At least six evenly spaced teats
9. Size, age, and condition
10. More than 6 square inches at 240 pounds

11. Answers may include any two of the following: number of days to 230 pounds, backfat thickness at 230 pounds, loin-eye area at 230 pounds, and feed efficiency.

12. Internal reproductive defects

UNIT III - SELECTION Name _____

Lesson 5: Selecting Swine Date _____

EVALUATION

Circle the letter that corresponds to the best answer.

1. Which of these traits is evaluated for a Sow Productivity Index?

   a. Days to 230 pounds
   b. Number of litters per year
   c. Number of pigs weaned per litter
   d. 21-day litter weight

2. The _____ should be the widest part of a hog's body.

   a. Shoulder
   b. Back
   c. Belly
   d. Ham

3. Before buying replacement breeding stock, health records should be checked to make sure the animals have been vaccinated for:

   a. Brucellosis.
   b. Tuberculosis.
   c. Pneumonia.
   d. Rabies.

4. The back of a lean, well-muscled hog is shaped like a _____ when viewed from above.

   a. Square
   b. Oval
   c. Hourglass
   d. Rectangle

5. Which of the following is a criteria for selection for both breeding and production?

   a. Conformation
   b. Litter size
   c. Reproductive soundness
   d. Performance tests

Complete the following short answer questions.

6. When viewed from the rear, what shape should the top of the hog's back have?

7. What are two items of information needed in health records used for selection?

   a.

   b.

8. How many teats should a boar or a sow used for breeding have? How should they be spaced?

9. When determining whether a group of animals is uniform, what three factors should be considered?

   a.

   b.

   c.

10. What is a desirable loin-eye area for breeding stock?

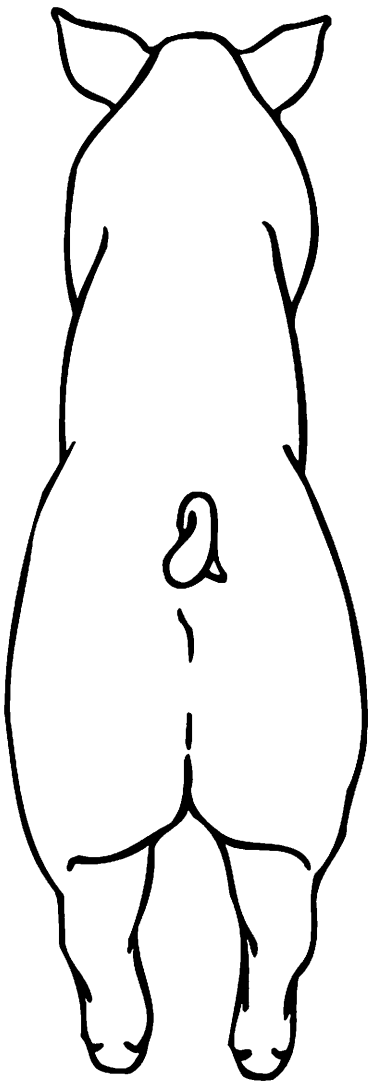
11. What are two types of information included in production records that can be used to aid in selection?

   a.

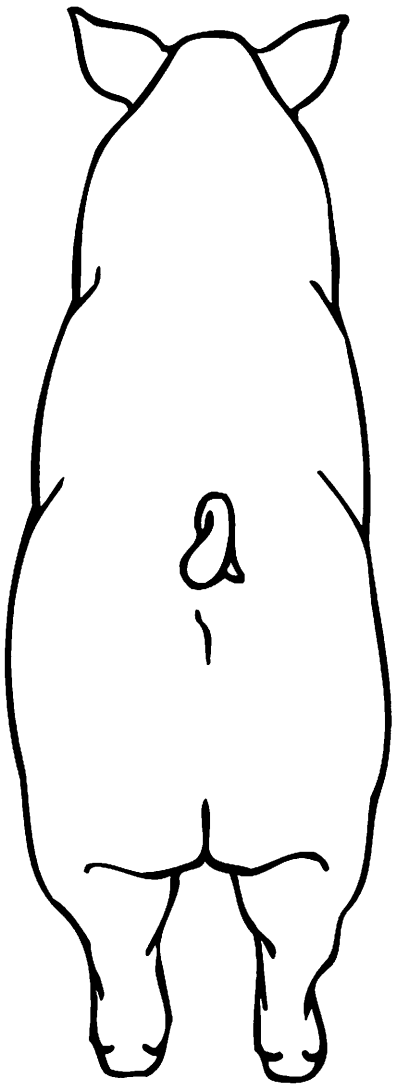
   b.

12. What can a small vulva in gilts indicate?

Lean and Fat Hogs

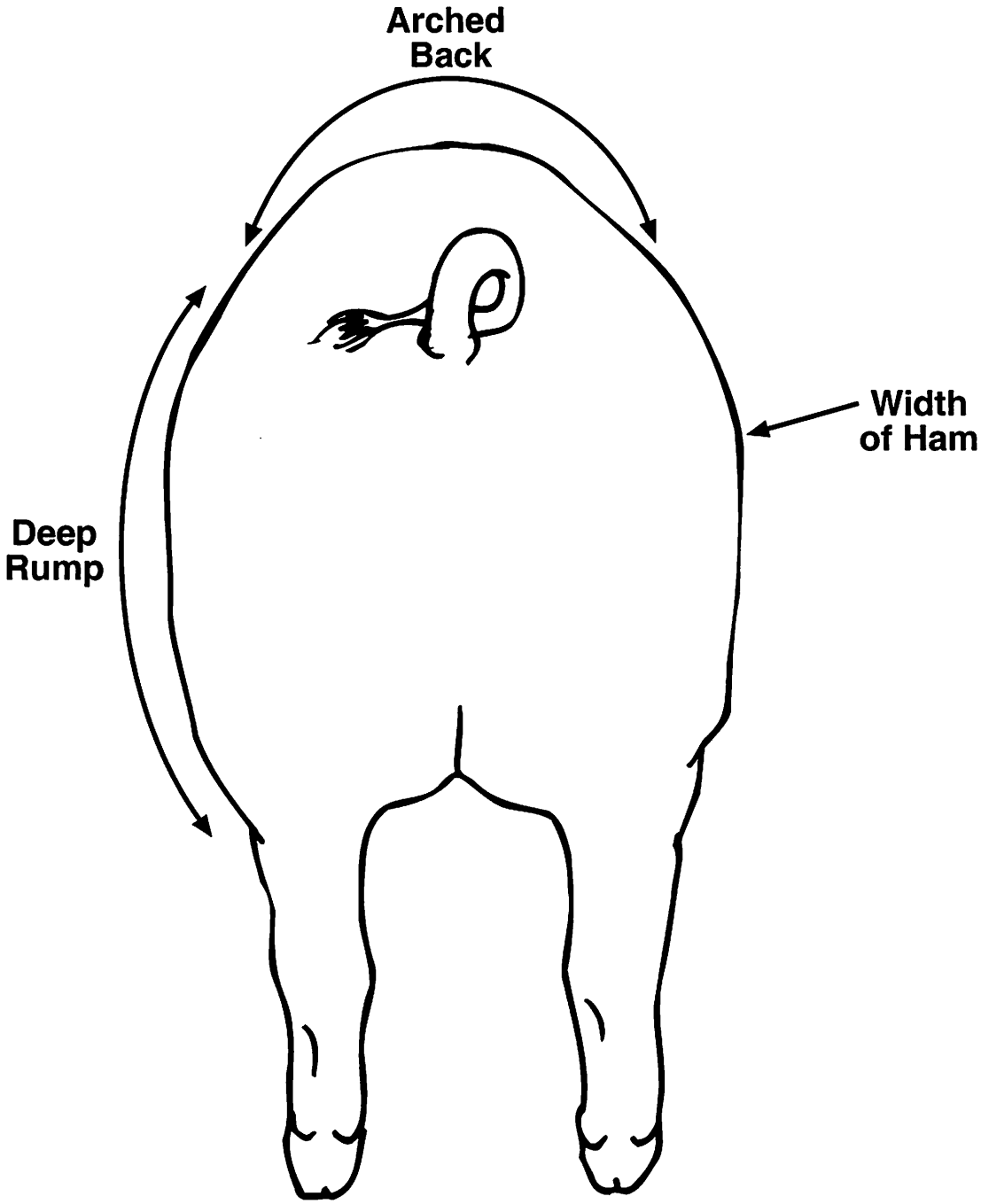


Lean



Fat

Rear View of a Hog



Lesson 5: Selecting Swine Name_____

Determining the Sow Productivity Index and Ratio

Objective: Evaluate and select the highest producing sows in a sow herd.

Using the formulas below, determine the Sow Productivity Index (SPI) for each sow. After finding the average SPI, determine the SPI ratio and rank the sows according to productivity.

$$SPI = \text{Number of pigs born alive} + \text{21-day adjusted litter weight}$$

$$SPI\ ratio = \frac{Individual\ SPI}{Herd\ SPI\ average} \times 100$$

Sow I.D. Number	Number of Pigs Born Alive	21-Day Adjusted Litter Weight	SPI	Ratio
101	10	220.5 lbs.		
102	8	168.0 lbs.		
103	11	207.0 lbs.		
104	12	220.0 lbs.		
105	9	211.5 lbs.		

SPI average: _____

Sow productivity ranking:

Sow Number

#1 _____

#2 _____

#3 _____

#4 _____

#5 _____

Lesson 5: Selecting Swine Name_____

Selecting The Best Boar

Objective: Select the best animal using the performance data presented.

Read the following EPD scenarios and answer the questions.

According to the swine semen catalog, Boar A has a backfat thickness EPD of +.04, and Boar B has an EPD of -.11 for the same trait. According to the pamphlet "Guidelines for Uniform Swine Improvement Programs" (1996), the value of decreasing backfat thickness by one inch is estimated at $15. Answer the following questions.

1. Which boar should produce offspring with the least backfat? _____

2. What would be the difference in value per pig between Boar A and B? (Show your work below.)

   $ _____

3. If 100 litters were produced by the superior boar above, with an average of 8 pigs per litter, what should be the difference in value of the progeny? (Show your work below.)

   $ _____

Lesson 5: Selecting Swine Name_____

Identifying Productive Gilts

Objective: Select the most productive gilt for reproduction using performance data.

Using the three formulas below, complete the performance data chart and select the most productive gilt for reproductive purposes. Then answer the question below.

$$\textit{Days to 230 pounds} = \frac{230 - \textit{weight}}{2} + \textit{days from birth to weighing}$$

$$\textit{Backfat (Adjusted)} = (230 - \textit{actual weight} \times .004 + 1) \times \textit{unadjusted backfat}$$

$$\textit{Loin Eye Area (Adjusted)} = (230 - \textit{weight} \times .015) + \textit{unadjusted LEA}$$

Gilt No.	Days from Birth to Weighing	Wt.	Unadjusted BF	Unadjusted LEA	Visual Appraisal	Days to 230	Adjusted BF	Adjusted LEA
8-1	171	215	1.1	4.75	OK			
8-2	171	198	1.4	4.70	OK			
8-3	169	210	1.2	4.87	OK			
8-4	170	212	1.5	4.67	Ruptures			
8-5	170	214	1.0	4.78	OK			

Which of the gilts should be selected for the breeding herd? Why?

UNIT III - SELECTION

Lesson 6: Selecting Sheep

Competency/Objective: Select sheep for production and breeding.

Study Questions

1. **How should sheep be selected for breeding?**

2. **How should sheep be selected for production?**

3. **What records need to be kept?**

References

1. *Advanced Livestock Production and Management* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit III.

2. Transparency Masters

   a) TM 6.1: Entropion
   b) TM 6.2: Jaw Defects

3. Activity Sheet

   a) AS 6.1: Selecting Ewes and Rams
   b) AS 6.2: Calculating the Adjusted Weights of Lambs

UNIT III - SELECTION

Lesson 6: Selecting Sheep

TEACHING PROCEDURES

A. ***Review***

In Lesson 5, the criteria for selecting swine for breeding and production were described. When selecting sheep for breeding, farm managers usually look for traits that need to be improved within their flock for more profitable production. Producers who are selecting lambs for finishing focus on the traits that will allow the animal to produce meat profitably.

B. ***Motivation***

Show the students pictures of sheep. Ask them what areas of the body they would look at when evaluating sheep.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Ask students which criteria are important for selecting sheep for breeding. Why? TMs 6.1 and 6.2 can be used to illustrate various defects. Hand out AS 6.1 and 6.2.

How should sheep be selected for breeding?

a) Conformation
   1) Wide, deep ribs
   2) Stands wide, with legs set at each corner of the body
   3) Deep chest allowing plenty of room for proper development of the lungs and heart
   4) Excess fat indicators - thick breast, middle, flank, or twist or fullness behind the shoulders or heart girth
   5) Muscular and lean top, not square and boxy
   6) Very little fat and heavy muscling
   7) Majority of a lamb's weight in its legs and loin
   8) Heavy muscling in the rump and loin
   9) Long and smooth shoulder
   10) Balanced rump
   11) Stands squarely on all four legs
   12) Strong feet and legs with a good amount of space between them
   13) Weight evenly distributed on all four feet
   14) Relatively straight pasterns
   15) Should be able to walk gracefully with long strides
   16) No problems with its front legs
      (a) Buck-kneed
      (b) Pigeon-toed
      (c) Calf-kneed
      (d) Weak pasterns
      (e) Splayed feet
   17) No incorrect skeletal structure in the hind legs
      (a) Post-legged
      (b) Sickle-hocked
      (c) Weak pasterns

(d) Cow-hocked
(e) Bow-legged

18) Long neck
19) Wide forehead, with a relatively wide space between the eyes
20) No eye problems
(a) Entropion - inverted eyelids
(b) Ectropion eyelids - loose, saggy
21) Open rather than wooly face
22) Jaws meet and are correctly centered, with the teeth in the lower jaw meeting the dental pad in the upper jaw
23) No jaw defects
(a) Parrot mouth - short lower jaw that causes the upper dental pad to protrude
(b) Monkey mouth - undershot jaw causing the lower teeth to protrude
(c) Scratched mouth - correct jaw position but the teeth miss the dental pad

b) Size and scale
1) Large-framed rams - often selected to breed to medium-sized ewes
2) Different standards for size and scale for each breed of sheep

c) Sex character
1) Ewes
(a) Feminine - more refined with sleek and graceful lines in the neck and head
(b) Sound udders and teats
2) Rams
(a) Masculine and more rugged than ewes
(b) Broader and stronger neck and face
(c) Superiority in growth and muscle development
(d) Proper testicular development and adequate scrotal circumference
(1) Varied standards for scrotal circumference between the different breeds
(2) Ram at puberty (5 to 7 months of age) - at least 12 to 13 inches

d) Reproductive efficiency
1) Customarily selected from a set of triplets or twins
2) Ewe lambs - More fertile and usually have higher lamb production throughout their lives if they reach puberty in the first year
3) Mothering ability - evaluated by looking at the weaning weight of lambs at 60 days of age, the best indicator of milking ability

e) Growth
1) Growth rate - estimated using birth, weaning, and yearling weights
2) Heavier birth weight - more rapid growth
3) Higher risk of lambing complications with heavier lambs
4) Common times to wean a lamb - 60, 90, or 120 days
(a) Weaning weight at any of these three ages - clue of the future growth potential of a ewe lamb
(b) Weaning weights at 60 days - not used to select for ram lambs, because they will not have expressed their potential growth
(c) Weaning at 90 days - most common; allows for selection of both genders

f) Fleece characteristics
1) Tight, dense, and long
2) Fleece grade - indicates the fiber's diameter, which should be uniform throughout the entire fleece
3) Selection of wool breeds - based on an evaluation of uniformity, length, and fineness of the fiber
4) Wool breed sheep - about 12 pounds of wool annually
5) Meat breed animal - about 6 to 8 pounds per year

g) Performance data
1) National Uniform Sheep Selection Program ewe index
(a) Evaluates a ewe's reproductive efficiency, milking ability, and wool production
(b) Only intended for comparing ewes from the same flock

2) National Extension Sheep Committee lamb index for comparisons within a flock, placing emphasis on multiple births, growth rate, and wool production
3) National Sheep Improvement Program (NSIP)
   (a) Provides estimates of the genetic potential or value of breeding sheep
   (b) Information on the genetic value of the sheep based on pedigrees and performance records
   (c) Includes values for fleece, growth, and reproductive traits in the form of a Flock Estimated Progeny Difference (FEPD)
      (1) Provides an estimate of the genetic value of every ewe, ram, or lamb in a flock for the traits selected by the producer
      (2) Can only be used to compare animals within the same flock
      (3) Involve the comparison of the performance of the offspring of an individual with the performance of the offspring of an average animal
      (4) Positive FEPD values - above average performance
      (5) Negative values - below average performance
      (6) Values based on the performance of the individual animal and all its relatives
      (7) Traits measured - number of lambs born, total litter weight at 60 days of age, and individual weights at various ages
      (8) Values for wool producers - clean or grease fleece weight, staple length, and fiber diameter

2. Ask students how sheep are selected for production. Discuss the characteristics evaluated when selecting feeder lambs.

How should sheep be selected for production?

a) Health
   1) Alert lambs
   2) No obvious signs of illness, such as coughing, weakness, or dull wool
   3) Free of signs of parasites
b) Conformation
   1) Preferably lean animals with proper skeletal structure
   2) No problems with their jaws or legs and feet, since these problems slow down growth and development
   3) Heavily muscled and is neither too fat nor too thin
   4) Majority of its weight in the leg and loin area
   5) Well muscled in the rump and loin, which should be deep and wide
   6) Wide chest to allow adequate muscling
   7) Wide ribs
   8) Thick and smooth forearms
   9) Muscular and lean top, not square and boxy
c) Weight
   1) Three weight standards for feeder lambs
      (a) Light - 60 to 75 pounds
      (b) Medium - 75 to 85 pounds
      (c) Heavy - 85+ pounds
   2) More efficient production from lambs that have a higher weight as long as the weight is from muscle and not excess fat
d) Sex
   1) Wethers (castrated rams) - preferred because they tend to gain faster and yield a carcass with higher cutability than ewe lambs
   2) Ram lambs - even faster rate of gain and carcass traits superior to wethers, but are commonly docked in price at lamb markets

3. Ask students what types of records are important to selection in sheep production systems.

What records need to be kept?

a) Health records - for selection for both breeding and production
   1) Vaccinations
   2) Treatments for parasites
   3) Veterinary care for health problems
b) Breeding and production records - for selection for breeding
   1) Data on an individual animal needed for selection purposes
      (a) Identification of the sire and dam
      (b) Birth weight
      (c) Type of birth
      (d) Weaning weight
      (e) Yearling weight
   2) Other records indicating reproductive efficiency of a ewe
      (a) Number of lambs born
      (b) Number weaned
      (c) Lambing difficulties
   3) Wool production records
      (a) Fleece weight
      (b) Staple length

F. ***Other Activities***

1. Have students research different breeds to determine which breeds (both meat and wool) might be selected in their area, given the local climate.

2. Have students practice judging sheep.

G. ***Conclusion***

Selecting good quality sheep is important for producers, because selection affects performance and profits. When selecting animals for breeding, producers need to examine a number of factors: conformation, size and scale, sex character, reproductive efficiency, growth, fleece characteristics, and performance data. The selection of feeder lambs for finishing is less complex, since fewer traits are considered; selection focuses on the health, conformation, weight, and sex of the lamb. Complete health, breeding, and production records can be valuable tools for selection, particularly of breeding animals.

H. ***Answers to Activity Sheets***

AS 6.1

Student's answers may vary but should include most or all of the following.

Conformation
- Structural correctness of feet, legs, face, and mouth
- Muscling
- Fat covering
- Balance

Size and scale
- Compared to breed standards

Sex character
- Feminine; sound udder and teats
- Masculine; proper scrotal circumference

Reproductive efficiency
- Fertility
- Mothering ability

Growth
- Birth, weaning, and yearling weights

Fleece characteristics
- Fleece grade
- Amount

Performance data
- FEPD values
- Ewe index
- Lamb index

AS 6.2

1. $\frac{86}{105}$ = .82 x 120 = 98 x .94 = 92.4 pounds

2. $\frac{92}{110}$ = 83.6 x 120 = 100.4 x 1.17 = 117.5 pounds

I. ***Answers to Evaluation***

1. c
2. a
3. d
4. b
5. e
6. b
7. d
8. Health, conformation, weight, sex
9. A ewe index and a lamb index
10. Because they tend to gain faster and yield a carcass with higher cutability than ewe lambs

11. Answers may include any four of the following: identification of the sire and dam, birth weight, type of birth, weaning weight, yearling weight, number of lambs born, number weaned, lambing difficulties, fleece weight, staple length.

12. An FEPD provides an estimate of the genetic value of every ewe, ram, or lamb in a flock for the traits selected by the producer.

UNIT III - SELECTION Name _____

Lesson 6: Selecting Sheep Date _____

EVALUATION

Match the terms in the column on the right with the descriptions in the column on the left.

1. _____ Undershot jaw
2. _____ Short lower jaw
3. _____ Inverted eyelids
4. _____ Teeth miss dental pad
5. _____ Loose, saggy eyelids

a. Parrot mouth
b. Scratched mouth
c. Monkey mouth
d. Ectropian
e. Entropian

Circle the letter that corresponds to the best answer.

6. What should the scrotal circumference of rams be at puberty?

   a. At least 10 to 11 inches
   b. At least 12 to 13 inches
   c. At least 14 to 15 inches
   d. At least 16 to 17 inches

7. How much wool should a sheep from a wool breed produce in a year?

   a. About 9 pounds of wool
   b. About 10 pounds of wool
   c. About 11 pounds of wool
   d. About 12 pounds of wool

Complete the following short answer questions.

8. What are four factors to consider when selecting feeder lambs for production?

   a.

   b.

   c.

   d.

9. What are two types of indexes that have been developed to help evaluate the performance of sheep for selection?

10. Why are wethers preferred when selecting feeder lambs?

11. What are three items of information contained in breeding and production records that may be useful when selecting breeding stock?

    a.

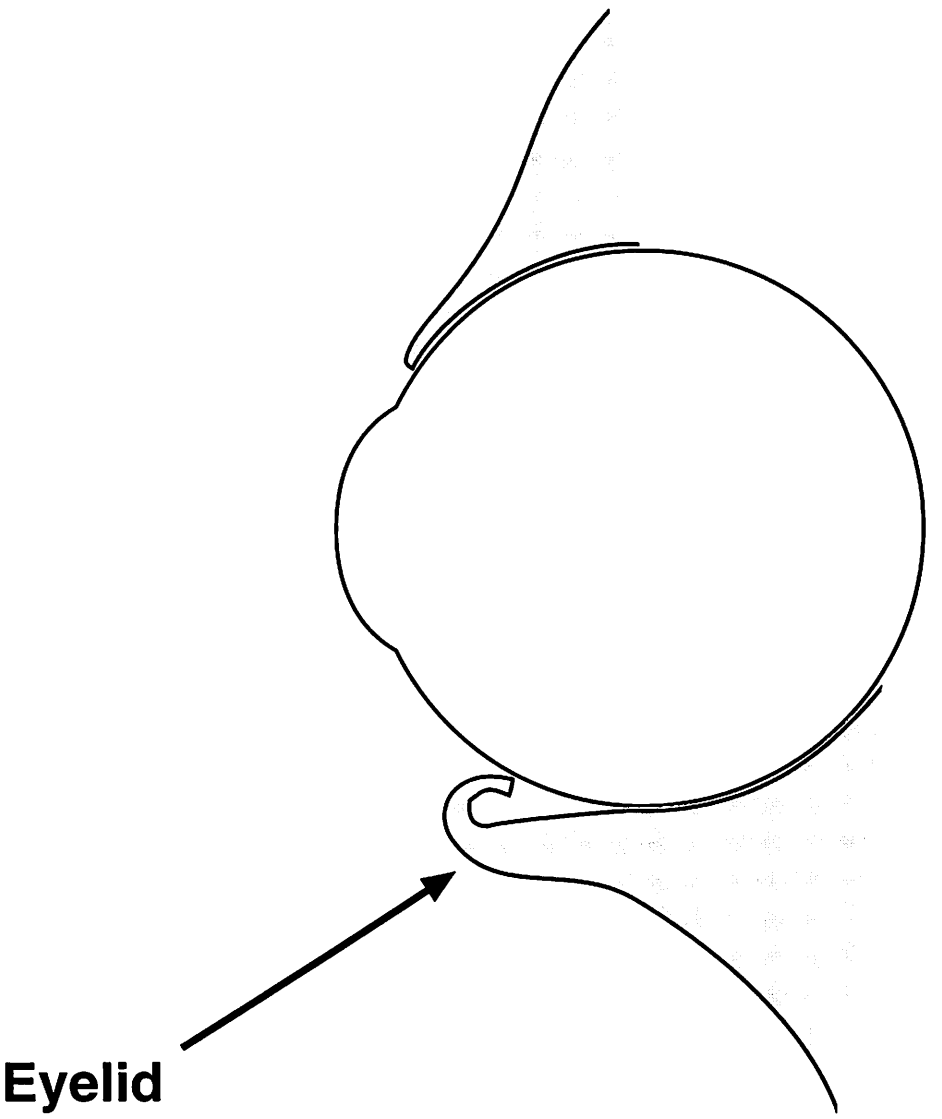
    b.

    c.

    d.

12. What is an FEPD?

Entropion



Jaw Defects

Parrot Mouth

Monkey Mouth

Lesson 6: Selecting Sheep Name _____

Selecting Ewes and Rams

Objective: Demonstrate knowledge of the criteria used in selecting breeding sheep.

Assume you are beginning a sheep enterprise on your farm. Review the lesson and list as many characteristics or criteria as you can that you would use in selecting your breeding ewes and rams. Consider conformation, size, sex characteristics, reproductive efficiency, growth, fleece, and performance data.

Lesson 6: Selecting Sheep Name _____

Calculating the Adjusted Weights of Lambs

Objective: Calculate the adjusted weight of lambs using the supplied information.

Read the scenarios and calculate the adjusted weights of the lambs using the information in the table.

Example: Find the adjusted 120-day weight of a twin-born and raised ram lamb from a 2-year-old ewe. The lamb weighed 90 pounds at 110 days of age.

$$\frac{90\ lbs.}{110\ days\ of\ age} = .82\ lbs.\ x\ 1.09\ (adjustment\ factor) = 107\ pounds$$

1. Find the adjusted 120-day weight of a twin-born ram lamb that was born to a 4-year-old ewe. It weighed 86 pounds at 105 days of age. The lamb was raised as a single.

2. Find the adjusted 120-day weight of a ram lamb that weighed 92 pounds at 110 days of age. This lamb was a triplet from a 7-year-old ewe. It was raised as a twin.

	Age of Dam		
	3 to 6 Years Old	2 Years Old or over 6 Years Old	1 Year Old
Ram Lamb			
Single	.89	.98	1.11
Twin--Raised as twin	1.00	1.09	1.22
Twin--Raised as single	.94	1.03	1.17
Triplet--Raised as triplet	1.11	1.22	1.35
Triplet--Raised as twin	1.06	1.17	1.31
Triplet--Raised as single	1.00	1.10	1.25

UNIT III - SELECTION

Lesson 7: Selecting Horses

Competency/Objective: Select horses for performance and breeding.

Study Questions

1. **How should horses be selected for performance?**

2. **How should horses be selected for breeding?**

3. **What records need to be kept?**

References

1. *Advanced Livestock Production and Management* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit III.

2. Transparency Master

   a) TM 7.1: Leg Structure - Front View
   b) TM 7.2: Leg Structure - Rear View
   c) TM 7.3: Front Leg Structure - Side View
   d) TM 7.4: Rear Leg Structure - Side View
   e) TM 7.5: Gaits

3. Activity Sheet

   a) AS 7.1: Selecting the Appropriate Horse

UNIT III - SELECTION

Lesson 7: Selecting Horses

TEACHING PROCEDURES

A. ***Review***

Lesson 6 described the factors that are considered when selecting sheep for breeding and production. Like sheep, which provide more than one product (meat and wool), horses serve more than one role and have been selected and bred for different purposes. Therefore, before purchasing a horse, the tasks the animal will be expected to perform should be considered. Horses have different general uses: pleasure, breeding, show, sport, and work. A horse used for one of these tasks may not necessarily be successful at performing the others. Its use will play a major role in determining the importance of factors that should be considered in selection.

B. ***Motivation***

Have students look at horses of different breeds. They may break up into groups and prepare a brief presentation about a particular breed. The students should discuss characteristics and tasks of that breed, noting how the characteristic shape of the animal's body may help it perform. (For example, Clydesdales are draft horses. They have very heavy muscling, which they use for pulling power.)

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Ask students how people use horses. Have them describe the desirable characteristics of a horse in regard to the tasks that may be expected of it. Use TM 7.1, 7.2, 7.3, 7.4, and 7.5 when discussing conformation of the feet and legs.

How should horses be selected for performance?

a) Temperament
   1) Good temperament - cooperative and passive, showing a desire to get a job done
   2) Bad temper - mean, moody, stubborn, and aggressive, and may be dangerous to humans and other livestock
   3) Expressed through body language
      (a) Passive and cooperative - points its ears forward and is calm and receptive to training and handling
      (b) Bad disposition - lays its ears back, has wide eyes, and throws its head back; is liable to kick or bite
   4) Affected by the sex of the animal
      (a) Stallions - more difficult to handle than geldings or mares
      (b) Mares - less feisty disposition than stallions but are prone to sporadic mood changes due to hormone fluctuations
      (c) Geldings - generally more calm

b) Conformation
   1) Undesirable traits
      (a) Blemish - any abnormality that has no effect on performance
      (b) Unsoundness
         (1) Abnormality that affects the horse's performance
         (2) May be inherited or a result of improper management
   2) Should not be too wide nor too narrow in the chest

3) Body capacity in the chest - adequate for proper development of the heart, lungs, and digestive system
4) Well sprung, long ribs; should not be visible but easily felt during handling
5) Short, straight back with enough muscle to support a rider
6) Well muscled, especially in the hindquarters to power movement
7) Long, lean, and smooth neck with well-developed muscles and a graceful, arch-like form
8) Prominent point where the neck meets the shoulder
9) Refined, proportional head held high
10) Long triangle shape to the head when viewed from the front
11) Lips and teeth that meet evenly
12) Large nostrils
13) Prominent eyes with no sight problems, such as blindness or moon blindness
14) Small and active ears
15) Deep shoulders set at a long, downward-sloping angle toward the front feet
16) Viewing the feet and leg structure from the front
    (a) The horse should have straight front legs and feet from the forearm to the hoof.
    (b) Animals should not be splay-footed, pigeon-toed, bow-legged, or knock-kneed.
    (c) Horses should not stand with the front legs too far apart or too close together.
17) Evaluating the hind legs from a rear view
    (a) The width and narrowness of the base of the horse should also be considered.
    (b) The horse should be examined for other unsound leg structures, such as being bow-legged or cow-hocked.
18) Evaluating legs from the side
    (a) Front legs should not be camped out or under, calf-kneed, or buck-kneed.
    (b) The rear legs should not be camped out or under, post-legged, or sickle-hocked.
    (c) The hind feet should toe-out slightly.
    (d) The pastern and the hoof of the front leg should form a 45-degree angle with the ground, while the rear leg should have a 50-degree angle.
    (e) The heel should not be too high or too low.
19) Should ideally walk with legs moving only in a forward motion, but feet may move inward or outward

c) Size - big enough to perform the tasks the horse is expected to do, including carrying a rider

d) Health
1) Healthy horse - alert, shows a good appetite, and has a shiny, smooth coat
2) Symptoms of health problems - dull, rough coat, listlessness, or a bloated belly
3) Buyers
    (a) The buyer should request to see all medical records, including deworming schedules and vaccinations.
    (b) He or she may want a veterinarian to perform a pre-purchase health evaluation to ensure that the animal is healthy.

e) Age
1) In their prime - between the ages of five and eight years
    (a) Young foals - greater risk of unsoundness and injury; require an investment in training
    (b) Older horses - less expensive and generally good for training novice riders
2) Estimated by looking at the horse's teeth

2. Ask students what characteristics are important in selecting horses for breeding. Why?

How should horses be selected for breeding?

a) Conformation - should be the same as for performance
b) Temperament - should have a good disposition, since a horse with a bad temper is dangerous to his or her mate
c) Reproductive soundness
    1) Stallions
        (a) Stallions should appear masculine and have fully developed testicles.
        (b) To ensure fertility, breeders tend to perform fertility tests on stallions twice, once before mating and again afterwards.
    2) Mares
        (a) Mares should appear feminine.
        (b) Having a veterinarian perform a breeding soundness examination on mares before the breeding season begins is advisable.
        (c) If the horse is twelve years old or older, an examination is imperative.
d) Performance data
    1) Registered stallions and mares - breeding and production records from breed associations
    2) Show and race horses - performance records that indicate their merit in those areas
e) Pedigree
    1) Important for horses that will be used for show or racing
    2) Most useful when an animal is young and untrained, because its worth is more difficult to determine at that stage

3. Discuss the records that can be used for the purposes of selection.

What records need to be kept?

a) Breeding and production records for mares
    1) Birth date
    2) Number of times bred
    3) Number of times settled
    4) Number of live foals produced
    5) Performance records of foals
b) Breeding and production records for stallions
    1) Name, breed, registration number, owner's name, and date of service for each mare bred
    2) Number of mares bred
    3) Number of mares settled
    4) Number of live foals produced
    5) Performance records for foals
c) Health records
    1) Deworming schedules
    2) Vaccinations

F. ***Other Activities***

1. Have students request information from different horse breed associations and prepare poster board displays of the breeds and their expected performance.

2. Take a field trip to observe horses and their behavior. This observation can also be done by watching equestrian shows on television.

3. Obtain the movie "Equine Reproduction" from Creative Educational Video (CEV). It contains information on the selection of breeding stock as well as other aspects of reproduction. This video may also be used with Lesson 6 in Unit IV.

4. The American Quarter Horse Association (AQHA) has videos available on the selection of animals as well as a number of other topics. These videos are available for free loan to teachers and can be obtained by contacting the association.

G. ***Conclusion***

One of the most important aspects of selecting a horse is specifying the tasks of the animal, which may include breeding, sport, show, work, or pleasure. Whatever its use, selecting a horse with a bad disposition is unwise. The conformation of the horse is another important consideration, along with its size, health, and age; reproductive soundness is important in breeding animals. If a horse will be used for breeding, performance, production, and breeding records will provide necessary information, while pedigrees may also be valuable tools for selection. A horse with weaknesses should never be used for breeding, even if it excels in a desired trait. Breeding a horse that has an average performance for the desired trait and no weaknesses is a better idea. The improvement may occur more slowly, but it will be more efficient in the long run since no other problems are introduced into the bloodlines.

H. ***Answers to Activity Sheet***

1. Becky should purchase Horse B. A stock-type mare of 14 years of age and some training should be gentle enough for her to handle after receiving experience and training. The price is also the most affordable.

2. Tony should purchase Horse C. The western gelding should be young enough to perform in a rodeo roping event and is possibly familiar with working cattle.

3. Debbie should purchase Horse A. She must have a stallion to use on her breeding farm, and the thoroughbred will meet her racing needs. Earnings from the horse's career may support the purchase.

I. ***Answers to Evaluation***

1. d
2. b
3. c
4. d

5. A horse with a bad temper is dangerous to his or her mate.

6. Conformation, temperament, reproductive soundness, performance data, and pedigree

7. A blemish is any abnormality that has no effect on performance, such as a scar. Unsoundness refers to an abnormality that affects the horse's performance, either inherited or a result of improper management.

8. Answers may include any two of the following: name, registration number, birth date, number of times bred, number of times settled, number of live foals produced, and performance records of foals.

UNIT III - SELECTION Name _____

Lesson 7: Selecting Horses Date _____

EVALUATION

Circle the letter that corresponds to the best answer.

1. The ears of a bad-tempered horse are:

   a. Floppy.
   b. Pricked forward.
   c. Swiveling.
   d. Laid back.

2. When selecting a horse for a novice rider, what type of horse should be chosen while he or she learns how to ride?

   a. A young untrained horse
   b. An older, passive horse
   c. A horse in its prime
   d. A small horse

3. When is a horse in its prime?

   a. At 1 to 3 years of age
   b. At 3 to 5 years of age
   c. At 5 to 8 years of age
   d. At 8 to 11 years of age

4. To ensure soundness, how often is a stallion tested for fertility?

   a. Once a year
   b. Every spring and fall
   c. Before mating
   d. Before and after mating

Complete the following short answer questions.

5. Why is a horse with a bad temper not desirable for breeding?

6. What five factors affect the selection of horses for breeding?

   a.

   b.

   c.

   d.

   e.

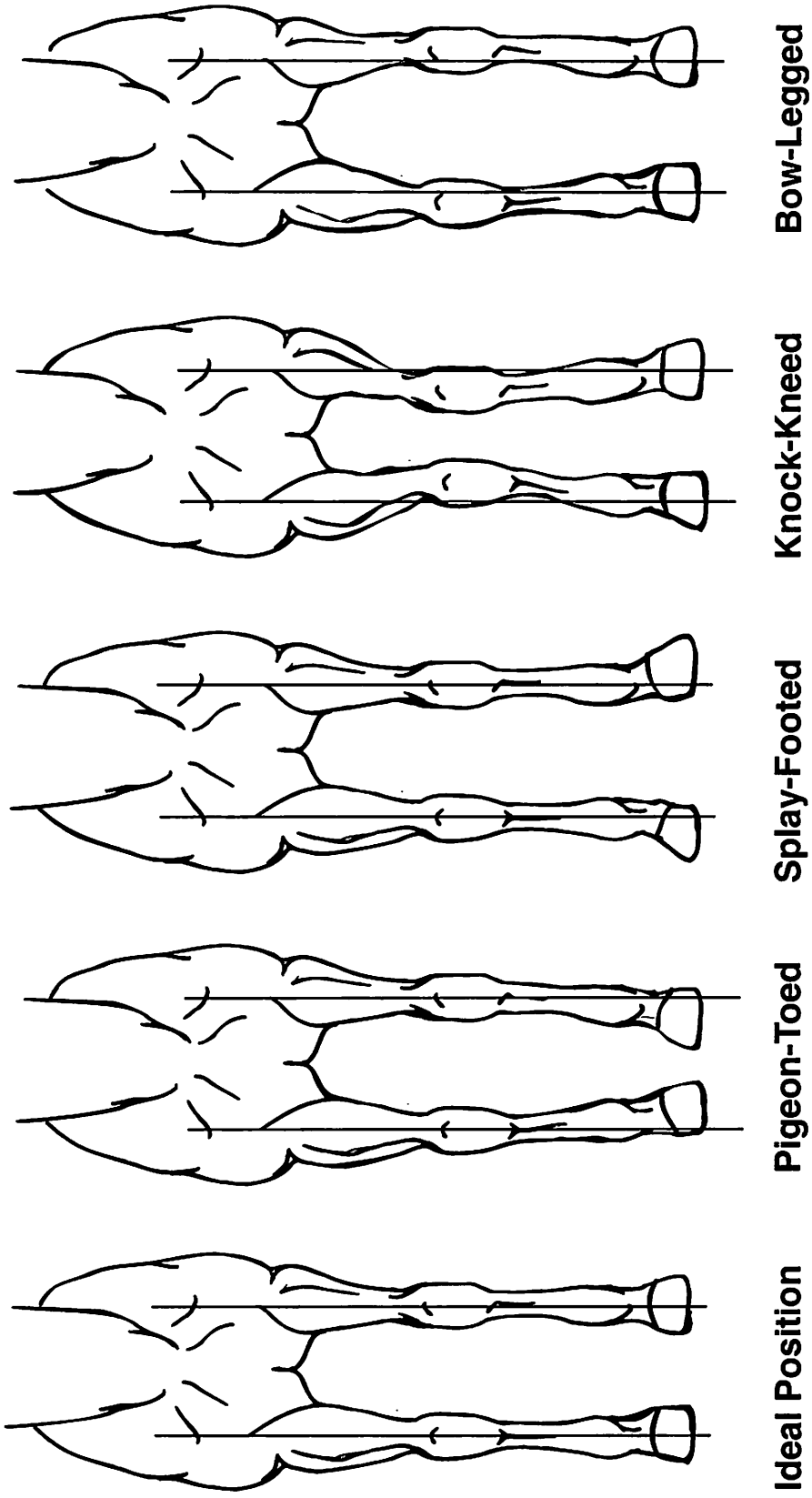
7. What is the difference between an unsoundness and a blemish?

8. What are two pieces of information included in breeding and production records for mares that may be useful when selecting a mare for breeding?

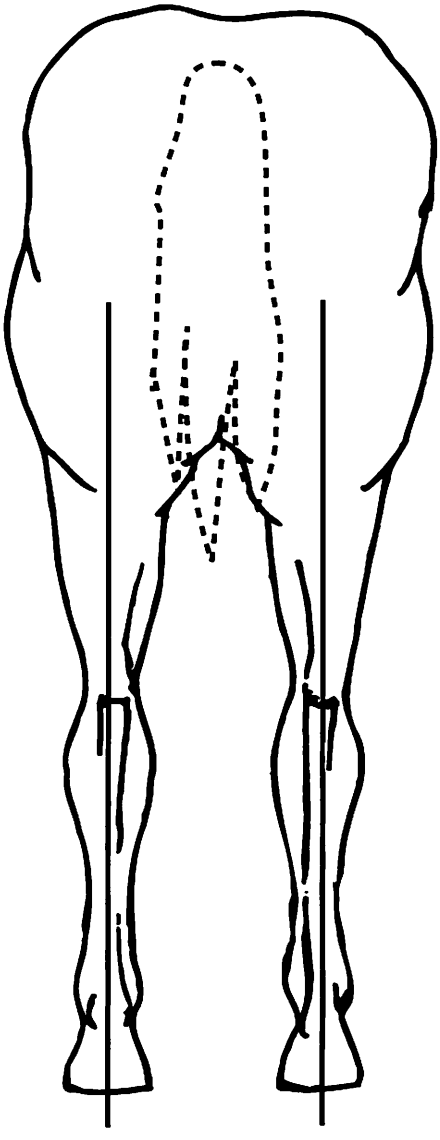
   a.

   b.

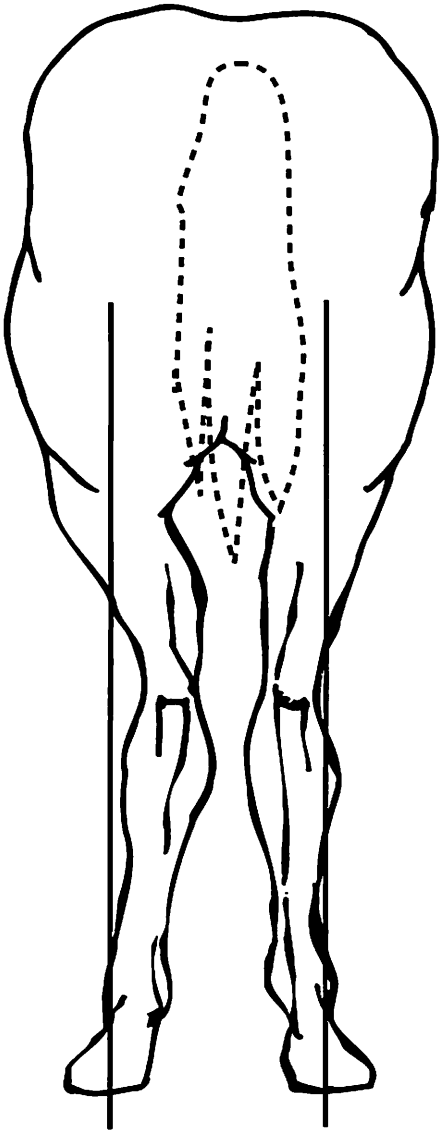
Leg Structure - Front View



Leg Structure - Rear View

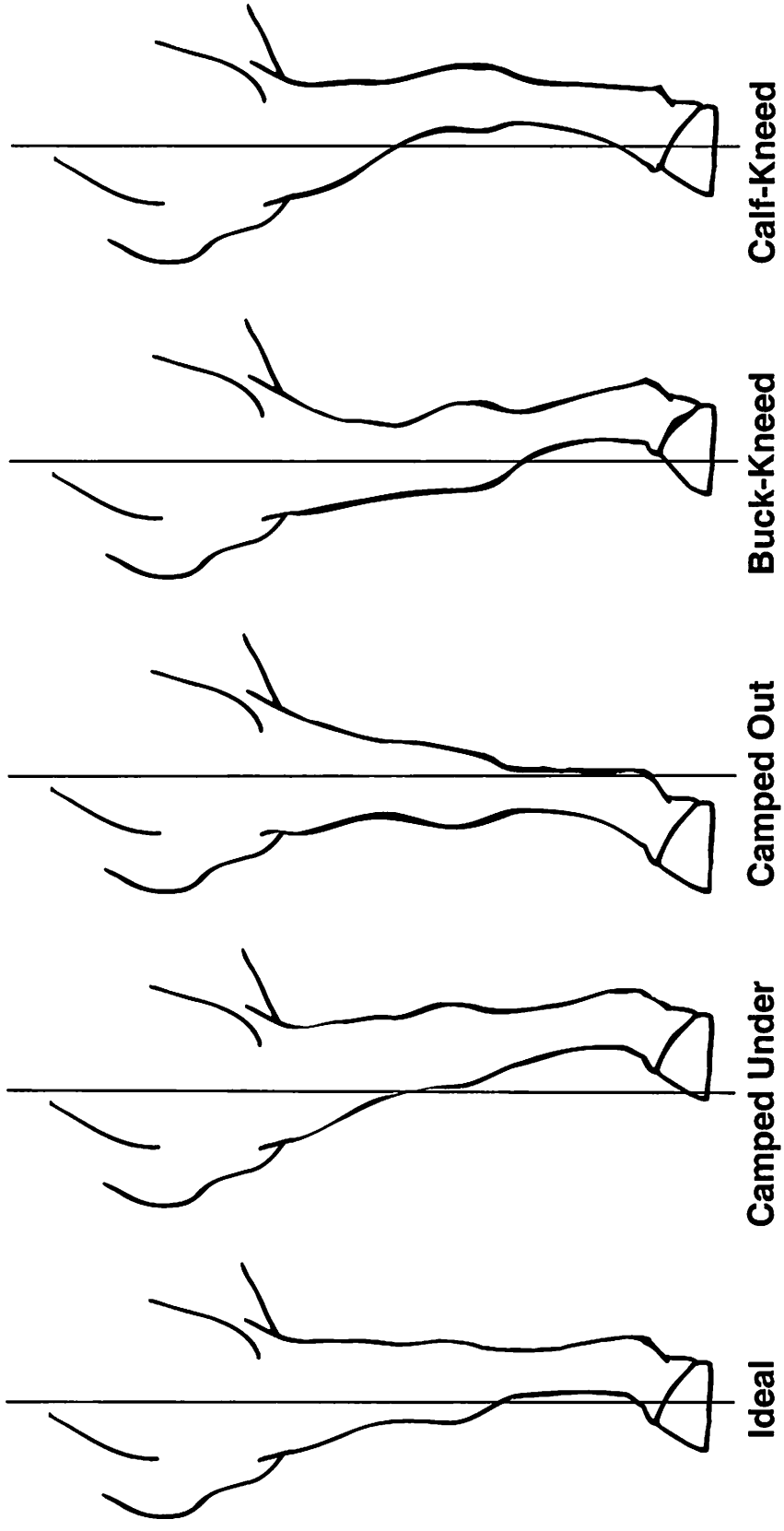


Ideal Position



Cow Hocked

Front Leg Structure - Side View

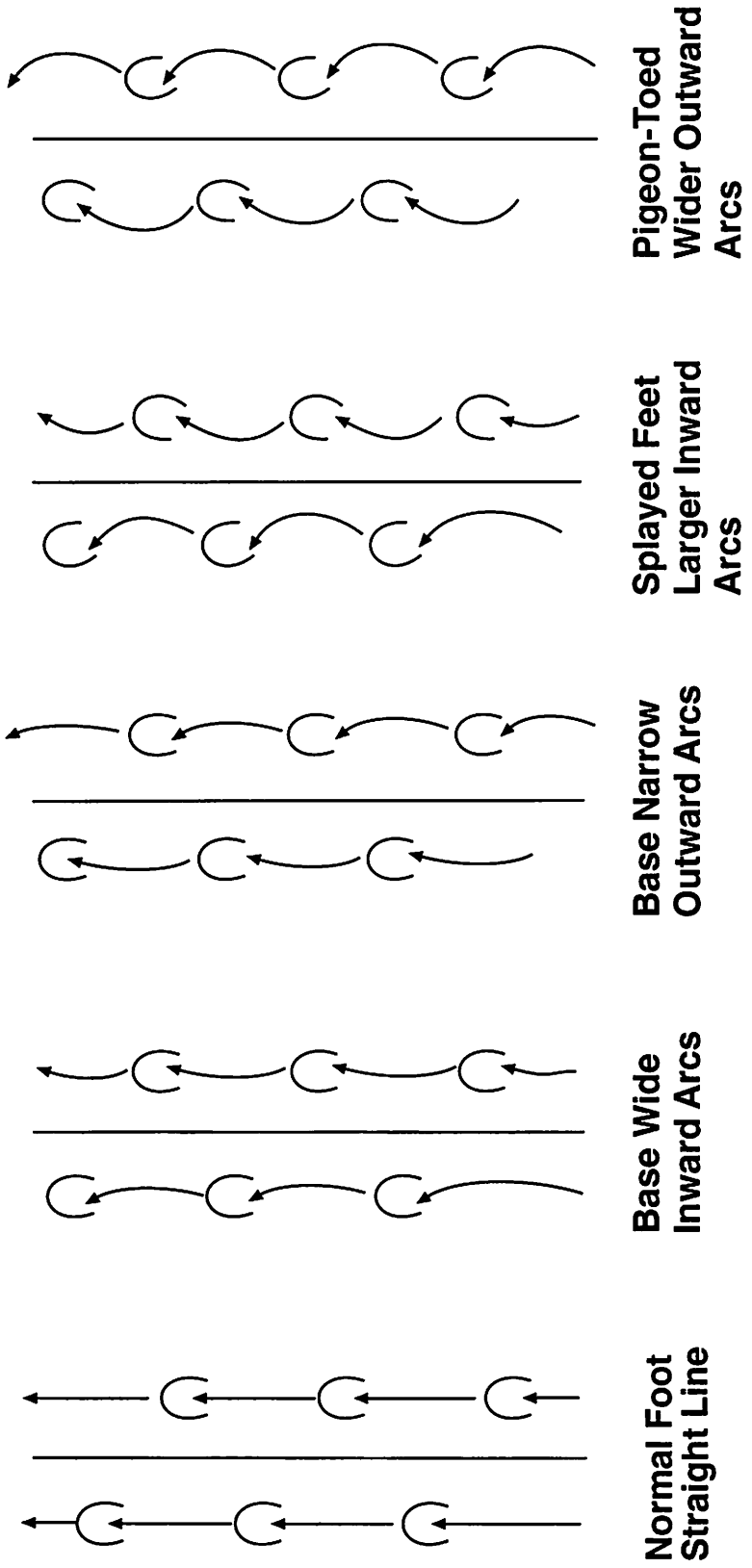


Rear Leg Structure - Side View

Ideal

Post-Legged

Gaits


Pigeon-Toed
Wider Outward
Arcs
Splayed Feet
Larger Inward
Arcs
Base Narrow
Outward Arcs
Base Wide
Inward Arcs
Normal Foot
Straight Line

Lesson 7: Selecting Horses Name _____

Selecting the Appropriate Horse

Objective: Select the most appropriate horse for a proposed task.

Examine the following advertisements for horses. Select the horse that is best suited to the needs of the prospective owners described below. Explain your reasoning.

Horse A : 3-year-old Thoroughbred stallion. 15 hands, spirited, black. $20,500. Call 555-1234

Horse B : 14-year-old, black, stock-type mare. Some show training. Sound. Stands 14 hands. $850. 555-4312

Horse C: 7-year-old Western stock gelding standing 14.5 hands. Bay quarter type. $1,200. Call Jan at 555-5623.

1. Becky is nine years old and has little experience with horses. She wants to learn to show in her local 4-H horse show.

2. Tony is a senior in high school and a member of the rodeo club. Although he has never owned a horse, he has some experience with horses and wants to compete in team roping events.

3. Debbie is an investment broker who loves horse racing. She wants to own her own horse and plans to breed and sell horses someday.

UNIT III - SELECTION

Lesson 8: Selecting Poultry

Competency/Objective: Select poultry for production and breeding.

Study Questions

1. **How should layer and broiler chickens and turkeys be selected for breeding?**

2. **How should layer and broiler chickens and turkeys be selected for production?**

3. **What records should be kept?**

References

1. *Advanced Livestock Production and Management* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit III.

2. Activity Sheet

   a) AS 8.1: Judging Laying Hens Based on Pigmentation

UNIT III - SELECTION

Lesson 8: Selecting Poultry

TEACHING PROCEDURES

A. ***Review***

Lesson 7 discussed the selection of horses for both breeding and production, which involves looking at factors such as conformation and health. Some of the same factors are important when evaluating poultry to determine their value for breeding or production.

B. ***Motivation***

Point out that layer hens are producing more eggs per bird than they did fifty years ago. Discuss how selection has contributed to this change.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Ask students what factors are important in selecting genetically superior layers, broilers, and turkeys for breeding.

   How should layer and broiler chickens and turkeys be selected for breeding?

   a) Layer hens and roosters
      1) Conformation
         (a) Hen
            (1) Should be small-bodied in comparison to broiler chickens to consume less feed while producing a large number of eggs
            (2) Proper body capacity for production
            (3) Rectangular body
            (4) Deep and broad heart girth
            (5) Wide, long, and flat back
            (6) Long keel bone
            (7) Strong head with a relatively long, flat skull
            (8) Smooth and clean face
            (9) Broad, strong, and straight feet and toes with no abnormalities
            (10) Elastic and soft skin
            (11) Smooth and well-kept feathers
         (b) Rooster
            (1) Sturdy and straight legs
            (2) Straight breast bone
            (3) Well kept plumage
            (4) Good body capacity and posture
            (5) Wide and straight back
            (6) Tail feathers held higher than the back
      2) Health and vigor
         (a) Unhealthy bird
            (1) Listless behavior
            (2) Coarsely textured or discolored comb
            (3) Damp and dirty vent feathers
            (4) Unkempt plumage

(b) Healthy bird
(1) Alert, active, and vocal
(2) Bright round eyes
(3) Smooth, waxy, and bright red comb
(4) Dry and well-groomed feathers

3) Pedigree
(a) Reveals the productivity of ancestors
(b) Especially helpful if performance data is not available
(c) Determining factor when selecting between two birds that are similar

4) Performance data
(a) Looking at the performance of the bird and its sisters and brothers
(1) Tend to select families of birds for breeding purposes; more efficient because the producer does not have to individually select each bird
(2) Accurate records needed to demonstrate desirable laying and egg characteristics
(b) Progeny testing - measures actual performance of offspring

b) Broiler breeders
1) Conformation
(a) Smooth and graceful combination of a crescent-shaped back, broad breast, and upright head
(b) Strong and straight legs
(c) Poor conformation
(1) Wedge-shaped body
(2) Crooked breast
(3) Crooked back
(d) Fat
(1) No excess fat, although a healthy layer of subcutaneous fat is desirable
(2) Too little fat - thin skin over the abdominal area, at the point where the skin over the thigh is connected to the breast, and under areas with heavy feathering
(3) Measuring the amount of fat by gently pinching the skin of the abdomen; if hard, adequate fat is deposited
(e) Fleshing - commercially important muscles that make up the shape of bird
(1) Thick breasts that are rounded in shape and wide through the keel bone
(2) Strong and meaty back and legs
(3) Poor fleshing - breast with pointy triangular shape or thin back and legs
(f) Feathers
(1) Close-fitting, well-groomed feathers
(2) Should not have bare spots that leave the skin vulnerable to picking and sunburns
(3) Should not have too many pinfeathers

2) Body weight
(a) Body weight of offspring - related to weight of the broiler's parents at seven weeks of age
(b) Evaluated at seven weeks - only larger birds selected for breeding

3) Health and vigor

4) Performance data
(a) Growth rate - important performance measure
(b) Reduces the amount of time to market and produces savings in feed consumption

c) Turkey breeding stock
1) Conformation - even more important in turkey breeding stock because turkey carcasses may be marketed whole and birds are marketed at higher weights
2) Body weight
3) Health and vigor
4) Performance data

2. Discuss the selection of poultry for production. How does it differ from selecting other types of livestock for production? Have students complete AS 8.1, providing four hens at varying stages of productivity for them to evaluate.

How should layer and broiler chickens and turkeys be selected for production?

a) Layers
   1) Pullets for replacement layers
      (a) Often supplied to a producer as part of a contract with an integrated operation
      (b) Should be obtained from a reputable hatchery if producers select their own pullets
      (c) Should be well-developed physically and ready to begin producing eggs around 22 weeks of age
      (d) Should have good body capacity with a wide, long body and long keel bone
      (e) Broad, strong, and straight feet and toes with no abnormalities
      (f) Sexual maturity
         (1) Determined by observing the head and comb
         (2) Should have a well-developed head with large, firm, and bright red comb
   2) Layers
      (a) May keep layers for a longer time, allowing them to stop producing eggs for a period while they shed and renew their feathers
      (b) May cull some hens while others are kept for further production
      (c) Production records showing the rate of lay; hens should lay at least 220 eggs per year
      (d) Conformation indicating high egg production
         (1) Large, pliable, and soft abdomen
         (2) Flexible pubic bones that are spread apart about three fingers width
      (e) Pigmentation
         (1) Productive hen
            1) Bleached pigmentation on her beak, eye rings, earlobes, and shanks
            2) Bleached vent that is smooth, elastic, and moist
         (2) Non-productive hen
            1) Yellow pigmentation
            2) Yellow vent that is small and dehydrated
b) Broiler chicks
   1) Chicks supplied by large commercial hatcheries that are often part of the integrated poultry operation to broiler producers operating under a contract
   2) Responsible for breeding and supplying high-quality chicks
   3) Provide producers with either straight-run chicks or sexed chicks
      (a) Straight-run chicks - random in gender
      (b) Sexed chicks - divided according to gender
         (1) Female chicks - better price when they are marketed
         (2) Tend to produce a more rounded carcass with more flesh in the breast, back, thighs, and legs
c) Turkey poults
   1) Breeding companies responsible for supplying high quality, genetically superior turkey poults to producers
   2) Provide straight-run or sexed poults

3. Ask students what records might be used when selecting birds for breeding or production.

What records should be kept?

a) Breeding

1) Layers - laying and egg characteristics
2) Broiler breeders - growth rate, amount fed, mortality records

b) Layer hens kept for further egg production after molting - egg production records

F. ***Other Activities***

1. Have a guest speaker who works for a poultry breeding company discuss their company with the class.

2. Have students research poultry breeders and suppliers on the Internet.

3. Have students practice judging techniques, using the USDA Poultry Grading Manual or the 4-H Avian Bowl for a judging guide.

G. ***Summary***

In the poultry industry, birds used for breeding are selected and bred by commercial breeders rather than by individual producers. Selecting animals for production is also usually not the responsibility of the producer. Instead, birds are sent in groups from a hatchery.

H. ***Answers to Activity Sheets***

Answers will vary.

I. ***Answers to Evaluation***

1. b
2. c
3. a
4. d
5. Growth rate, amount fed, and mortality records
6. Large commercial hatcheries that are often part of the integrated poultry operation
7. Because turkey carcasses may be marketed whole and because birds are marketed at higher weights

UNIT III - SELECTION Name_____

Lesson 8: Selecting Poultry Date_____

EVALUATION

Circle the letter that corresponds to the best answer.

1. Which of the following is a sign of poor fleshing in broilers?

   a. Long keel bone
   b. Pointy breast
   c. Thick thighs
   d. Thin abdominal skin

2. Sexual maturity in replacement pullets can be determined by observing the:

   a. Feathers.
   b. Abdomen.
   c. Head and comb.
   d. Wings and legs.

3. At what point are broiler breeders evaluated for selection in terms of body weight?

   a. Seven weeks
   b. Twelve weeks
   c. Seventeen weeks
   d. Sexual maturity

4. The pigmentation on certain parts of the body of a productive hen:

   a. Turns yellow.
   b. Gets darker.
   c. Becomes blotchy.
   d. Bleaches.

Complete the following short answer questions.

5. What are three types of information kept in records that can be used to help in selecting broiler breeders?

   a.

   b.

   c.

6. Broiler producers do not select individual birds for production. Who is responsible for supplying them with chicks?

7. Why is conformation especially important when selecting turkey breeding stock?

Lesson 8: Selecting Poultry Name _____

Judging Laying Hens Based on Pigmentation

Objective: Evaluate the productivity of laying hens based on their pigmentation loss.

Using the chart below, evaluate the productivity of four laying hens. Then rank the hens from 1 to 4 based on their remaining productivity, with 1 given to the hen with the most time left in the cycle.

Order of Bleaching of Pigmentation in Laying Hens		
Skin Zone	Number of Eggs Laid	Elapsed Time in Cycle
Vent	0 - 10	0 - 2 weeks
Eye ring	8 - 12	2 - 2.5 weeks
Ear robe	10 - 15	2.5 - 3 weeks
Beak	35	5 - 8 weeks
Bottom of feet	68	
Shanks	159	
Top of toes and hocks	175 - 180	20 - 30 weeks

Bleaching Location	Hen #1	Hen #2	Hen #3	Hen #4
Vent				
Eye ring				
Ear lobe				
Beak				
Bottom of feet				
Shanks				
Top of toes and hocks				
Final ranking				

UNIT IV - BREEDING

Lesson 1: Breeding Systems

Competency/Objective: Select and develop a breeding system for a livestock enterprise.

Study Questions

1. **What are the different breeding systems used in livestock production?**
2. **What are the advantages and disadvantages of the different breeding systems?**
3. **How do resources affect the selection of a breeding system?**

References

1. *Advanced Livestock Production and Management* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit IV.
2. Transparency Master
   a) TM 1.1: Three-Breed Rotational Cross
3. Hand-out
   a) HO 1.1: Grading Up
4. Activity Sheet
   a) AS 1.1: Exploring Breeding Systems

UNIT IV - BREEDING

Lesson 1: Breeding Systems

TEACHING PROCEDURES

A. ***Introduction***

After producers have selected quality animals for breeding, they must choose a breeding system that suits their needs and facilities. They use two basic systems of breeding, straightbreeding and crossbreeding. Straightbreeding involves mating animals of the same breed; methods of straightbreeding include purebred breeding, inbreeding, outcrossing, and grading up. Crossbreeding involves mating animals of different breeds. Systems of crossbreeding include two-breed crossing, three-breed crossing, backcrossing, and rotational breeding.

B. ***Motivation***

Provide students with a case scenario for a swine operation. Have them work in groups to come up with the best possible breeding system for the operation. In the scenario, be sure to list all resources available to the swine operation, such as facilities, number of pastures, number of purebred sires, etc. Set the scenario to make a three-breed rotational cross possible, but do not give the answer away. After the class discusses ideas, discuss the use of a rotational cross for the operation.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Ask students what types of breeding systems they are familiar with. Can they describe them? Which breeding systems would work well with purebred animals? Have students complete AS 1.1. Use HO 1.1 to demonstrate how grading up can improve livestock quality.

   What are the different breeding systems used in livestock production?

   a) Straightbreeding - mating animals of the same breed; often utilized to produce purebred animals for use by commercial producers to improve their stock
      1) Purebred breeding
         (a) Mating of purebred animals of the same breed that are recognized by a breed association and have a pedigree proving their ancestry
         (b) Main purpose - to raise foundation stock for other breeding systems, primarily crossbreeding systems that produce market animals
         (c) Varied financial returns, with success depending on the species and breed being produced
      2) Inbreeding
         (a) Mating animals that are closely related to each other, with related ancestry within the last four or five generations
         (b) Often used in purebred breeding systems
         (c) Improves the genetic purity, or homozygosity, of purebred animals
         (d) Purpose
            (1) To form families or groups of genetically superior animals
            (2) To produce breeding stock
            (3) To develop lines for crossbreeding systems
         (e) Two general types of inbreeding systems

(1) Intensive inbreeding (closebreeding) - mating animals that are very closely related and whose ancestors have been inbred for a number of generations
(2) Linebreeding - mating animals that are somehow related to each other but never closer than half-brother or half-sister

3) Outcrossing
   (a) Most widely used breeding system for most livestock species
   (b) Mating animals that are from the same breed but are not closely related to introduce new traits into the herd or flock
4) Grading up (upgrading)
   (a) Mating purebred sires to grade females
   (b) Purpose - to improve quality, develop uniformity, and increase the performance of offspring
   (c) Best used for cattle and horses
   (d) Not very efficient with swine, sheep, and poultry because of the large numbers of purebred breeders raising these species, which decreases costs for purebred animals
   (e) Improvement - dependent on generation interval and the quality of the sire

b) Crossbreeding - mating animals from different breeds selected for genetic superiority and complementary characteristics; traits are improved since the dominant genes tend to keep the recessive genes that are undesirable from being expressed
1) Two-breed cross - mating purebred sires with high grade or purebred dams of another breed
2) Three-breed cross - mating a crossbred female to a male of a different breed
3) Backcrossing (crisscrossing)
   (a) First involves mating sires of one breed with dams of another breed
   (b) Then mate the crossbred females to males of the same breed as the sire or dam, alternating so that a female sired by a male from one breed will be mated to a male from the other breed
4) Rotational breeding
   (a) Involves using sires of different breeds for succeeding generations of females, ending with a male of the same breed as the female used in the first cross and then repeating the series
   (b) Three-breed rotational - rotating the use of three purebred sires of three different breeds for mating with crossbred dams

2. Ask students to list possible advantages and disadvantages for each of the breeding systems described in the previous section.

What are the advantages and disadvantages of the different breeding systems?

a) Inbreeding
1) Advantage - increases genetic uniformity, improving the efficiency of selection by concentrating genetic material of superior animals
2) Disadvantages
   (a) Causes decreases in vigor, fertility, survival rate, and growth rate
   (b) Greater rate of expression of undesirable genes because all the traits are grouped together at a high frequency, undesirable genes become more visible and these animals can be eliminated from breeding program
   (c) Expensive to cull any animals that have undesirable traits

b) Outcrossing
1) Advantages
   (a) Desirable traits introduced into the herd or flock
   (b) Risk of maximizing undesirable traits not as high as with inbreeding; as unrelated animals are bred, the gene pairs are mostly heterozygous
2) Disadvantage - undesirable traits still carried by the animals used for breeding, although they may not be expressed

c) Grading up
   1) Advantages
      (a) Results in offspring that genetically resemble the purebred sire
      (b) Uses cheaper grade stock
d) Two-breed cross
   1) Advantages
      (a) Results in increased vigor, heavier offspring, and increased fertility due to hybrid vigor (heterosis), which causes crossbred progeny to out-produce the average of the parents' production
      (b) Results in animals that combine desirable traits not found in any one breed
   2) Disadvantages
      (a) Purebred sire and dam, so hybrid vigor is only present in the progeny
      (b) Will need to replace purebred or high-grade dams to continue breeding over time, which becomes expensive
e) Three-breed cross
   1) Advantages
      (a) Improved hybrid vigor due to the use of a crossbred dam
      (b) Can potentially introduce a greater diversity of desirable traits into one animal
f) Backcrossing
   1) Advantages
      (a) Improved hybrid vigor because crossbred females are utilized
      (b) Combines desirable traits not found in any one breed
      (c) Easily managed
      (d) Produces its own replacement females
g) Rotational breeding
   1) Advantages
      (a) Improved heterosis due to the use of crossbred females
      (b) Combines traits that are desirable for production not found in any one breed
      (c) Can select replacements, so production-tested sires are the only outside purchase
   2) Disadvantage - after the first few generations, must either maintain sires or purchase semen from sires of all of the purebred breeds

3. Ask students what types of resources they think they would need to successfully utilize any of the breeding systems discussed.

How do resources affect the selection of a breeding system?

The resources available to breeders make a marked difference in the choice of a breeding system.
a) Size of the herd or flock
b) Number of pastures or facilities available
c) Availability of feed
d) Availability of breeding stock
e) Financial resources

F. ***Other Activities***

Have students research different livestock operations in the area to find out what breeding systems are used in the area.

G. ***Conclusion***

Two basic types of breeding systems are used by producers: straightbreeding and crossbreeding. Methods of straightbreeding include purebred breeding, inbreeding, outcrossing, and grading up. Methods of crossbreeding include two-breed crossing, three-breed crossing, backcrossing, and rotational breeding. The breeding systems described in this lesson have specific advantages and

disadvantages that must be taken into account when a breeding system is chosen. The available resources are another factor that influences breeders when they are deciding which breeding system is best for the flock or herd. Also, managers must consider which breeding system will be the most profitable.

H. ***Answers to Activity Sheet***

Answers will vary.

I. ***Answers to Evaluation***

1. b
2. d
3. c
4. b

5. Heterosis causes crossbred progeny to out-produce the average of the parents' production.

6. The purpose of grading up is to improve quality, develop uniformity, and increase the performance of offspring.

7. Increases genetic uniformity

8. The purebred or high-grade dams will need to be replaced.

9. A three-breed rotational cross involves rotating the use of three purebred sires of three different breeds for mating with crossbred dams.

10. Answers may include any three of the following: size of the herd or flock, number of pastures or facilities available, availability of feed, availability of breeding stock, and financial resources.

UNIT IV - BREEDING Name _____

Lesson 1: Breeding Systems Date _____

EVALUATION

Circle the letter that corresponds to the best answer.

1. What is the general term for mating animals of the same breed?

   a. Purebred breeding
   b. Straightbreeding
   c. Crossbreeding
   d. Inbreeding

2. Mating animals that are closely related to each other is:

   a. Grading up.
   b. Outcrossing.
   c. Backcrossing.
   d. Inbreeding.

3. Mating purebred sires to females of the same breed that do not qualify for registration with the breed association is called:

   a. Outcrossing.
   b. Crisscrossing.
   c. Grading up.
   d. Rotational breeding.

4. Which of the following is a type of straightbreeding?

   a. Rotational breeding
   b. Outcrossing
   c. Backcrossing
   d. Two-breed cross

Complete the following short answer questions.

5. What is the effect of heterosis?

6. What is the purpose of grading up?

7. What is an advantage of inbreeding?

8. Why is a two-breed cross more expensive than other types of breeding systems?

9. What is a three-breed rotational cross?

10. What are three resources that one should consider when choosing a breeding system?

    a.

    b.

    c.

Three-Breed Rotational Cross

Lesson 1: Breeding Systems

Grading Up

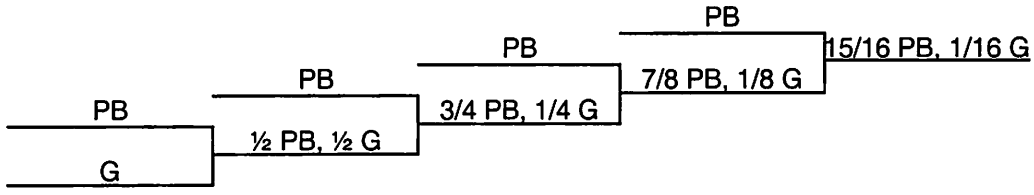
Objective: Demonstrate how grading up can improve livestock quality.

The graphic below demonstrates how grading up works. Begin with a grade female (G) bred to a purebred male (PB) in the first mating. The greatest percent of improvement comes in the first cross.

The second generation mates a purebred male (PB) with 50 percent purebred and 50 percent grade resulting in an offspring that is 75 percent purebred (3/4 PB) and 25 percent grade (1/4 G).

The third generation mates a purebred male (PB) with a 75 percent purebred and 25 percent grade. This will result in an offspring that is 87.5 percent purebred (7/8 PB) and 12.5 percent grade (1/8 G).

The fourth generation mates a purebred male (PB) with a 87.5 percent purebred and 12.5 percent grade. This will result in an offspring that is close to 100 percent purebred (15/16 PB and 1/16 G).



Lesson 1: Breeding Systems Name _____

Exploring Breeding Systems

Objective: Describe a breeding system used in livestock production.

Research and prepare an oral report on a breeding system used in livestock production. Provide the following information in the report.

1. What is the name of the breeding system?

2. Is it an inbreeding or outbreeding system?

3. How is the system defined?

4. Explain how it can be used in a breeding herd.

5. Explain how the system is managed in a breeding herd.

6. What are the advantages and disadvantages of this breeding system?

UNIT IV - BREEDING

Lesson 2: Mating Systems

Competency/Objective: Select a mating system for a livestock enterprise.

Study Questions

1. **What mating systems are used in livestock production?**
2. **What are the advantages and disadvantages of the different mating systems?**
3. **How do resources affect the selection of a mating system?**

References

1. *Advanced Livestock Production and Management* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit IV.
2. *Artificial Insemination in Swine: Breeding the Female (G2312).* University Extension Agricultural Publications, 1997.
3. Transparency Master
   a) TM 2.1: Artificial Insemination in a Cow
4. Activity Sheet
   a) AS 2.1: Artificial Insemination of Swine

UNIT IV - BREEDING

Lesson 2: Mating Systems

TEACHING PROCEDURES

A. ***Review***

Lesson 1 of this unit described the breeding systems used in livestock and poultry operations. In addition to selecting a breeding system, breeders must also decide which type of mating system would best suit the needs of their herd or flock. Two general types of mating systems are used in commercial agriculture: artificial insemination and natural mating. Both of these general mating systems have advantages and disadvantages. Factors that may influence the choice of a mating system include the climate, location and type of markets, size of the operation, personal preferences of the breeder, the economic and production goals of the breeder, and available resources such as financing, equipment, or labor. Breeders must carefully consider these factors and the benefits and problems of the different mating systems to decide which system would be the best choice for a particular operation.

B. ***Motivation***

Show students materials used in artificial insemination.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Ask students what types of mating systems exist. How can people intervene in mating livestock and poultry to achieve the desired results? TM 2.1 can be used to illustrate AI. Hand out AS 2.1.

What mating systems are used in livestock production?

a) Artificial insemination
   1) Process involving collecting semen from the sire and placing it in the reproductive tract of the dam, with no physical contact between them
   2) Can be used for cattle, swine, sheep, horses, and poultry (particularly turkeys)
      (a) Semen is collected with an artificial vagina, electro-ejaculator, or by hand.
      (b) The semen is frozen and stored in a freezer if it is not used right away; sometimes chemicals are added to increase the longevity of the sperm.
      (c) When females are observed to be ready for mating, the semen is thawed (if it was frozen) and placed into an inseminating instrument.
      (d) A technician deposits the semen directly into the female's reproductive tract with a pipette.

b) Natural mating
   1) Involves physical contact between the male and female with or without human intervention and assistance
   2) Hand mating
      (a) Males are kept separate from females at all times until the female comes into heat.
      (b) When the female enters the estrus phase, she is brought to the male for servicing.
   3) Corral mating
      (a) Horse breeders utilize corral mating.
      (b) The selected sire and dam are placed together in a corral for servicing.
   4) Stud mating

(a) The poultry industry uses stud mating systems.
(b) The males are held alone in a pen or coop, and the female is brought to the male for servicing.

5) Pasture mating
(a) Males and females are kept together in the same pasture during the breeding season or throughout the entire year.
(b) For offspring to be born around the same date and have a relatively uniform size, the males should be limited to sharing a pasture only during the breeding season.

6) Flock mating
(a) The flock mating system is used by poultry breeders.
(b) Several males are placed with an entire flock of females for natural servicing.
(c) One male can run with fifteen to twenty females to achieve high conception rates.

7) Pen mating
(a) Pen mating is used by poultry breeders.
(b) One male is placed in a pen with fewer females, usually eight to twenty hens.

2. Ask students to list some advantages and disadvantages of these mating systems. Discuss their answers.

What are the advantages and disadvantages of the different mating systems?

a) Artificial insemination
1) Advantages
(a) Increases uniformity, the development of large numbers of animals that are part of a genetically superior family line
(b) Increases the use of genetically superior sires
(c) Works well with estrus synchronization programs
(d) Makes it possible to prove the genetic superiority of sires by increasing the number of their offspring, making progeny testing more accurate
(e) Eliminates the need to keep a sire on the premises
(f) Reduces the chance of breeding injuries
(g) Helps to control disease by eliminating sexual contact
(h) Tends to improve production records because breeders must use them to keep track of which animals have been inseminated
(i) Increases profits for some breeders by eliminating other costs and labor associated with keeping a sire

2) Disadvantages
(a) Requires skilled technicians that have been specially trained to improve conception rates
(b) Requires a large investment to begin and operate
(c) Can accentuate the damage to a herd caused by a poor sire because its semen will be used for servicing a large number of females
(d) May increase the spread of disease if the equipment is not sanitary
(e) Can easily be abused through such practices as the distribution of poor semen and label switching

b) Hand mating
1) Advantages
(a) Controlled mating
(b) Allows breeders to keep more accurate records than with other types of natural mating

2) Disadvantages
(a) Requires more labor than some other natural mating systems
(b) Must be sure that the female is observed at least twice a day during the breeding season to see if she is in heat
(c) Need labor to bring her to the sire

c) Corral mating - requires transporting sire and dam to corral and back
d) Stud mating
    1) Advantage - usually allows the male to achieve the maximum breeding value because more matings take place
    2) Disadvantage - requires more labor as different females are brought back and forth to the male
e) Pasture mating
    1) Advantages
        (a) Can be used for many livestock species
        (b) Is not labor intensive, because less handling is involved
    2) Disadvantage - difficulty keeping accurate records, especially if more than one sire is used
f) Flock mating - requires minimal labor
g) Pen mating
    1) Advantages
        (a) Easier record keeping because the exact parents of every chick are known
        (b) Easier to evaluate the males for production
    2) Disadvantages
        (a) Lower fertility rates than those in a flock mating system because the female cannot chose her mate
        (b) No competition between males for mating, which can drastically reduce fertility rates

3. The mating system used should be matched to the resources available to the breeding system, with producers carefully evaluating which resources are limiting factors that may prevent the use of a particular mating system. Ask students what types of resources should be considered when choosing a mating system for a particular herd or flock. How do these resources interact to be more beneficial in a particular situation? Have students complete AS 2.1.

How do resources affect the selection of a mating system?

a) Available labor
b) Number of females and males in the herd or flock
c) Facilities available
d) Financial resources

F. ***Other Activities***

1. Practice AI with the rendered reproductive tract of a cow.

2. Show the video "Artificial Insemination of Beef and Dairy Cattle" (10 min.) available from the Missouri Resource Center for Career and Technical Education (MRCCTE), University of Missouri-Columbia.

3. Show the video "Striving for Perfection," which discusses AI. It may be obtained on a free-loan basis from the Missouri Pork Producers Association or purchased from the National Pork Producers Association.

G. ***Conclusion***

Two general types of mating systems, natural mating and artificial insemination (AI), are used by producers in their breeding programs. In artificial insemination, semen is collected from a sire and placed in the female's reproductive tract, with no physical contact between them. Natural mating is mating with physical contact between the sire and the dam, with or without the intervention or assistance of humans. General types of natural mating include hand mating, corral mating, stud mating, pasture mating, flock mating, and pen mating. Each mating system has advantages and

disadvantages. The breeder must evaluate the operation's resources wisely to decide which of these mating systems is the best for their situation.

H. ***Answers to Activity Sheet***

1. Evaluate the semen with a microscope for motility and viability before using.

2. Use a paper towel to clean the vulva before inseminating the female.

3. Lubricate the tip of the spirette or catheter.

4. Gently guide the spirette/catheter with the tip pointed upward through the vagina to the cervix. The bottle of semen should not be attached at this time.

5. Insert the spirette/catheter into the cervix with a counterclockwise motion. When inserted properly, resistance will be felt when gently pulling on the spirette/catheter.

6. Gently invert the semen bottle two or three times to mix the semen. Attach the bottle to the spirette and slowly discharge the semen.

7. A small amount of backflow is expected. If it is too much, stop and reposition the spirette/catheter by turning it 1/4 of a turn. Cut a hole in the bottle if the flow is stopped because of a vacuum.

8. If excessive resistance to flow exists, reposition spirette/catheter. The tip may be lodged against a fold in the cervix.

9. Semen reception or fertilization will be inefficient if the female is frightened or disturbed. Females should always be handled calmly and gently.

10. When all the semen is deposited, remove the spirette/catheter by rotating it clockwise and gently pulling.

11. Use a new spirette or catheter with each female to avoid disease transmission.

12. Keep the female in quiet surroundings for 20 to 30 minutes. Distress may interrupt fertilization.

I. ***Answers to Evaluation***

1. c
2. e
3. a
4. b
5. d
6. f

7. Answers may include any three of the following: requires skilled technicians; requires a large investment to begin and operate; AI can accentuate the damage to a herd caused by a poor sire; insemination may increase the spread of disease if the equipment is not sanitary; and it can easily be abused through such practices as the distribution of poor semen and label switching.

8. The semen is frozen; chemicals can be added to increase its longevity.

9. Physical contact does not occur between the male and female in an AI program.

10. Answers may include any three of the following: available labor, number of females and males in the herd or flock, facilities available, and financial resources.

UNIT IV - BREEDING Name _____

Lesson 2: Mating Systems Date _____

EVALUATION

Match the mating system listed on the right with the description on the left.

1. _____ Utilized by horse breeders
2. _____ For poultry, one male is placed in an enclosure with eight to twenty females
3. _____ System in which males and females kept together in the same enclosure during the breeding season
4. _____ Used for poultry, with several males placed with an entire group of females for natural servicing
5. _____ System in which males are kept separate from females before the female comes into heat
6. _____ Used in the poultry industry; the male is held alone in a pen, and the female is brought to him for servicing

a. Pasture mating
b. Flock mating
c. Corral mating
d. Hand mating
e. Pen mating
f. Stud mating

Complete the following short answer questions.

7. What are three disadvantages of using AI?

   a.

   b.

   c.

8. In AI, how is semen preserved if it is not used immediately?

9. What is the main difference between natural mating and an artificial insemination mating program?

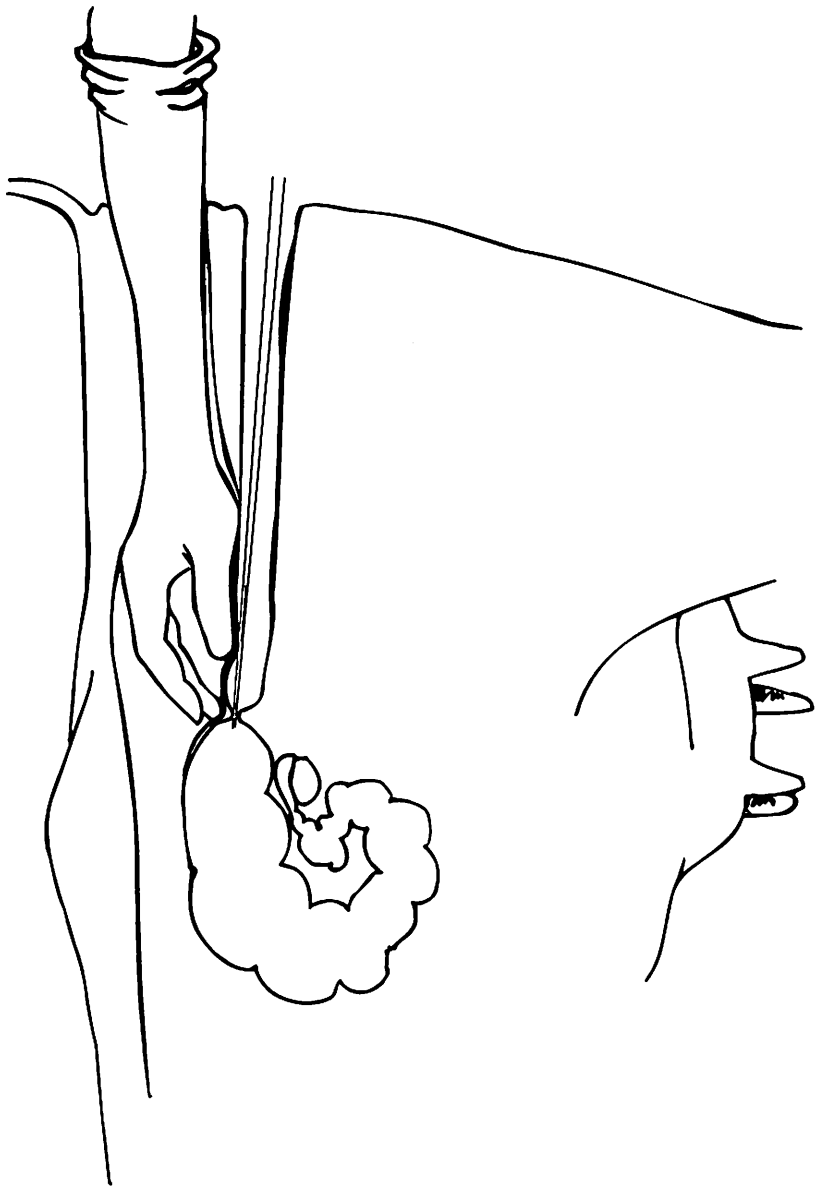
10. What are three resources one should consider when selecting a mating system?

    a.

    b.

    c.

Artificial Insemination in a Cow



Lesson 2: Breeding Swine Name _____

Artificial Insemination of Swine

Objective: Indicate how artificial insemination is performed in swine.

Using the Extension Guidesheet *Artificial Insemination in Swine: Breeding the Female (G2312)*, which is available on the Internet at http://muextension.missouri.edu/xplor/agguides/ansci/g02312.htm, summarize the 12 points or steps of procedure for successfully inseminating a sow or gilt.

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

11.

12.

UNIT IV - BREEDING

Lesson 3: Breeding Beef and Dairy Cattle

Competency/Objective: Discuss the steps to be taken to ensure reproductive efficiency in beef and dairy cattle.

Study Questions

1. **What are the different methods of heat detection for beef and dairy cattle?**
2. **What management factors affect successful estrus detection?**
3. **What factors affect conception rates?**
4. **What are the different methods of pregnancy detection?**

References

1. *Advanced Livestock Production and Management* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit IV.
2. Transparency Master
   a) TM 3.1: Rectal Palpation
3. Activity Sheet
   a) AS 3.1: A Breeding Puzzle

UNIT IV - BREEDING

Lesson 3: Breeding Beef and Dairy Cattle

TEACHING PROCEDURES

A. ***Review***

Lesson 2 described the different mating systems used in livestock production. Because mating systems may require producers to time mating to coincide with estrus, the ability to detect when a cow or heifer is in heat is useful. Other factors to consider to ensure reproductive efficiency in beef or dairy herds are management factors that affect estrus detection, conception rates, and the use of different methods to detect pregnancy.

B. ***Motivation***

Bring in a tool commonly used in cattle production to help detect heat in cows, such as the chin ball marker or heat-mount detector. Let students try to figure out how they work.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Ask students how they can tell if a cow is in heat. Can they use records? Visual signs? Discuss some of the common methods of heat detection.

   What are the different methods of heat detection for beef and dairy cattle?

   a) Physical signs
      1) Other animals mounting the cow (the only true indicator of standing heat)
      2) Bawling loudly
      3) Excitability
      4) Restlessness
      5) Mounting other cows and heifers
      6) Roughed up hair over the tailhead
      7) Swaybacked appearance
      8) Swollen vulva
      9) Mucus flowing from the vulva on the buttocks, over the pins, and under the tail
   b) Teaser bulls (gomers)
      1) Used to signal heat in females by mounting the cows
      2) Made incapable of impregnating a cow
         (a) Often use vasectomized bulls
            (1) A piece of the vas deferens is removed from the spermatic cord, preventing sperm transport.
            (2) An advantage to this method is that the sexual organs are left intact and are still able to function normally.
            (3) A disadvantage is that the bull is still able to copulate, creating a risk of the spread of venereal disease.
         (b) Also prevent fertilization by displacing the penis and sheath
            (1) A veterinarian surgically redirects the penis and sheath from the normal position to the folds in the flank.
            (2) A disadvantage of this method is that the bull may get frustrated, lose his sex drive, and not be helpful in identifying cows and heifers in standing heat.

3) Chin ball marker
   (a) This device is attached with a halter to the chin of a teaser bull.
   (b) As the bull mounts the cow, he rests his head on the rump or back or over the shoulders of the cow, and the chin ball marker smears ink on these areas.
   (c) This system of heat detection is commonly used in large pastures and with large herds.
   (d) The chin ball marker will need to be refilled after 15 to 20 cows or heifers have been marked.
4) Heat-mount detector
   (a) The detector is made of a small plastic capsule attached to a fabric base.
   (b) The capsule is filled with red dye, and the entire detector is attached to the teaser bull with a harness.
   (c) The capsule is located on the brisket of the bull.
   (d) If enough pressure is placed on the capsule, the dye will slowly be released.
5) Electronic activity Indicator
   (a) It is frequently used for dairy cattle.
   (b) A transmitter is attached to the cow using a neck chain.
   (c) The activity level of the cow is transmitted daily to a computer in the dairy barn.
   (d) During estrus, the female becomes more active.
   (e) The increase in activity level indicated by the computer lets the producer know when estrus begins.

2. Ask students what they would do if they were managers of a livestock operation to be sure that they could successfully detect heat in their breeding animals.

What management factors affect successful estrus detection?

a) Keeping accurate records of the dates dams were bred, the dates that unsettled dams came back into heat, and calving dates
b) Observing breeding dams from 17 to 25 days after the last heat period
   1) Animals are closely observed for signs of heat at least twice a day.
   2) If possible, observing the animals three times a day for periods of at least twenty minutes is desirable.
   3) A clear and concise identification system, such as branding, tattooing, or ear-tagging, should be used.

3. Ask students what factors could improve or hinder conception rates. Describe environmental, physiological, and managerial factors that affect conception rates in cattle.

What factors affect conception rates?

a) High temperatures
   1) High temperatures tend to lower conception rates.
   2) Cows and heifers need adequate shade and water to avoid overheating.
b) Age
   1) Females used for breeding should not be bred too young because they are still growing themselves.
   2) Breeding heifers to calve at two years of age will increase the lifetime production of the animal from 1 to 1.3 calves per year.
   3) Young heifers require more feed or good pasture and should be kept separate from mature cows.
c) Quality of the bull
   1) Breeding bulls are ready to perform by 18 to 24 months of age.
   2) A mature bull can service between 25 to 50 cows in a pasture mating system and 40 to 50 cows in a hand mating system.
   3) In a range system, one bull is generally used for every 25 cows.

4) A young bull should be able to service ten to twelve cows in a hand mating system and eight to ten in a pasture mating system.
5) Bulls should undergo a breeding soundness evaluation prior to the breeding season.
6) A fertility test should also be performed to analyze the quality of the semen, especially if an unusual percentage of cows are not settled after being mated twice.

d) Post-calving period
1) If annual calving is desired, cows must calve a minimum of 45 days prior to the next breeding season.
2) The highest conception rates in cattle occur when they are bred 60 to 90 days after calving.
3) The number of days after calving before a cow comes into heat again is influenced by age, with older cows generally coming into heat in less time.

e) Good herd health and nutrition
1) Before breeding, producers should cull all animals that are diseased or unsound.
2) If a female is too fat or thin, conception rates are lower.
3) Flushing involves giving breeding females more feed two to three weeks prior to breeding to cause weight gains, which result in more eggs being shed, females coming into heat more rapidly, and higher conception rates.

f) Choosing the best time to breed a cow in heat
1) Conception rates tend to be higher if the cow or heifer is bred between 9 and 24 hours after standing heat is observed.
2) It is generally recommended that cows be bred 12 hours after standing heat is noted.

g) Estrus synchronization
1) Many beef and dairy cattle producers use the practice of estrus synchronization to help improve conception rates.
2) Estrus synchronization involves using synthetic hormones to cause a group of females to come into heat at the same time.
3) Lutalyse is an injectable substance that works like naturally-produced prostaglandin.
4) The recommended procedure is to administer two injections eleven days apart, between days five and eighteen of the 21-day estrous cycle.
5) Other products used to synchronize estrus include orally administered synthetic hormone and injectable gonadotropin release hormone (GNRH).

4. Ask students how they would check pregnancy in cattle after they have done their best to successfully breed them. Could they use physical signs? Use TM 3.1 to illustrate rectal palpation in cattle. Have students complete AS 3.1.

What are the different methods of pregnancy detection?

a) Testing the cow or heifer for heat 17 to 25 days after the last heat period
b) Rectal palpation
1) Requires protective covering for the hand and arm of the handler, a holding chute to restrain the animal, and lubricant to facilitate entry into the rectum
2) Requires that a skilled technician or well-trained farm laborer insert his or her hand into the rectum, locating the reproductive tract through the wall of the rectum
3) Usually palpate cows around 45 days after the end of the breeding season
(a) When a technician begins palpating the cow, she or he holds the cow's tail for balance.
(b) The fingers of the gloved and lubricated free hand are held close together to form a wedge shape.
(c) Upon entry into the rectum, the hand position is changed to a fist, which is pushed deeper into the rectum while moving feces aside and straightening the rectal folds.
(d) If desired, the feces can be pulled out of the rectum; this practice is more time consuming but will increase the sense of touch and is recommended for beginning palpators.

(e) As soon as the palpator's hand enters the rectum, she or he should locate the pelvic ridge.
(f) If the animal is not pregnant, the reproductive tract will be just behind the pelvic ridge.
(g) If pregnancy has occurred, the tract may be moving to rest on the floor of the pelvis.
(h) The first organ that is felt in palpation is the vagina, which is located directly under the rectum and feels spongy and tubular.
(i) The palpator follows the vagina to the cervix at its upper end; the cervix feels harder than the vagina.
(j) The next organ is the uterus, located right in front of the cervix, and connected to the uterus are two uterine horns.
(k) The palpator feels these two horns and the uterus, from the cervix to the tapering upper ends of the uterine horns.
(l) As the palpator locates the ovary on the same side as the enlarged uterine horn, a corpus luteum is felt on the ovary.
(m) It will feel hard and project from the ovary.
(n) At this stage in a pregnancy, the reproductive tract remains on the floor of the pelvis.
(o) By 45 days of pregnancy, the embryo is attached to the wall of the uterus.

F. ***Other Activities***

1. Obtain a rendered cow's reproductive tract from a slaughter/packing facility, and have students practice feeling the different organs and parts used in pregnancy detection through rectal palpation.

2. Bring a chin ball marker and heat mount detector to class so students can see the differences in the devices and how they attach to the animals.

3. Have students talk with beef or dairy producers. Have them discuss which tools they use for heat detection in their cattle. Why do they use these tools? Have they had bad experiences with other tools?

G. ***Conclusion***

Ensuring reproductive efficiency is vital to producing a good calf crop. The ability to detect heat in animals is important. A female of any livestock species is in standing heat only when she allows other animals to mount her; other physical signs of heat in cattle include an excitable demeanor, restlessness, bawling, mounting other cows, a swaybacked appearance, a swollen vulva, and mucus discharge from the vulva. As aid in detecting estrus, cattle breeders can use teaser bulls with chin ball markers or heat-mount detectors. Management factors that affect successful estrus detection include keeping accurate records, observing cows expected to be in heat, using a clear identification system, and handling animals gently. Factors that affect conception rates include the environment, age of the sire and dam, nutrition and flushing, health, and knowledge of when to breed. Pregnancy detection in cattle is commonly performed by palpation.

H. ***Answers to Activity Sheet***

			E	S	T	R	U	S			
D	E	T	E	C	T	I	O	N		I	S
	T	H	E		K	E	Y		T	O	
			H	I	G	H	E	R			
	C	O	N	C	E	P	T	I	O	N	
			R	A	T	E	S				

I. ***Answers to Evaluation***

1. b
2. b
3. a
4. d
5. c
6. A teaser bull
7. Lower conception rates
8. Sixty to ninety days after calving
9. Testing the cow or heifer for heat 17 to 25 days after the last heat period and rectal palpation
10. Chin ball marker and heat-mount detector

UNIT IV - BREEDING Name _____

Lesson 3: Breeding Beef and Dairy Cattle Date _____

EVALUATION

Circle the letter that corresponds to the best answer.

1. How long should cows and heifers be flushed before breeding?

   a. One week
   b. Two to three weeks
   c. One month
   d. Six to eight weeks

2. When should cows be observed for heat?

   a. Every 12 to 20 days after the last heat period
   b. Every 17 to 25 days after the last heat period
   c. Every 22 to 30 days after the last heat period
   d. Every 27 to 35 days after the last heat period

3. What is the only true indication of standing heat?

   a. Other animals mounting the cow
   b. Mounting other cows and heifers
   c. Bawling loudly
   d. Swaybacked appearance

4. Which of the following is a disadvantage of using vasectomized teaser bulls?

   a. Prevention of the spread of venereal disease between animals
   b. Loss of the bull's sex drive after the surgery
   c. Prevention of copulation between the bull and cow
   d. Risk of the spread of venereal disease through copulation

5. At what point should a cow be bred after standing heat is observed?

   a. Immediately
   b. After 6 hours
   c. After 12 hours
   d. After 24 hours

Complete the following short answer questions.

6. What is a gomer?

7. What effect do high temperatures have on conception rates?

8. When should cows be bred after calving to improve conception rates?

9. What are two ways to detect pregnancy in cattle?

   a.

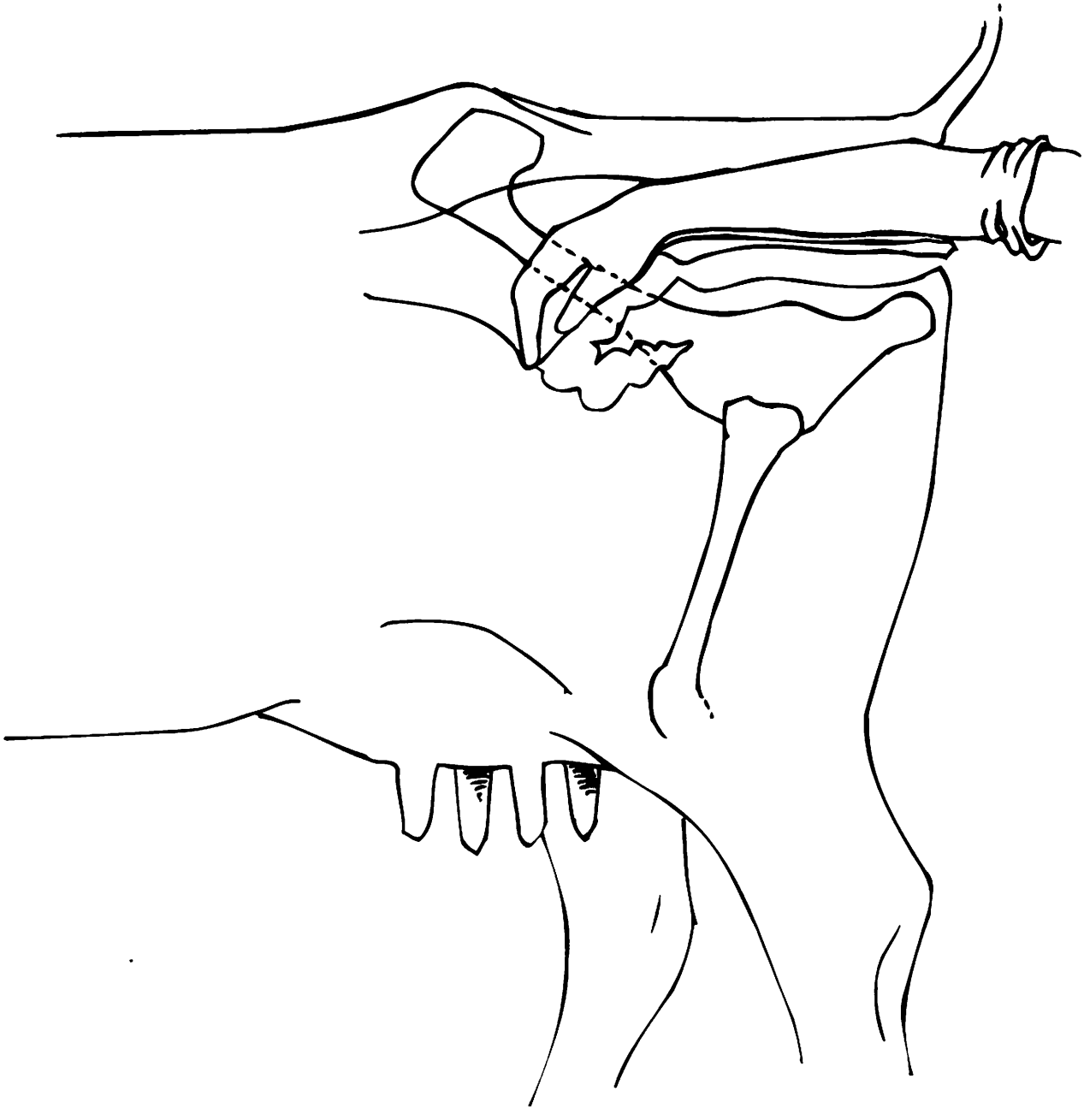
   b.

10. What are two devices that can be used to physically mark cows that are in heat?

    a.

    b.

Rectal Palpation

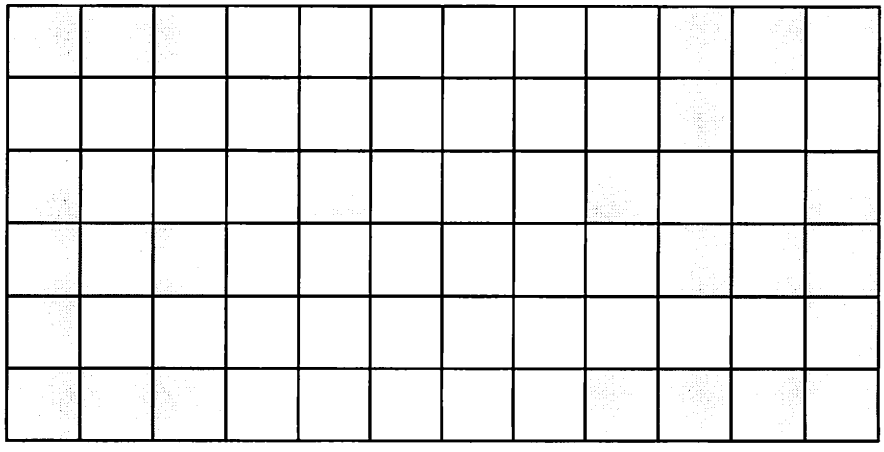


Lesson 3: Breeding Beef and Dairy Cattle Name _____

A Breeding Puzzle

Objective: Discover the phrase relating to beef and dairy cattle breeding.

Place each of the letters in the correct box in the column directly above the line of letters to discover the phrase relating to beef and dairy cattle breeding.



E E I T
R C T P S
H C K R O I
E H E I T E Y S O
C O E S G E U N O N
D T T N A T H E R T I S

UNIT IV - BREEDING

Lesson 4: Breeding Swine

Competency/Objective: Discuss the steps to be taken to ensure reproductive efficiency in swine.

Study Questions

1. **What are the different methods of heat detection for swine?**
2. **What management factors affect successful estrus detection?**
3. **What factors affect conception rates?**
4. **What are the different methods of pregnancy detection?**

References

1. *Advanced Livestock Production and Management* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit IV.
2. Activity Sheet
   a) AS 4.1: Improving Conception Rates

UNIT IV - BREEDING

Lesson 4: Breeding Swine

TEACHING PROCEDURES

A. ***Review***

Lesson 3 discussed measures that can be taken to ensure reproductive efficiency in beef and dairy cattle. Efficiency and productivity in this area are important in the swine industry as well. Determining whether a sow is in heat is a relatively easy process. However, good management practices are still necessary for successful estrus detection and good conception rates. Producers should also implement some method of pregnancy detection to make sure their breeding program is effective.

B. ***Motivation***

Have students look at ultrasound readings of pregnant sows and sows that are not pregnant to compare the differences between them. Obtain these readings from a local swine producer or from the College of Veterinary Medicine at the University of Missouri.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Ask students how the signs of heat in swine differ from signs of heat in cattle. How are they the same?

   What are the different methods of heat detection for swine?

   a) Observing physical signs of heat
      1) Swollen vulva
      2) Slight mucus discharge secreted from the vulva
      3) Frequent urination
      4) Attempting to ride other sows in the pen
      5) Aggressive disposition
      6) Grunting loudly
      7) Refusing to eat
   b) Walking a boar through the facilities
   c) Applying pressure on the lumbar area of the sow's back
      1) Interpreted by the sow as a boar mounting her
      2) Will not move if she is in standing heat, showing that she accepts service

2. Ask students to describe the management strategies that would most likely help swine breeders identify sows in estrus.

   What management factors affect successful estrus detection?

   a) Record keeping - The breeder should be aware of when to expect the sows to enter their heat period, which generally occurs every 21 days.
   b) Observation
      1) Sows and gilts should be observed at least once a day.
      2) Observing them twice a day tends to improve conception rates.
   c) Synchronizing estrus

1) Many breeders try to synchronize estrus for better scheduling and to reduce the amount of time spent observing animals.
2) Sows will naturally enter estrus four to five days after weaning, so managers may choose to wean a group at the same time.
3) Estrus can be induced by exposing the sow to the boar.

3. Ask students what factors may influence conception rates negatively. Which factors have a positive effect? Have students complete AS 4.1.

What factors affect conception rates?

a) Management of gilts and sows
   1) Gilts should be bred when they reach seven to eight months of age and weigh between 230 and 250 pounds.
   2) They can be bred earlier, but conception rates will be lower.
   3) Gilts tend to farrow larger litters if they are bred during their second heat period.
   4) Entering heat periods early or late may decrease conception rates.
      (a) Gilts that are raised on dirt or pasture are prone to go into heat earlier than those that are raised on concrete floors.
      (b) If gilts raised on concrete flooring are moved to outside lots before they reach 175 to 200 pounds, conception rates tend to improve.
      (c) If a boar is kept nearby, gilts will be able to hear, see, and smell the boar, which stimulates early heat periods.
      (d) Gilts raised in confinement or in large groups will go into heat later.
   5) Breeding swine 24 hours after the beginning of estrus will help to increase conception rates.
   6) Sows are ready for breeding during their first cycle of standing heat after weaning, and breeding at this time will improve conception rates.
   7) Conception rates in sows are best if they are bred at least twice (24 hours apart) after they enter standing heat.

b) Management of boars
   1) A good practice when buying a boar is to purchase it prior to the breeding season and keep it in isolation from other animals.
      (a) It should be isolated for at least 30 days.
      (b) During this period, the boar can be treated for parasites and may be observed for any signs of health problems.
      (c) After isolation, the boar should be kept for another 30 days before it is used for breeding.
   2) A boar should be at least 8 to 9 months old before it is used as a sire.
   3) Younger boars of 8 to 10 months of age are capable of hand mating only once per day.
   4) Test mating a young boar to a few gilts to prove its fertility is useful.
   5) Breeders should also evaluate the young boar's desire to mate, its ability to mount a female, and its ability to impregnate a female.
   6) Mature boars should only be used for servicing females twice a day, or up to 10 to 12 times per week.
   7) Mature boars should be in good health and be proven as effective sires.

c) Temperature
   1) Hot weather tends to lower conception rates.
   2) Swine exposed to high temperatures should be provided cool shelter and plenty of water.
   3) Cold temperatures tend to decrease conception rates.
   4) Housing adequate for the temperature conditions.

d) Nutrition
   1) Swine that are overweight or too thin have lower conception rates.
   2) Sows and gilts should be flushed two to three weeks before breeding to ensure high conception rates.

e) Herd health
   1) A good herd health program is essential to high conception rates.
   2) The breeding herd should be separated from the rest of the herd.

4. Ask students if it would be possible for swine producers to palpate sows to detect pregnancy as they do in the cattle industry. What may be some problems with palpating sows? How else can they check for pregnancy?

   What are the different methods of pregnancy detection?

   a) Checking all sows and gilts that were bred for heat 21 days after breeding by walking a boar in front of the pens containing the females and watching for signs of heat
   b) Ultrasonic devices
      1) A technician places a transducer on the rear flank of the animal.
      2) The machine transmits sound, and the echoes returned are measured.
         (a) Not pregnant - echoes back at about 5 centimeters
         (b) Pregnant - reflected at 15 to 20 centimeters due to fluid in the uterus
      3) Most breeders check sows and gilts at 35 days, since the results are more accurate.

F. ***Other Activities***

Visit a swine facility where ultrasound is used to detect pregnancy.

G. ***Conclusion***

Several different factors affect the efficiency of reproduction in the swine herd. Successful heat detection, for example, is very important. Heat detection is not difficult in swine; breeders first observe the sows and gilts for the physical signs of heat, then walk a boar near the sows to double-check the signs, and finally apply pressure to the back to check for standing heat. Management factors, such as keeping accurate breeding records, closely observing sows, and using the appropriate method to check for standing heat can improve estrus detection. Conception rates are affected by other factors, such as the timing of breeding, the number of times bred, the number of times the boar is used, temperature, handling, and nutrition. To ensure that heat detection and breeding were successful, pregnancy detection is usually done with ultrasound machines after the sows have been rechecked for signs of heat.

H. ***Answers to Activity Sheet***

1. Gilt A, because research indicates that gilts raised on pasture tend to have higher conception rates than gilts raised on concrete.

2. Sow D. Sows that are bred about 24 hours after the beginning of estrus should have higher conception rates than sows bred at the beginning.

3. Gilt E. This gilt should have a higher conception rate because she has good body condition (weight for age) and is not exposed to the elements like Gilt F. Gilt F is also underweight.

I. ***Answers to Evaluation***

1. b
2. c
3. c
4. b
5. c

6. Answers may include any three of the following: swollen vulva, slight mucus discharge secreted from the vulva, frequent urination, attempting to ride other sows in the pen, aggressive disposition, grunting loudly, and refusing to eat.

7. By applying pressure on the lumbar area of the sow's back

8. Accurate records will make the breeder aware of when to expect the sows to enter a heat period.

9. Ultrasonic devices and observing the females for signs of heat while walking a boar in front of their pens

10. Two to three weeks before breeding

UNIT IV - BREEDING Name _____

Lesson 4: Breeding Swine Date _____

EVALUATION

Circle the letter that corresponds to the best answer.

1. How old should boars be before they are used as sires?

   a. Six months
   b. Eight to nine months
   c. Ten to eleven months
   d. One year

2. On average, how often do sows enter heat?

   a. Every 11 days
   b. Every 15 days
   c. Every 21 days
   d. Every 30 days

3. How often are older boars capable of servicing females?

   a. Once every two days
   b. Once every day
   c. Twice every day
   d. Once every four hours

4. When buying a boar, how long should it be kept in isolation from the rest of the breeding herd?

   a. 20 days
   b. 30 days
   c. 40 days
   d. 50 days

5. When do sows normally enter estrus after weaning?

   a. Two days
   b. Three to four days
   c. Four to five days
   d. Five days

Complete the following short answer questions.

6. What are three visual signs of heat in sows and gilts?

   a.

   b.

   c.

7. Other than looking at visual signs, how can sows be checked for standing heat without using a boar?

8. How can records positively affect the detection of estrus?

9. What are the two most common forms of pregnancy detection used in the swine industry after checking sows for heat?

   a.

   b.

10. When should sows and gilts be flushed?

Lesson 4: Breeding Swine Name _____

Improving Conception Rates

Objective: Identify practices and procedures used to improve conception rates in swine.

Read the following scenarios and answer the questions.

1. Gilt A was raised on pasture and Gilt B was raised in confinement. Both animals weigh approximately 230 pounds and are within days of being the same age. Which gilt should have higher conception rates? Explain your reasoning.

2. Sow C and Sow D are approximately the same age, in good body condition, and ready to be bred for their second litter. Both came into heat at about noon on Tuesday. Sow C was bred by the boar at 8:00 p.m. that day. Sow D was bred by the boar at 1:00 p.m. on Wednesday. Which sow should have a higher conception rate? Why?

3. Gilt E is about six months of age, weighs 245 pounds, and has access to a barn bedded with dry straw. It is mid-January, and the temperatures have been averaging about 20 degrees Fahrenheit during the day. Gilt F is on a neighbor's farm on pasture with no shelter. She is the same age and weighs about 190 pounds. Both are bred by proven boars on the same day. Which gilt should have the higher conception rate? Provide two reasons to justify your answer.

UNIT IV - BREEDING

Lesson 5: Breeding Sheep

Competency/Objective: Discuss the steps to be taken to ensure reproductive efficiency in sheep.

Study Questions

1. **What are methods of heat detection for sheep?**
2. **What management factors affect successful estrus detection?**
3. **What factors affect conception rates?**
4. **What are the different methods of pregnancy detection?**

References

1. *Advanced Livestock Production and Management* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit IV.
2. Transparency Master
   a) TM 5.1: Crotching
3. Activity Sheet
   a) AS 5.1: Planning for Breeding

UNIT IV - BREEDING

Lesson 5: Breeding Sheep

TEACHING PROCEDURES

A. ***Review***

Lesson 4 discussed breeding in swine. One significant difference between pigs and sheep is that sheep do not display obvious visual signs of heat. Good management practices are therefore extremely important in detecting heat in sheep, especially since the goal is to produce a lamb crop of 130 to 200 percent per year. Producers also need to do everything they can to ensure high conception rates for their flock.

B. ***Motivation***

Bring in marking blocks commonly used for rams in breeding programs. Have students explain how a sheep breeder would use the blocks in a breeding program.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Ask students how a producer determines when ewes are in heat. Show students the marking block used in the motivation when discussing the use of teaser rams.

   What are methods of heat detection for sheep?

   a) Almost no visual signs of heat
   b) Heat detection using teaser rams
      1) Either vasectomized or are fitted with heavy aprons to prevent mating
      2) Fitted with a marking harness
         (a) Consists of a colored marking block held on the ram's chest with a harness
         (b) Marks the ewe's rump when the ram is accepted by the ewe and attempts to mount her
         (c) Indicates which ewes have accepted the ram and are in standing heat

2. Discuss the management factors used to help detect estrus in sheep.

   What management factors affect successful estrus detection?

   a) Typically come into heat in late summer and early fall.
   b) Estrus triggered by change in temperature and length of day.
   c) Ewes should be observed twice daily for marks indicating that they have been mounted by a teaser ram during the seasonal estrus period.

3. Ask students how producers can promote high conception rates in their flocks. Discuss the factors that affect conception rates. TM 5.1 can be used to illustrate crotching.

   What factors affect conception rates?

   a) Age of the ewe
      1) Ewes can be bred to lamb at one year of age.
      2) Conception rates are lower in ewes that are less than two years old.

3) Mature ewes that are three to seven years old have higher fertility rates and produce a high percentage lamb crop.

b) Management of the ram
   1) Rams should be at least eight to nine months old.
   2) The number of ewes a ram can breed in one breeding season depends on its age and the type of mating system used.
      (a) Pasture mating system
         (1) Ram lamb - about 15 to 25 ewes
         (2) Yearling ram - about 25 to 35 ewes
         (3) Mature ram - about 35 to 45 ewes
         (4) Three mature rams kept for every 100 breeding ewes
      (b) Hand mating - yearling ram breeds 50 to 75 ewes

c) Nutrition
   1) Ewes should be flushed two weeks prior to the breeding season with good pasture or extra concentrates.
   2) Only ewes with proper body condition should be flushed.
   3) In overweight ewes, flushing will result in lower conception rates.
   4) Flushing is also associated with twinning.

d) Shearing or crotching prior to breeding
   1) Producers may shear their sheep prior to breeding.
   2) Crotching involves shearing the ewe's wool around the crotch to make breeding easier for the ram.
   3) Rams should be sheared six to eight weeks before the breeding season.

e) Season in which breeding takes place
   1) For most breeds of sheep, the natural breeding period occurs in the late summer and early fall.
   2) Lambing takes place in the spring.
   3) With all breeds, breeding outside the normal breeding season will lead to lower conception rates.

f) Breeding at the proper time during estrus
   1) Ewes remain in heat for about 36 hours and tend to ovulate toward the end of the heat cycle.
   2) If a producer determines that a ewe is in heat in the morning, she should be bred that afternoon.
   3) If the producer realizes that the ewe is in heat in the afternoon, breeding should take place the following morning.

g) High temperatures
   1) Hot weather may cause sterility in rams.
   2) High temperatures can also kill embryos.
   3) Rams and ewes need adequate shade and water to avoid overheating.
   4) Rams may be shorn.

4. Discuss the methods of pregnancy detection used for sheep, comparing them to the methods used for cattle and swine. Have students complete AS 5.1.

What are the different methods of pregnancy detection?

a) Marking block system
   1) Producers may use a light-colored marking block at first; after 14 days, a darker color is used when the teaser ram is run with the ewes again.
   2) The ewes that were not settled should return to heat.
   3) Markings from the teaser ram allows the producer to identify them for rebreeding.
   4) Ewes that do not return to heat are likely to be settled.

b) Ultrasound
   1) Ultrasound can be used to determine whether the ewe is pregnant six to ten weeks after breeding.

2) Ultrasonic pregnancy detectors send ultrasonic pulses into the body cavity of the ewe.
3) When the waves bounce back, they reflect the contours of the reproductive tract.
4) This information can be used to determine whether the ewe is pregnant and whether she is carrying multiple lambs.

F. ***Other Activities***

1. Have students crotch ewes in preparation for the breeding season.

2. Have students research the ultrasound systems available for checking pregnancy in sheep. Have them prepare a report discussing their features and cost.

G. ***Conclusion***

Unlike many other livestock species, ewes show no visual signs of heat, and producers must rely on teaser rams for heat detection. Keeping accurate records and observing the flock daily can aid in detecting estrus. Producers should also be aware of the factors that affect conception rates so they can manage their flocks properly to increase the rates. Breeders detect pregnancy in ewes by using teaser rams or ultrasonic pregnancy detectors.

H. ***Answers to Activity Sheet***

Answers will vary.

I. ***Answers to Evaluation***

1. b
2. a
3. b
4. a
5. c
6. Ultrasound
7. Because there are almost no visual signs of heat

8. Twice a day

9. Crotching involves shearing the ewe's wool around the crotch. It is done to make breeding easier for the ram.

10. A marking harness consists of a colored marking block held on the teaser ram's chest. It is used to indicate that a ewe is in standing heat.

UNIT IV - BREEDING Name_____

Lesson 5: Breeding Sheep Date_____

EVALUATION

Circle the letter that corresponds to the best answer.

1. If an overweight ewe is flushed before breeding, conception rates:

   a. Go up.
   b. Go down.
   c. Remain the same.
   d. Become unpredictable.

2. Conception rates are lower in ewes that are less than _____ years old.

   a. 2
   b. 3
   c. 4
   d. 5

3. How long before breeding should ewes be flushed?

   a. One week
   b. Two weeks
   c. Three weeks
   d. Four weeks

4. How old should rams be before they are used for breeding?

   a. 8 to 9 months
   b. 12 to 15 months
   c. 16 to 17 months
   d. 20 to 22 months

5. How long do ewes remain in heat?

   a. 12 hours
   b. 24 hours
   c. 36 hours
   d. 48 hours

Complete the following short answer questions.

6. What pregnancy detection method sends pulses into the body cavity of the ewe?

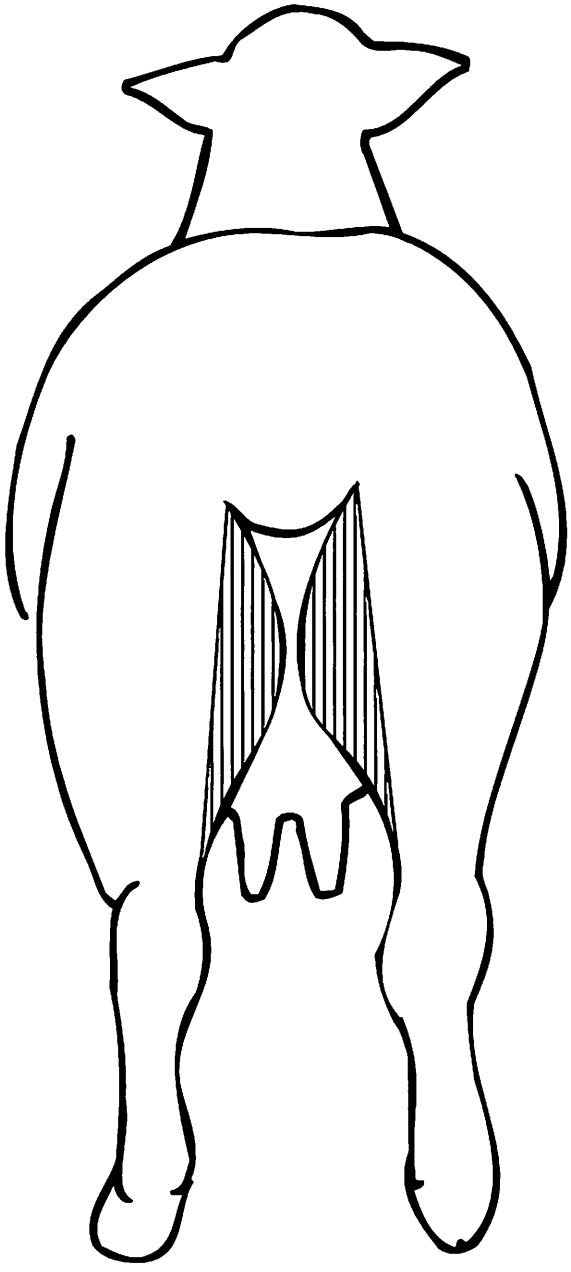
7. Why are teaser rams the primary method of heat detection in sheep?

8. How often should ewes be observed to determine whether they have been mounted by a teaser ram?

9. What is crotching? Why is it done?

10. What is a marking harness? Why is it used?

Crotching



Lesson 5: Breeding Sheep Name _____

Planning for Breeding

Objective: Demonstrate a knowledge of the timing of activities that will take place during the reproductive cycle of sheep.

Fill in the blanks below to give your projections for the timing of activities connected to the reproductive cycle of sheep. Then in the space below, explain your reasoning to justify the dates you have chosen.

Date to flush the ewes: _____

Date and time observed in heat: _____

Date to breed: _____

Date of pregnancy testing: _____

Date to expect lambing: _____
(Hint: The average length of gestation is 147 days.)

Justification:

UNIT IV - BREEDING

Lesson 6: Breeding Horses

Competency/Objective: Discuss the steps to be taken to ensure reproductive efficiency in horses.

Study Questions

1. **What are the different methods of heat detection for horses?**
2. **What management factors affect successful estrus detection?**
3. **What factors affect conception rates?**
4. **What are the different methods of pregnancy detection?**

References

1. *Advanced Livestock Production and Management* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit IV.
2. Transparency Masters
   a) TM 6.1: Teasing Rail
   b) TM 6.2: Breeding Hobbles
3. Activity Sheet
   a) AS 6.1: A Pregnancy Puzzle

UNIT IV - BREEDING

Lesson 6: Breeding Horses

TEACHING PROCEDURES

A. ***Review***

Lesson 5 described some of the factors and practices that affect reproductive efficiency in sheep. Horse breeding poses some of the same risks and challenges that are encountered in breeding sheep and other livestock. However, an added problem with breeding horses is the difficulty of achieving high conception rates, which makes good management a must.

B. ***Motivation***

Review the tack commonly used in breeding, such as breeding hobbles and other forms of restraint.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Ask students how a mare indicates she is in heat. What are the visual signs of heat? How are they different from those of other livestock species? How are they the same? TM 6.1 illustrates the use of a teasing rail.

   What are the different methods of heat detection for horses?

   a) Teasing mares with a stallion
      1) Either teased in a group or one by one
      2) Involves the use of some form of restraint to prevent injuries and uncontrolled mating
         (a) Teasing rail when teasing animals one at a time
         (b) Teasing mill when teasing many mares at one time
   b) Observing for visual signs of heat
      1) Desire to be near other horses
      2) A little mucus discharge from the vulva
      3) Urinating frequently
      4) Raising the tail
      5) Spreading the hind legs
      6) Allowing the stallion to nip at the mare's flanks and neck
      7) Flexing and relaxing the vulva in a winking motion

2. Ask students to describe the management techniques that would help promote the success of estrus detection in horse breeding.

   What management factors affect successful estrus detection?

   a) Knowing when mares are likely to come into heat based on the seasonal breeding cycle
      1) The cycle begins in the spring when the mare's body senses that the number of daylight hours per day is longer than the period of darkness.
      2) It terminates in the fall as her body senses that daylight hours are decreasing.
   b) Bringing the mare to a stallion for teasing once a day when the mare may soon be entering estrus

1) If the mare has a violent reaction consisting of bucking and jumping, she is not ready for servicing.
2) If she exhibits the signs of heat, she is likely prepared for breeding.

3. Have the students list factors that could affect conception rates. Discuss the different factors. TM 6.2 can be used to illustrate breeding hobbles.

What factors affect conception rates?

a) Management of mares for breeding
   1) Mares are generally ready to be bred for the first time at the age of three years and are capable of reproducing until they reach an age of fourteen to sixteen years.
   2) Conception rates are improved in mares if they are bred in April, May, or June.
   3) Breeders commonly allow mares to be serviced or artificially inseminated after two days of heat.
   4) Mares come into heat between five to eleven days after parturition and can be bred at this time if their bodies have recuperated from giving birth.
   5) Many breeders breed mares during the second heat period after foaling, which occurs 25 to 30 days after parturition.
   6) If the stallion is mature, conception rates are improved if a mare in standing heat is bred twice a day over a short period of time.
   7) If the breeder prefers to have the mare serviced for a longer period of time, once a day is adequate.
b) Management factors affecting stallions
   1) Stallions do not have a specific breeding season.
   2) Productivity tends to decrease with decreasing daylight, but viable semen can be collected throughout the year.
   3) Young stallions should be used for servicing less frequently, not exceeding three times per week.
   4) In artificial insemination programs, sperm may be collected from both younger and mature stallions at a rate of once every two days.
   5) Sperm should be assessed for fertility by checking its motility and numbers.
c) Health and condition
   1) The mare and stallion should be checked for diseases or other health problems to be sure they are sound.
   2) Animals should not be overweight.
   3) Being underweight can also have a negative impact on conception rates.
   4) Breeders should be sure horses receive proper rations and plenty of exercise to ensure that the animals are in good condition.
d) Mating system
   1) Conception rates tend to be lower in pasture breeding programs.
   2) Hand mating programs yield the best conception rates.
e) Handling
   1) Before and after breeding, the mare should have time to calm down and relax.
   2) She should only be serviced when she shows that she will accept the stallion.
   3) In a hand mating situation, using breeding hobbles is important to prevent the mare from injuring herself, the stallion, and the handlers.

4. Ask students what the risks of palpating livestock are. Is it necessary in horse production? Are any other methods of detecting pregnancy used? Hand out AS 6.1.

What are the different methods of pregnancy detection?

a) Checking the mare for signs of heat 21 days after breeding
b) Rectal palpation
   1) Palpation should only be performed by a veterinarian.
   2) Mares are ready to be palpated as early as 35 days after breeding.

3) They need to be restrained, using breeding hobbles or a breeding stock, to protect the palpator.
4) The palpator must use a lubricant to facilitate entry into the rectum.
5) The landmark organ the palpator looks for in horses is the ovaries.
   (a) Located 5 to 10 centimeters behind the upper third of the pelvic arch
   (b) Easily recognizable for their tough consistency and oval shape
6) After the palpator locates an ovary, she or he feels down to the uterine horns.
   (a) Funnel-like shape
   (b) Connected to the uterus so that the three organs form a "T"
7) The palpator then feels the horns and uterus for signs of pregnancy.
8) If the mare is settled, the amnion will be present in one of the uterine horns within 35 days and is about the size of a golf ball.

F. ***Other Activities***

Have a horse breeder or veterinarian talk to the class about breeding horses.

G. ***Conclusion***

Because conception rates in horses are generally low, good management is a must. To detect heat in mares, breeders use stallions to tease mares in a group or one by one. Signs of heat in mares include raising the tail, urinating frequently, a desire to be near other horses, a little mucus discharge from the vulva, spreading the hind legs, allowing the stallion to nip at the flanks and neck, and winking of the vulva. If a mare appears to be in heat, she is brought to the stallion for teasing. She is not yet ready for servicing If she reacts by bucking and jumping. When breeding does occur, conception rates are affected by many factors, including health and condition, cleanliness, stress, temperatures, the age of the sire and dam, the number of dams per sire, and the timing of breeding. To determine if a mare has settled, breeders should check for signs of heat 21 days after breeding, and then a veterinarian should palpate the mare.

H. ***Answers to Activity Sheet***

BEALUTCIR — L U B R I C A T E (10 5 3)

CUTMER — R E C T U M (8)

RUUTES — U T E R U S (9)

MINNOA — A M N I O N (1 11 6 7)

TUFES — F E T U S (4)

OHEBBLS — H O B B L E S (2 12)

P A L P A T I O N (1 2 3 4 5 6 7)

T E R M S (8 9 10 11 12)

I. ***Answers to Evaluation***

1. d
2. d
3. c

4. b
5. A teasing rail

6. Answers may include any three of the following: a desire to be near other horses, a little mucus discharge from the vulva, urinating frequently, raising the tail, spreading the hind legs, allowing the stallion to nip at the mare's flanks and neck, and flexing and relaxing the vulva in a winking motion.

7. The mare's estrous cycle begins when the mare's body senses that the number of daylight hours per day is longer than the period of darkness and terminates as her body senses that daylight hours are decreasing. Breeders need to know when mare is likely to come into heat.

8. Conception rates tend to be lower in pasture breeding programs.

UNIT IV - BREEDING Name _____

Lesson 6: Breeding Horses Date _____

EVALUATION

Circle the letter that corresponds to the best answer.

1. When mares are bred, they should be checked for signs of heat after _____ days to see if they are pregnant.

   a. 18
   b. 19
   c. 20
   d. 21

2. How often should young stallions be used for servicing?

   a. No more than once a day
   b. No more than once a week
   c. No more than twice a week
   d. No more than three times a week

3. At what age are mares generally ready to be bred?

   a. One year
   b. Two years
   c. Three years
   d. Four years

4. How soon after breeding can mares be rectally palpated to check for pregnancy?

   a. 30 days
   b. 35 days
   c. 40 days
   d. 45 days

Complete the following short answer questions.

5. What tool can be used to tease one mare at a time?

6. What are three visible signs of heat in mares?

   a.

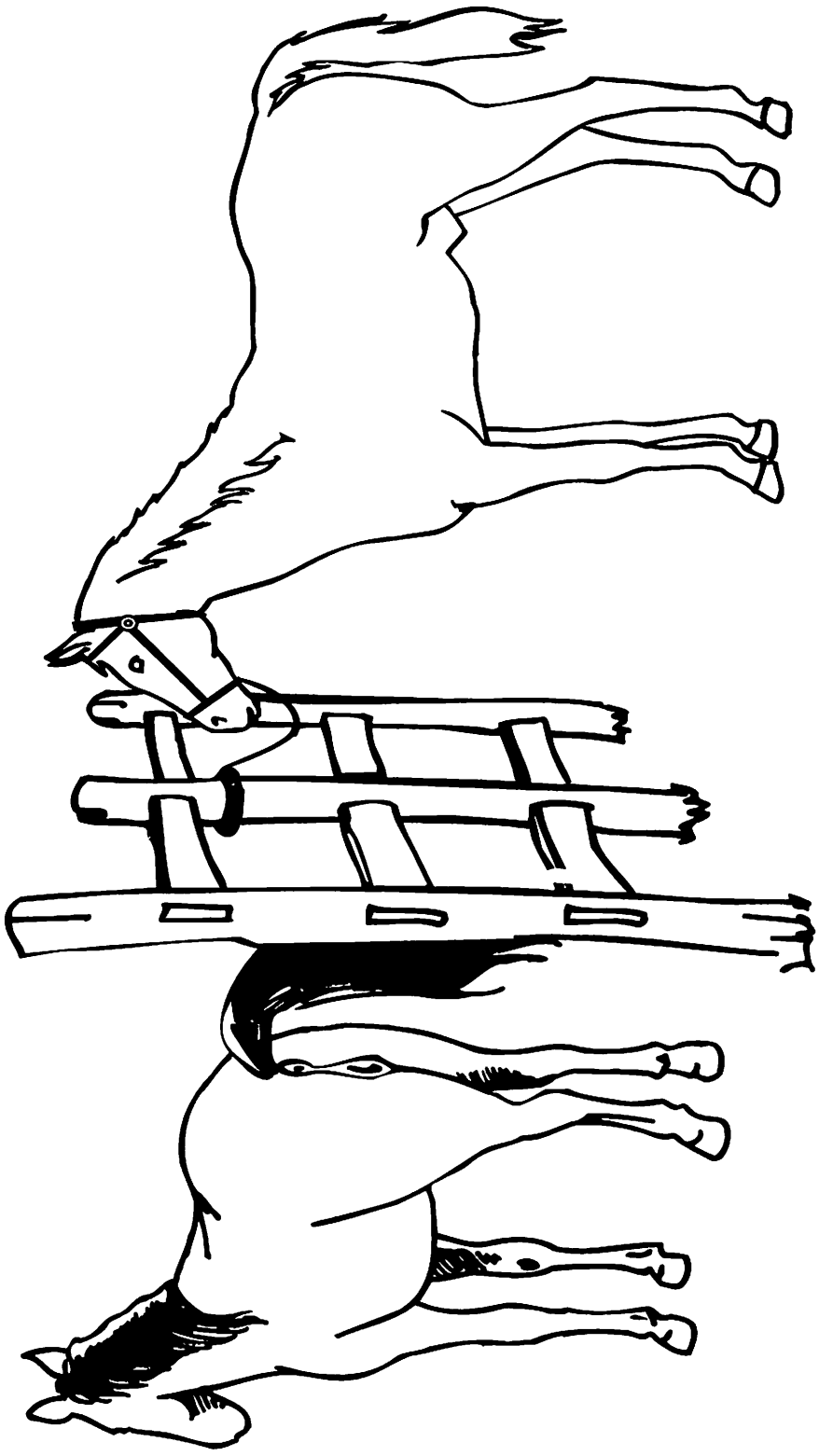
   b.

   c.

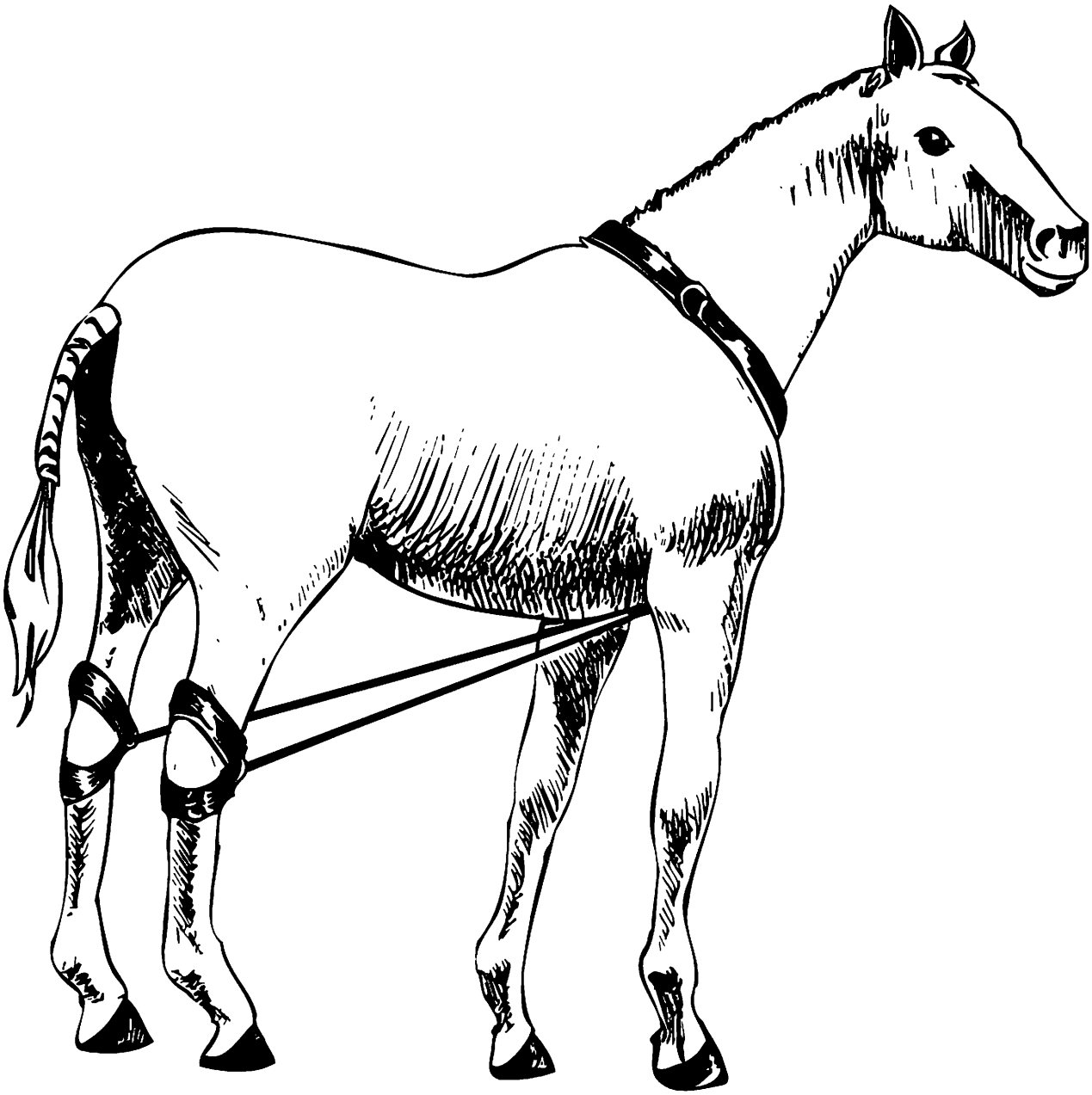
7. How does a mare's body react to the changing seasons? Why is this important?

8. What effect can pasture mating have on conception rates?

Teasing Rail



Breeding Hobbles



Lesson 6: Breeding Horses Name _____

A Pregnancy Puzzle

Objective: Identify terms associated with pregnancy determination in horses.

Unscramble each of the clue words. Copy the letters in the numbered cells to other cells with the same number to determine the phrase.

BEALUTCIR

			10	5		3		

CUTMER

			8		

RUUTES

		9			

MINNOA

1	11			6	7

TUFES

		4		

OHEBBLS

				2		12

P			P					
1	2		3	4	5	6	7	

8	9	10	11	12

UNIT IV - BREEDING

Lesson 7: Breeding Poultry

Competency/Objective: Discuss steps to be taken to ensure reproductive efficiency in poultry.

Study Questions

1. **When do poultry come into production?**

2. **How do producers know when birds will come into production?**

3. **What factors affect fertility and hatchability in poultry?**

References

1. *Advanced Livestock Production and Management* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit III.

2. Activity Sheet

   a) AS 7.1: Evaluating Eggs for Fertility

UNIT IV - BREEDING

Lesson 7: Breeding Poultry

TEACHING PROCEDURES

A. ***Review***

Lesson 6 discussed breeding horses, including the signs of heat, factors affecting conception rates, and pregnancy detection. Breeding poultry is very different from breeding horses. Poultry do not experience heat periods; rather, they come into production and are ready to lay eggs after that time.

B. ***Motivation***

Ask students what triggers birds in the wild to breed and produce eggs. Discuss the effect of light on reproduction in birds and how light is used to manipulate egg production in poultry.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Ask students how reproductive cycles differ in poultry from those of other livestock species. Discuss what it means for poultry to "come into production."

   When do poultry come into production?

   a) Come into production - when poultry are ready to breed and lay eggs
   b) Hens and roosters - 20 to 22 weeks of age
   c) Male and female turkeys - 26 to 30 weeks of age

2. Discuss how breeders know when birds are ready to come into production.

   How do producers know when birds will come into production?

   a) Keeping accurate hatching records of breeding birds
   b) Being able to recognize signs of sexual maturity
   c) Using light to control the age at which birds reach sexual maturity
      1) Most breeders decrease and then gradually increase the amount of light received during the growing period to control the onset of sexual maturity in pullets.
      2) They will produce eggs of a desirable size.

3. Ask students to list factors that would affect fertility and hatchability in poultry. Discuss how fertility and hatchability can be improved. Hand out AS 7.1. Provide a candler for the students; it may be as simple as a flashlight. Obtain ten eggs, some from a hatchery and some from the grocery store. The eggs from the hatchery should have been incubated for at least five days. Number each egg from 1 to 10 with a marker.

   What are factors affecting fertility and hatchability in poultry?

   a) Light
      1) Light is the most influential environmental factor affecting reproduction.
      2) Commercial hatcheries can control the production and release of ova in birds by controlling the timing and intensity of light.
         (a) Chickens - 14 to 16 hours of light

(b) Turkey hens - 14 hours of light

3) The amount of light should not be decreased during laying because any changes could decrease egg production.
4) Increasing the number of total hours of light to more than 17 hours will result in thin eggshells and may reduce egg production.
5) Lighting also affects the quantity and quality of semen in male birds.

b) Feeding
1) During the growing period prior to egg production, the feed intake of replacement breeding birds must be controlled.
(a) Particularly broiler breeders and turkeys
(b) Will not produce the maximum number of eggs if pullets and turkey hens are too heavy at sexual maturity
2) Broiler breeder hens should not be allowed to become too fat.
3) Breeding flocks require feed with the proper nutrients, including greater amounts of certain vitamins and minerals, to promote hatchability and embryo development.

c) Type of mating system
1) Natural mating may decrease fertility because mating does not occur frequently enough or because the birds are not receptive to mating.
2) AI is common, particularly with turkeys.
(a) Chickens - inseminated when they come into production and reinseminated weekly, which is necessary for fertility because semen dies in the hen's body after about two weeks
(b) Turkeys - inseminated on two-week intervals to achieve maximum fertility

d) Selection of eggs that show desirable physical characteristics related to hatchability, including shell quality, interior quality, size, and shape
1) Eggs with strong shells hatch better than thin-shelled eggs; shell quality is affected by various factors.
(a) Hen's diet
(b) Weather
(c) Length of the laying period
(d) Age of the hen
2) Eggs showing interior quality, such as a well-centered yolk, hatch more often than poor quality eggs.
3) Extremely large and small eggs and abnormally shaped eggs do not hatch well.

e) Proper egg management
1) Eggs should be gathered frequently, to help keep eggs clean and to prevent them from chilling or overheating due to the weather.
(a) Chickens - normally gathered three to four times daily, although they may be gathered hourly in hot or cold temperatures
(b) Turkeys - collected at least every two hours
2) Dirty eggs have lower hatchability rates, so nests should be kept clean.
3) Eggs are immediately decontaminated after gathering using sanitizer to kill any bacteria or other harmful microorganisms.
4) The eggs can then be stored in a temperature-controlled room.
(a) Chickens - 65 degrees Fahrenheit and a relative humidity of 75 to 80 percent
(b) Turkeys - 55 to 60 degrees Fahrenheit and 80 percent relative humidity
5) Chicken eggs may be held for up to ten days without drastically harming their hatchability.
(a) Decreases in hatchability after four days
(b) Should be turned twice a day if they are kept more than seven days
6) Turkey eggs should not be held for more than two weeks.

F. ***Other Activities***

1. Have students talk to managers or employees at turkey or chicken hatcheries. Have them discuss the common problems at the hatcheries, then have them compare and contrast the problems of hatcheries for the two poultry species.

2. Set up a poultry AI demonstration with a poultry AI technician.

G. ***Conclusion***

Rather than coming into heat, poultry come into production when they are ready to begin laying eggs. Poultry breeders must know when their birds are ready to produce eggs. Factors that affect fertility in breeding birds include light, feeding, and type of mating system. Proper egg selection and management are necessary for high hatchability rates.

H. ***Answers to Activity Sheet***

Answers will vary.

I. ***Answers to Evaluation***

1. d
2. b
3. c
4. c
5. d

6. Most breeders decrease and then gradually increase the amount of light received during the growing period to control the onset of sexual maturity in pullets so that they will produce eggs of a desirable size.

7. Because pullets and turkey hens will not produce the maximum number of eggs if they are too heavy at sexual maturity

8. Shell quality, interior quality, size, and shape

UNIT IV - BREEDING Name _____

Lesson 7: Breeding Poultry Date _____

EVALUATION

Choose the letter that corresponds to the best answer.

1. How many hours of daylight should chickens receive to stimulate production?

   a. 8 to 10 hours
   b. 10 to 12 hours
   c. 12 to 14 hours
   d. 14 to 16 hours

2. Chicken eggs may be stored in a temperature-controlled room at:

   a. 55 degrees Fahrenheit.
   b. 65 degrees Fahrenheit.
   c. 75 degrees Fahrenheit.
   d. 85 degrees Fahrenheit.

3. When breeding chickens, both hens and roosters are ready to begin breeding between_____ weeks of age.

   a. 10 and 12
   b. 15 and 17
   c. 20 and 22
   d. 25 and 27

4. When using artificial insemination, how often should turkeys be reinseminated?

   a. Twice a week
   b. Weekly
   c. Every two weeks
   d. Once a month

5. Turkey eggs should not be stored for more than:

   a. Four days.
   b. One week.
   c. Ten days.
   d. Two weeks.

Complete the following short answer questions.

6. How is light used to affect the age at which pullets come into production?

7. Why should the feed intake of growing broiler breeders and turkeys be controlled?

8. What are four physical characteristics of eggs that indicate hatchability?

   a.

   b.

   c.

   d.

Lesson 7: Breeding Poultry Name _____

Evaluating Eggs for Fertility

Objective: Evaluate poultry eggs to determine if they are fertilized.

One way to determine whether eggs are fertile is using a candler to observe the embryo. Using the candler provided by your instructor, hold each of the ten eggs up to the candler. Record whether they are fertilized or not by placing a check mark in the appropriate column. Then answer the question below.

Egg Number	Fertilized	Not Fertilized
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

What visual criteria did you use to determine which eggs were fertilized?

UNIT V - PARTURITION

Lesson 1: Calving in Beef and Dairy Cattle

Competency/Objective: Develop and practice production management strategies for parturition of beef and dairy cattle.

Study Questions

1. **What are the signs of parturition for beef and dairy cattle?**
2. **What management techniques should be used before and during parturition?**
3. **What practices should be used to assist with normal births?**
4. **What practices should be used to assist with abnormal births?**
5. **How is the cow managed after parturition?**
6. **What records should be kept?**

References

1. *Advanced Livestock Production and Management* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit V.
2. Transparency Masters
   a) TM 1.1: Normal Presentation
   b) TM 1.2: Abnormal Presentations
   c) TM 1.3: Using Pulling Chains
3. Activity Sheet
   a) AS 1.1: Assisting with Abnormal Births

UNIT V - PARTURITION

Lesson 1: Calving in Beef and Dairy Cattle

TEACHING PROCEDURES

A. ***Introduction***

Calving difficulty can result in losses for beef and dairy producers. One way producers can address this problem is to be familiar with parturition. They should learn the signs of calving and be familiar with the normal calving process as well as the management practices needed to assist with abnormal births. Producers should also be able to assist the cow if problems do occur during parturition.

B. ***Motivation***

1. Show TMs 1.1 and 1.2 to students to illustrate the various presentations. Have them discuss why the normal presentation is the safest and what problems might arise due to improper positioning.

2. Bring in pulling chains and other obstetrical tools and show them to the students.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Have students list signs they think a cow will exhibit before calving. What are the most obvious signs?

What are the signs of parturition for beef and dairy cattle?

a) Swelling of the mammary glands in the udders
b) Secretion of colostrum
c) Loosened pelvic ligaments between the tail head and pin bones, creating a sunken appearance
d) Relaxed and swollen vulva
e) Mucus secreted from the vulva
f) Desire to leave the rest of the herd
g) Being unusually restless and uneasy
h) Labor pains, indicated by bawling, attempting to push out the calf, and breathing rapidly
i) Rupturing of the water bag

2. Ask students what management techniques can be done before parturition to prepare for the birth.

What management techniques should be used before and during parturition?

a) A good manager will keep records that indicate when to expect cows to calve, allowing for preparation time.
b) The equipment used to assist in parturition should be on hand in an accessible area and ready for use.
    1) Soap
    2) Clean towels
    3) Clean obstetrical gloves
    4) Obstetrical lubricant
    5) Pulling chains

(a) Cleaned prior to calving season and between uses
(b) Placed in a clean bucket of disinfectant and water before and after use to kill any bacteria that may harm the cow

c) During expected calving times, cows should be observed more often than usual; pregnant cows may be kept in a smaller pasture that is located close enough to observe them easily.
d) A cow should have a safe and clean place to give birth
   1) Pasture - free of excess manure, dangerous equipment, and heavy cover where the cow can isolate itself from the herd
   2) Confinement - clean and disinfected maternity stall that is 12 by 16 feet in size and plenty of ventilation, light, and fresh bedding

3. Have students describe a "normal" birth. Ask them how producers might assist with normal calving. Show students TM 1.1 and discuss the normal presentation.

What practices should be used to assist with normal births?

a) A cow should give birth within an hour or two after delivery begins.
b) The calf should appear in the normal calving position with the forelegs extended outward with the nose between the legs.
c) No assistance is required in the normal delivery of a calf, but certain steps are necessary immediately after a birth.
   1) Clear the mouth and nostrils of mucus and observe the calf to make sure it has begun to breathe.
   2) Sometimes it may need to be "started", or stimulated to breathe.
      (a) Tickling the nostrils with a piece of hay
      (b) Slapping the sides of the calf
      (c) Suspending the calf in the air by the hind legs and gently shaking it
      (d) In extreme cases, performing artificial respiration

4. Ask students how they can tell if a birth is abnormal. Discuss practices that may be used to assist with abnormal births. Use TM 1.2 to illustrate malpresentations. Have students complete AS 1.1.

What practices should be used to assist with abnormal births?

a) If the cow has not delivered after an hour, the producer may choose to call a veterinarian.
b) The producer may decide to perform a pelvic examination if he or she is confident enough to do so.
   1) The amount the cervix has dilated should be checked.
   2) Other potential problems that should be checked are whether the calf is too large to exit the cow's body or if the calf and birth canal are dry.
   3) The position of the fetus should also be determined.
c) A veterinarian must be called if the calf is too large to exit through the birth canal.
d) If the calf and the birth canal are dry or if the cervix has not dilated sufficiently, a commercial lubricant and pulling chains can be used to assist with parturition.
   1) A glove should be worn to spread the lubricant on and inside the cow.
   2) Clean obstetrical pulling chains should be attached to the calf.
      (a) The pulling chains should be placed around the pasterns of the forelegs with the loop portion of the chains on top of the hooves.
      (b) After the chains are in place, handles are attached to the chains, and the calf is pulled gently from the cow's body.
      (c) Alternately pulling gently on each leg, freeing a few inches at a time, is recommended to walk the calf's shoulders out of the pelvic opening one at a time.
      (d) If the shoulders get locked, chains should be attached to the calf's head with the chains wrapping around the poll and passing through the mouth.

(e) When using pulling chains during parturition, the calf should be pulled out gradually.

3) After the head and shoulders are outside of the cow's body, repositioning the calf may be necessary.
   (a) Turning the calf a quarter turn onto its side will help the hind quarters fit through the birth canal.
   (b) If this procedure does not work, the producer should grab the forelegs and pull downward toward the cow's rear feet.
4) The hips may get locked in the birth canal.
   (a) If this occurs while the cow is lying down, the calf should be pushed back slightly and then turned a quarter turn.
   (b) If the calf cannot be turned, the forelegs should be pulled between the cow's hind legs and toward its chin.

e) With abnormal presentations, repositioning the calf so that the birth can proceed normally may be possible.
   1) Before reaching into the cow's uterus, the producer should be sure to wash using soap.
   2) If possible, gloves should be worn to prevent the spread of bacteria.
   3) If a foreleg is retained, the leg can be pulled forward.
   4) If the calf's head is bent back, the calf should be pushed back into the uterus and then its head should be brought forward between its legs.
   5) When the calf is upside down, it may be possible to turn it to the normal position.

f) A calf that is backward in the uterus may be delivered hind legs first if the legs extend into the birth canal.
   1) The birth may proceed without assistance, but it must occur quickly.
   2) If not, pulling chains should be attached to the rear legs around the fetlock.
   3) Plenty of lubrication is necessary to counter the direction of hair growth.
   4) The calf should be turned a quarter turn to facilitate its passage.
   5) The rear legs should be pulled gently one at a time.
   6) If delivery is slow or unsuccessful, the veterinarian may need to perform a caesarian section.

g) As soon as the umbilical cord breaks, the calf must begin to breathe in order to get oxygen and survive.
   1) A danger with abnormal presentations is that the umbilical cord may break or be pinched while the calf's head is still within the cow's body, causing the calf to suffocate.
   2) If the delivery is difficult but the calf's head is outside the cow, the producer should take the time to be sure that the calf is breathing normally.

5. Ask students to describe the care a cow needs after parturition.

How is the cow managed after parturition?

a) The cow should expel the afterbirth by uterine contractions two to eight hours after delivery.
   1) Producers should watch for the membrane and be sure that the cow has expelled all of it.
   2) If the cow has not passed the membranes in 24 hours, they may need to be removed manually.

b) Another problem that producers should watch for is uterine prolapse, in which the uterus becomes inverted and is forced out of the cow
   1) The cow will die if appropriate medical attention is not provided immediately.
   2) Only a veterinarian should treat a cow with a uterine prolapse.
   3) Many managers try to get the cow to stand up as soon as possible after parturition as a preventative measure.

c) A cow that has recently calved needs good nutrition to produce enough milk, recuperate from parturition, and prepare the womb to hold another fetus.

d) A major concern with dairy cattle is parturient paresis, or milk fever.

1) This disease is the result of a lack of calcium salts in the blood of a cow and is more common in high-producing cows.
2) Symptoms generally arise a few days after parturition.
   (a) Dry muzzle
   (b) Reduced defecation
   (c) Cold skin
   (d) Loss of coordination
   (e) Paralysis
   (f) Depression
   (g) Excitability
   (h) Lying on the brisket with the head turned backwards
3) A veterinarian can treat the cow with an injection of calcium.

e) With beef cattle, a good practice is keeping cows and new calves separate from the rest of the herd for a few days before turning them out to join the herd.

f) Dairy cows are kept with their calves only long enough to pass on their colostrum.

6. Birth records are left for proper selection and breeding. Ask students to list the information that should be recorded.

What records should be kept?

a) Date of calving
b) Sex of the calf
c) Sire
d) Identification number
e) Birth weight
f) Difficulty during parturition
g) Any medications given to the cow or her calf
h) Post-delivery problems such as a retained placenta or uterine prolapse

F. ***Conclusion***

Each year dairy and beef producers lose money because of problematic births. To reduce costly losses, cattle producers and managers must keep precise records so they know when to expect their pregnant cows to deliver and be able to recognize the signs that indicate a cow is in labor. Calving facilities and equipment should be clean, sanitary, and ready for use before the expected calving dates. Producers should be prepared to assist with normal and abnormal births if necessary. After birth, the cow will require proper care to remain healthy and productive. Accurate birth records are required because they serve as important guidelines in the selection and culling of breeding stock.

G. ***Other Activities***

1. Have the students observe a live birth if possible. If they cannot, videotape a cow during calving and show the video to the class.

2. Have students research the signs of parturition and create a time line of the appearance of behavior signs and changes in the cow's body prior to parturition.

3. Have students prepare a brochure or bulletin board that discusses how to tell when a birth is abnormal or normal. Have the brochure discuss when it is better to call a veterinarian, or when to help and how.

4. The Oklahoma Cooperative Extension Service has a number of videotapes available for purchase. Obtain a copies of "Calving Management: Parturition" and "Calving Management: Dystocia" to show to the class. Their online video catalog can be found at http://www.okstate.edu/ag/agedcm4h/tv-video/videocat.

H. ***Answers to Activity Sheet***

1. Before reaching into the cow's uterus, be sure to wash your hands using soap. Gloves should be worn to prevent the spread of bacteria. Push the calf back into the uterus and then bring its head forward between its legs.

2. A veterinarian should be called.

3. The birth may proceed without assistance if it occurs quickly. If not, pulling chains should be attached to the rear legs around the fetlock. Plenty of lubrication is necessary. The calf should be turned a quarter turn to facilitate its passage. The rear legs are pulled gently one at a time. If delivery is slow or unsuccessful, the veterinarian may need to perform a caesarian section.

4. If this occurs while the cow is lying down, the calf should be pushed back slightly and then turned a quarter turn. If the calf cannot be turned, the forelegs are pulled between the cow's hind legs and toward its chin.

5. A glove should be worn to spread lubricant on and inside the cow. Clean obstetrical pulling chains are attached to the calf. The pulling chains should be placed around the pasterns of the forelegs with the loop chains on top of the hooves. The calf is pulled gently from the cow's body by alternately pulling gently on each leg, freeing a few inches at a time.

I. ***Answers to Evaluation***

1. b
2. c
3. a

4. The umbilical cord may break or be pinched while the calf's head is still within the cow's body.

5. Answers may include any two of the following: birth weight, date of calving, sex of the calf, sire, identification number, difficulty during parturition, any medications given to the cow or her calf, and post-delivery problems such as a retained placenta or uterine prolapse.

6. The uterus becomes inverted and is forced out of the cow.

7. Answers may include any three of the following: swelling of the mammary glands in the udders, secretion of colostrum, loosened pelvic ligaments between the tail head and pin bones with a sunken appearance, relaxed and swollen vulva, mucus secreted from the vulva, desire to leave the rest of the herd, being unusually restless and uneasy, labor pains, and rupturing of the water bag.

8. Answers may include any two of the following: soap, clean towels, obstetrical gloves, obstetrical lubricant, and pulling chains.

9. With the forelegs extended outward into the birth canal and the nose between the legs

10. Answers may include any two of the following: the cervix has not dilated enough, the calf is too large to exit the cow's body, or the calf and birth canal are dry.

UNIT V - PARTURITION Name _____

Lesson 1: Calving in Beef and Dairy Cattle Date _____

EVALUATION

Circle the letter that corresponds to the best answer.

1. If the cow has not calved by _____ after the beginning of labor, a pelvic exam may be necessary.

   a. Half an hour
   b. One hour
   c. Half a day
   d. One day

2. What does "starting" a calf mean?

   a. Being sure that it eats
   b. Giving it solid feed
   c. Getting it to breathe
   d. Inducing labor

3. How long should it take for the cow to pass the afterbirth from her body after delivery?

   a. 2 to 8 hours
   b. 5 to 10 hours
   c. 6 to 12 hours
   d. 24 hours

Complete the following short answer questions.

4. Why is a calf more likely to suffocate with an abnormal presentation?

5. What are two examples of information that should be included in birth records?

   a.

   b.

6. What is a uterine prolapse?

7. What are three signs of parturition?

   a.

   b.

   c.

8. What are two items that should be kept on hand to use if assisting with calving is necessary?

   d.

   e.

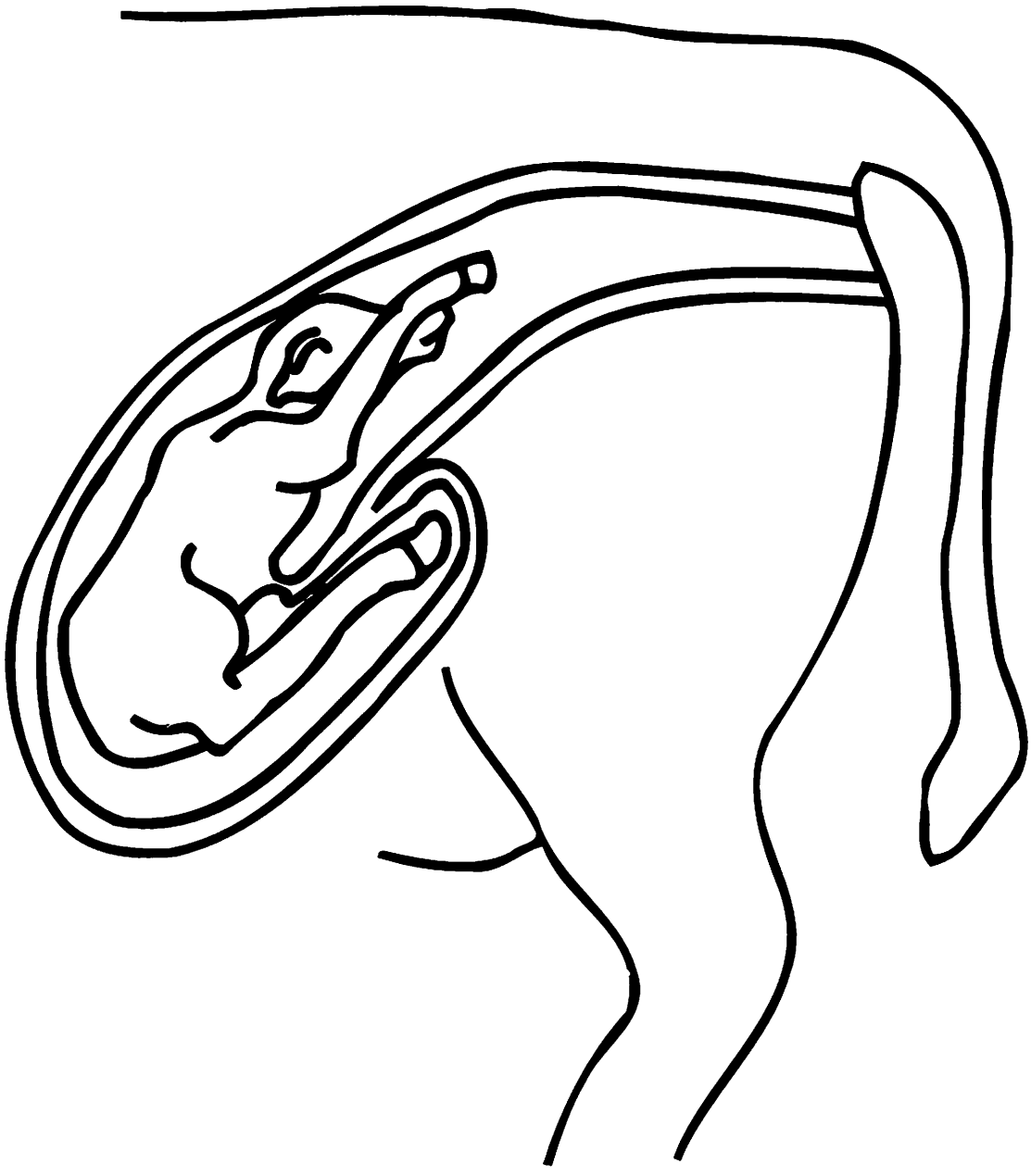
8. What is the normal presentation for a calf?

9. Besides abnormal presentations, what are two problems with calving that may require assistance?

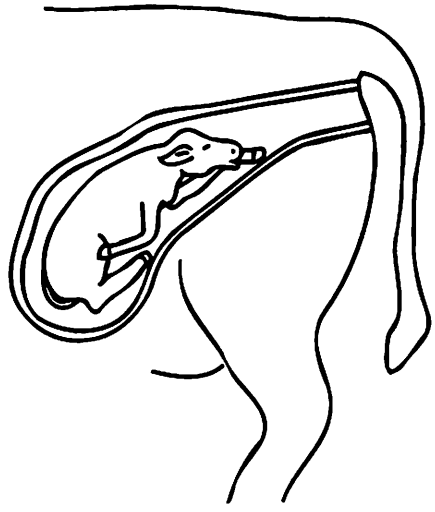
   a.

   b.

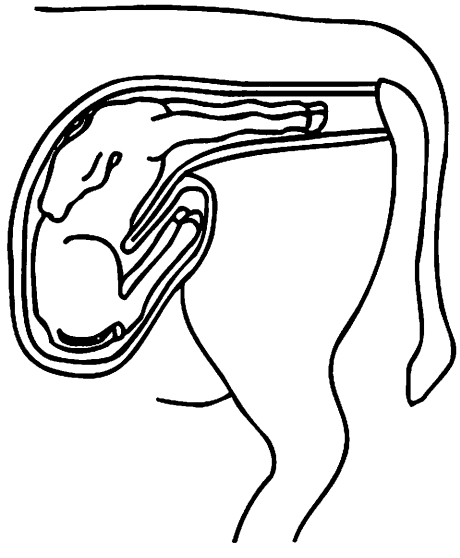
Normal Presentation



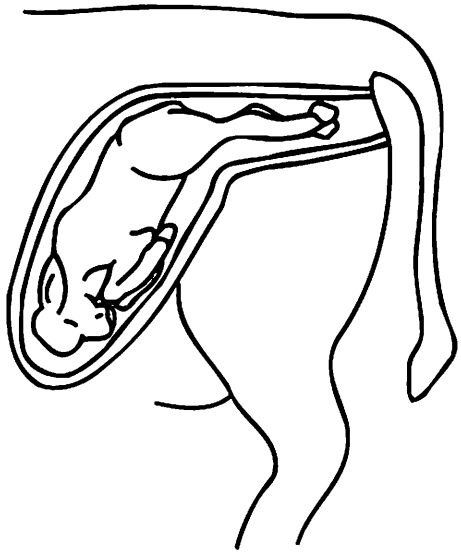
Abnormal Presentations



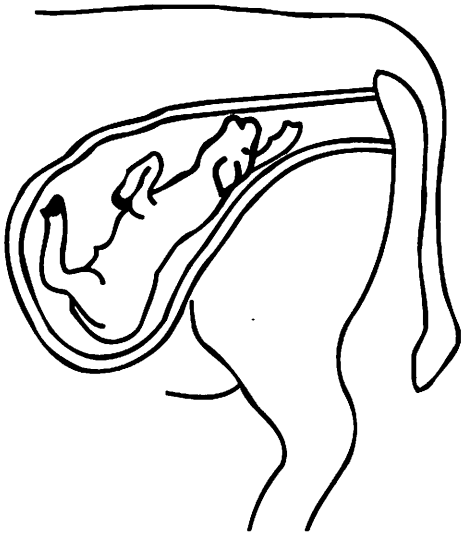
Foreleg Retained



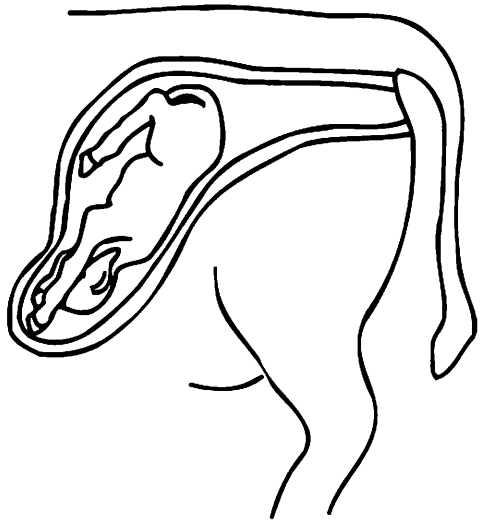
Head Bent Backward



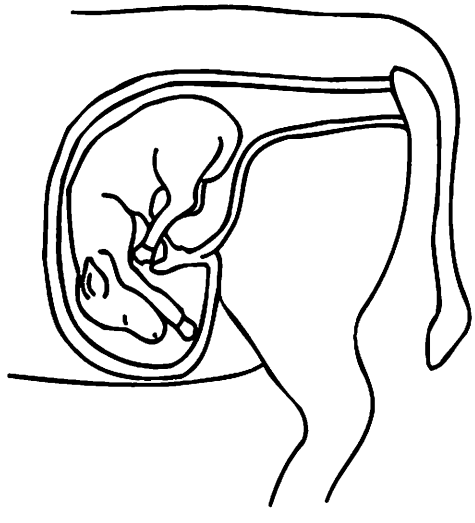
Hind Legs Extended



Upside Down

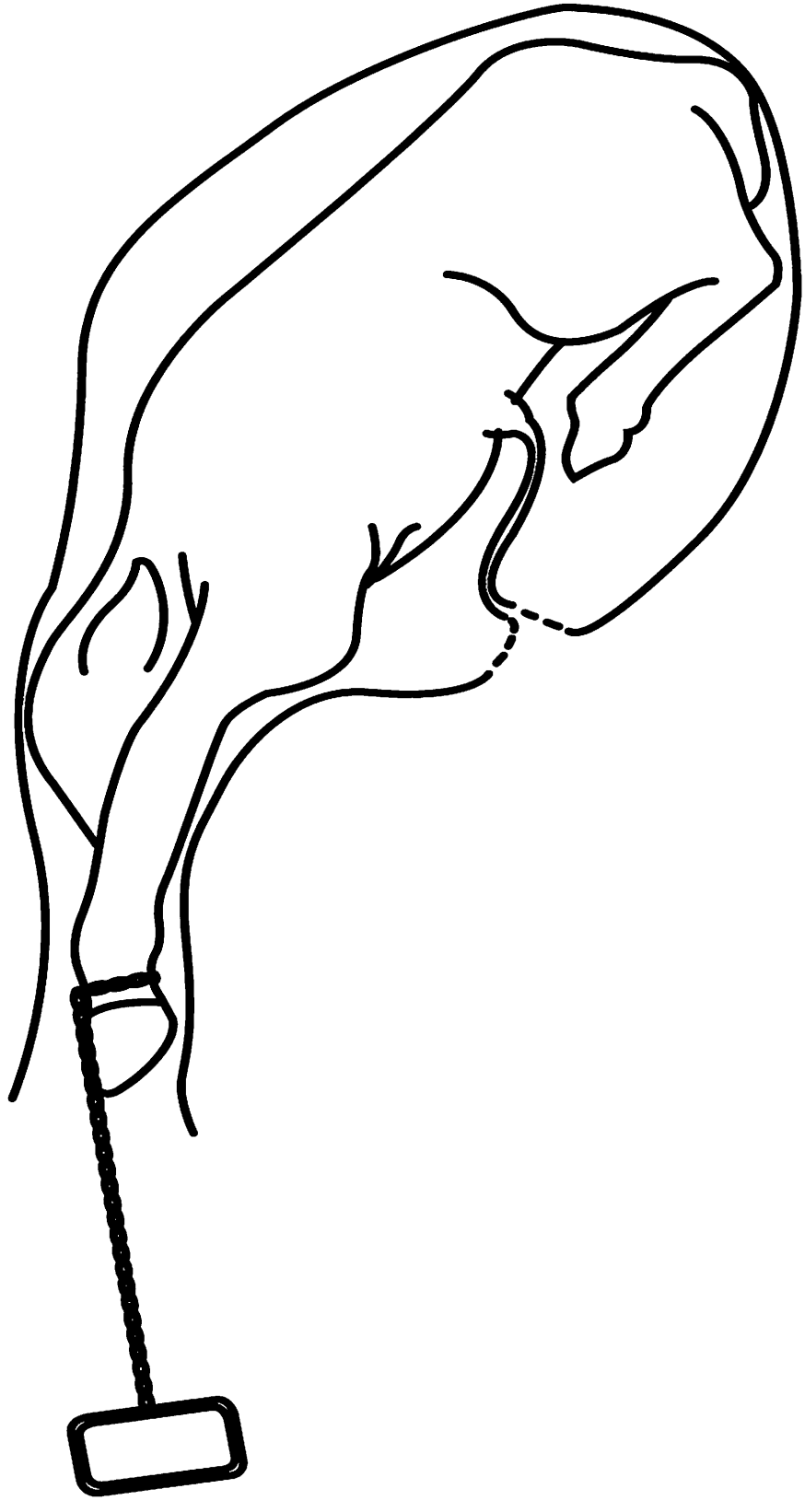


Backward and Upside Down



Backward with Feet Retained

Using Pulling Chains



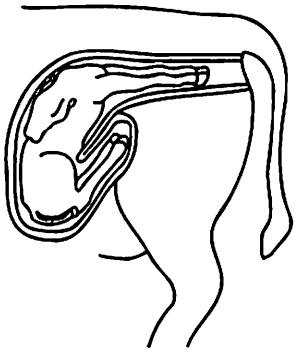
Lesson 1: Calving in Beef and Dairy Cattle Name _____

Assisting with Abnormal Births

Objective: Describe practices for assisting with abnormal births.

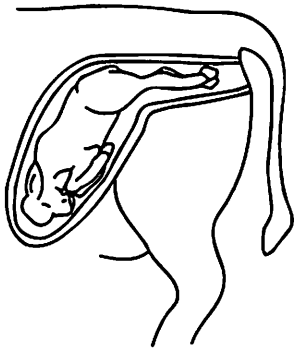
Describe what measures should be taken to assist with an abnormal birth for each of the problems described or pictured. In your description, be sure to include any equipment or materials that may be used, as well as how to use them correctly.

1.



2. The calf is too large to pass through the cow's birth canal.

3.



4. The calf's hips have become locked in the birth canal.

5. The calf and birth canal are dry to the touch.

UNIT V - PARTURITION

Lesson 2: Farrowing

Competency/Objective: Create and implement production management strategies for parturition in swine.

Study Questions

1. **What are the signs of parturition for swine?**
2. **What management techniques should be used before and during parturition?**
3. **What practices should be used to assist with normal births?**
4. **What practices should be used to assist with abnormal births?**
5. **How is the sow managed after parturition?**
6. **What records should be kept?**

References

1. *Advanced Livestock Production and Management* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit V.
2. Activity Sheet
   a) AS 2.1: Farrowing Information

UNIT V - PARTURITION

Lesson 2: Farrowing

TEACHING PROCEDURES

A. ***Review***

Lesson 1 discussed parturition in beef and dairy cattle. A major difference between cattle and swine is that swine use both uterine horns to hold and nourish their offspring. Because of this difference, swine are able to produce large litters. Providing assistance during farrowing can therefore prove to be labor intensive.

B. ***Motivation***

Ask students to suggest differences and similarities between cattle and swine in parturition. Discuss their suggestions.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Ask students how a sow's body will change to give birth and nurse her young. Discuss the different physical and behavioral signs of parturition.

   What are the signs of parturition for swine?

   a) Nest-building behavior
   b) Swollen vulva
   c) Bagging, or swelling of the mammary glands as they fill with milk
   d) Slight frothing at the mouth
   e) Chomping, especially in younger, less experienced sows
   f) Restlessness
   g) Slight mucus discharge from the vulva

2. Ask students how a manager can prepare for farrowing ahead of time.

   What management techniques should be used before and during parturition?

   a) Pregnant sows should be moved gently to farrowing facilities about a week before the expected farrowing date.
      1) The facilities should be cleaned and disinfected thoroughly.
      2) The sows should also be washed with soap and water before being placed in the farrowing facilities
      3) The introduction of bacteria should be discouraged by keeping human traffic through the farrowing barns to a minimum.
   b) The farrowing facility should have the equipment needed to ensure the survival of the young pigs.
      1) A nursery generally has farrowing crates that do not allow the sow to turn around and guard rails that protect areas for the young pigs.
      2) Open pens with guard rails may also be used for farrowing.
      3) Heat lamps should also be provided for the newborn pigs.
         (a) They are hung next to the sow over the area where the newborns are protected by the guard rails.

(b) A temperature of 90 to 95 degrees Fahrenheit should be maintained at first.
(c) The temperature is lowered to 80 to 85 degrees after a period of four or five days.

c) Certain supplies should be kept on hand for assisting with farrowing, including an obstetrical lubricant, obstetrical gloves, clean towels, syringes, and oxytocin.

3. Have students describe a normal birth for swine. How can the producer assist with normal farrowing?

What practices should be used to assist with normal births?

a) While pigs may be born in many different positions, certain presentations are considered normal.
   1) These presentations include having the forelegs forward with the head resting between them or backward with the hind legs first.
   2) The sow should not require assistance with either position.
b) The manager should carefully observe the new pigs and be ready to assist them if necessary.
   1) The pigs may need to be freed from the fetal membranes.
   2) Their snouts should be cleaned.
   3) The newborns should be checked to see if they are breathing.
   4) Starting their breathing may be necessary.
      (a) Gently yet firmly slapping the animal
      (b) Picking it up by the hind legs and patting it on the sides until it coughs up mucus
   5) All the new pigs should be dried off with towels and placed under the heat lamps.
c) Producers should be aware that sows carry their fetuses in both uterine horns and only will give birth to their young one horn at a time.
   1) After a sow gives birth to all of the piglets in the first uterine horn, she will pass the placenta of that horn before giving birth to the rest of her offspring and passing the second placenta.
   2) The producer should be sure that both placentas have passed.
   3) They should be disposed of in the dead animal or waste disposal facilities.
   4) The producer should also dispose of stillborn and mummified pigs.

4. Ask students how providing assistance for abnormal births in swine differs from assisting cattle. Discuss the measures taken to assist with abnormal births.

What practices should be used to assist with abnormal births?

a) Assistance may be needed with some abnormal births.
   1) Abnormal birth presentations for swine include having the head turned back, presenting the rump first, and presenting the back first.
   2) Assistance is required if the fetus is too large to exit the birth canal.
b) The birth canal must be examined if the sow delays for a half an hour after giving birth to some of her young or is struggling from the onset.
   1) A sow's birth canal should be entered as little as possible to prevent disease.
   2) Obstetrical gloves and plenty of obstetrical lubricant are necessary.
   3) The producer should first check to see if anything is in the birth canal.
   4) If a pig is in the canal, the manager should pull it out swiftly by grabbing the baby pig's legs.
c) If nothing is blocking the birth canal, the sow may need to be given a shot of oxytocin.
   1) Producers may inject the sow with three shots of oxytocin given at 20-minute intervals over the course of an hour.
   2) A sow should never receive oxytocin unless the birth canal has been checked and is cleared of any pigs.
d) Temperature has an effect on sows.

1) When they are hot and tired, they will give up and let their offspring die inside their bodies.
2) If the weather is too hot and the sows get overheated under the heat lamps, producers may have to pull many of the pigs.

5. Discuss management practices used with sows after parturition. Hand out AS 2.1.

How is the sow managed after parturition?

a) A nursing sow needs extra nutrients to produce the milk that will nourish her young.
   1) The feed needs to be nutritionally complete.
   2) Sows will need to consume larger amounts.
b) Some producers give their sows injections after farrowing.
   1) Oxytocin can help expel the placenta and promote milk let down.
   2) Producers may give their sows penicillin as a preventive measure against infections.
c) Sows should be allowed to nurse for 14 to 15 days after farrowing, and then the young pigs should be weaned.
   1) Natural estrous synchronization of sows can be achieved if the young pigs are weaned on the same day
   2) The sows are exposed to the boar and bred after four days.
   3) An injection of the hormone prostaglandin can induce heat if a sow does not come into heat naturally.

6. Ask students why accurate record keeping is important in the swine industry. What information is needed?

What records should be kept?

a) Sow's record
   1) Litter number
   2) Sire
   3) Date of farrowing
   4) Temperament of the sow at farrowing
   5) Amount of farrowing difficulty
   6) Number of pigs born
   7) Number of stillborn pigs
   8) Number of mummies
   9) Average birth weight
   10) Mortality rates - may be recorded during nursing
      (a) Date
      (b) Number found dead
      (c) Cause of death, such as abscesses or being crushed
b) Litter record
   1) Pig number
   2) Sex
   3) Number of teats
   4) Birth weight
   5) Defects

F. ***Other Activities***

1. Have students observe farrowing, either by watching a videotape or by visiting a farrowing barn.

2. Ask students to research how close a sow is to giving birth based on the signs of parturition she displays. Have them create a time line showing the sequence.

G. ***Conclusion***

Producers should be aware of the signs of farrowing, particularly the most obvious ones, bagging and a swollen vulva. Before farrowing, sows should be prepared for giving birth by washing them and moving them to clean, disinfected farrowing facilities. If someone is present during farrowing, any necessary assistance can be provided for normal or abnormal births. After farrowing, the sows need good nutrition and care to produce enough milk and recuperate from farrowing for rebreeding. Precise records on mortality, health, and farrowing difficulty should be kept.

H. ***Answers to Activity Sheet***

Answers may vary, but suggested answers are given below.

1. Signs of farrowing include nest-building behavior, a slight frothing at the mouth, chomping, a swollen vulva, bagging (swelling of the mammary glands), restlessness, and a slight mucus discharge from the vulva.

2. Move pregnant sows gently to farrowing facilities about a week before the expected farrowing date. Clean and disinfect the facilities thoroughly before moving the sows. Wash the sows with soap and water before placing them in the farrowing facilities. Keep supplies on hand for assisting with farrowing, including an obstetrical lubricant, obstetrical gloves, clean towels, syringes, and oxytocin.

3. If needed, free pigs from the fetal membranes. Clean their snouts and check to see if they are breathing. If starting their breathing is necessary, gently yet firmly slap the animal or pick it up by the hind legs and pat it on the sides until it coughs up mucus. Be sure that both placentas have passed before leaving. As soon as the placentas are expelled, dispose of them in the dead animal or waste disposal facilities, along with stillborn and mummified pigs. Dry off all the new pigs with towels and place them under the heat lamps.

4. If the sow delays for a half an hour after giving birth to some of her young or is struggling from the onset of parturition with little success, examine the birth canal using obstetrical gloves and plenty of obstetrical lubricant. Check to see if anything is in the birth canal. If a pig is in the canal, pull it out swiftly by grabbing the baby pig's legs. If nothing is blocking the birth canal, she may need a shot of oxytocin. Give three shots of oxytocin at 20-minute intervals over the course of an hour. Never give a sow oxytocin unless the birth canal has been checked and cleared of any pigs. If the weather is too hot and the sows get overheated under the heat lamps, be prepared to pull many pigs.

5. Make sure that nursing sows receive larger amounts of feed that are nutritionally complete. Inject sows with oxytocin and penicillin. Allow sows to nurse their offspring for 14 to 15 days after farrowing, and then wean the young pigs. Rebreed sows after four days. If a sow does not come into heat with the rest of the herd naturally, induce heat with an injection of prostaglandin.

I. ***Answers to Evaluation***

1. a
2. d
3. c
4. d

5. Answers may include any two of the following: litter number, sire, date of farrowing, temperament of the sow at farrowing, amount of farrowing difficulty, number of pigs born, number of stillborn pigs, number of mummies, average birth weight, and mortality rates during nursing.

6. To help expel the placenta and promote milk let down

7. Gently and firmly slapping the animal and picking it up by the hind legs and patting it on the sides until it coughs up mucus

8. Students may answer with either nest-building or restlessness.

9. If the sow delays for half an hour after giving birth to some of her young or is struggling from the onset of farrowing

UNIT V - PARTURITION

Name _____

Lesson 2: Farrowing

Date _____

EVALUATION

Circle the letter that corresponds to the best answer.

1. What does "bagging" mean?

   a. Swelling of teats with milk
   b. Passing of the water bag
   c. Passing of the afterbirth
   d. Farrowing a stillborn pig

2. When should sows be moved to farrowing facilities?

   a. One day before the expected farrowing date
   b. Three days before the expected farrowing date
   c. Five days before the expected farrowing date
   d. One week before the expected farrowing date

3. How many shots of oxytocin may be given over the course of an hour?

   a. 1
   b. 2
   c. 3
   d. 4

4. How long should the pigs be allowed to nurse after farrowing before weaning them to allow for rebreeding?

   a. 8 to 9 days
   b. 10 to 11 days
   c. 12 to 13 days
   d. 14 to 15 days

Complete the following short answer questions.

5. What are two examples of information that should be included in the sow's records?

   a.

   b.

6. Why might a producer inject a sow with oxytocin after farrowing?

7. What are two ways that a pig's breathing may be stimulated?

   a.

   b.

8. What is a behavioral sign of farrowing?

9. At what point during farrowing should the birth canal be examined to check for abnormalities?

Lesson 2: Farrowing Name _____

Farrowing Information

Objective: Describe various aspects of farrowing, including signs of farrowing, procedures for assisting with normal and abnormal births, and care of the sow after farrowing.

You have just been promoted to the position of farrowing manager at a local swine production facility. Now you are in charge of FFA members doing their SAE's at your facility. You want to help them do a good job, so you decide to write out the important information about farrowing on a guidesheet they can keep in their notebooks.

In the space below, write down the information about farrowing you would include on the sheet. Be sure to be clear and concise in your descriptions.

1. Signs of parturition in sows

2. Preparing for farrowing

3. Assisting with normal births

4. Assisting with abnormal births

5. Care of the sow after farrowing

UNIT V - PARTURITION

Lesson 3: Lambing

Competency/Objective: Create and implement production management strategies for parturition of sheep.

Study Questions

1. **What are the signs of parturition for sheep?**
2. **What management techniques should be used before and during parturition?**
3. **What practices should be used to assist with normal births?**
4. **What practices should be used to assist with abnormal births?**
5. **How is the ewe managed after parturition?**
6. **What records should be kept?**

References

1. *Advanced Livestock Production and Management* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit V.
2. Transparency Masters
   a) TM 3.1: Normal Presentation
   b) TM 3.2: Abnormal Presentations
3. Activity Sheet
   a) AS 3.1: Assisting with Lambing

UNIT V - PARTURITION

Lesson 3: Lambing

TEACHING PROCEDURES

A. ***Review***

Lesson 2 discussed parturition in swine. Unlike swine, sheep generally only give birth to one lamb unless the ewe has twins or triplets. However, although sheep have fewer offspring, complications in lambing can be more difficult to handle. Lambing times are the most labor-intensive periods for sheep enterprises because producers must be prepared to assist with both normal and abnormal births to minimize losses.

B. ***Motivation***

Ask students what crotching and facing are. Show them pictures of sheep that have been crotched and/or faced. Ask them why shearing the sheep in these ways might be desirable.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Have students list signs of parturition in sheep.

   What are the signs of parturition for sheep?

   a) Seeking solitude
   b) Uneasy disposition
   c) Repetitively standing up only to lay back down again
   d) Digging into the ground before laying down, as if building a nest
   e) Being more vocal, especially ewes carrying more than one lamb
   f) Dropping, which gives the ewe a sunken appearance in front of the hip bones and may make her appear sway-backed
   g) Relaxed, slightly more pink vulva
   h) Broken water bag

2. Ask students what management strategies might be used to prepare for lambing.

   What management techniques should be used before and during parturition?

   a) Producers should have lambing supplies available and easily accessible, including soap, obstetrical lubricant, obstetrical gloves, clean towels, and lambing snares or loops.
   b) Producers may shear their ewes three to four weeks before lambing.
      1) The physical signs of parturition are more apparent.
      2) The lamb does not come into contact with the ewe's dirty wool as it passes out of the birth canal.
      3) The lamb can find the ewe's teats more easily if no wool tags are in the way.
      4) Providing assistance for abnormal births is easier.
      5) Identifying a prolapse before it becomes serious is easier.
      6) A shorn ewe is less likely to lay on her offspring and is more likely to find shelter for both herself and her lamb in bad weather.
   c) Producers may choose to crotch their ewes prior to breeding instead of completely shearing them.

1) Crotching involves shearing the wool from the crotch, udder, and stomach a few inches in front of the udder.
2) The limited shearing involves less labor and holds many of the same advantages that are provided by completely shearing the ewe.

d) Another practice common among producers is called facing, which involves trimming the wool from the ewe's face.
1) Many producers will face and crotch the ewe at the same time.
2) An advantage of facing is preventing wool blindness; if a ewe has trouble seeing her lamb, she will not tend to it as much.
3) A ewe with an open face tends to seek shelter in poor weather conditions for both herself and her lamb more often.

e) At lambing time, producers must keep a very close eye on their ewes.
1) For safety reasons, many producers choose to bring them into lambing pens after the lambs are born.
2) Other producers prefer to confine ewes during the lambing season.

f) Producers should have their lambing pens ready for pregnant ewes close to parturition.
1) They should also have jugs (panels) ready so that the ewe and her offspring have a safe and private place in which to bond.
2) These areas typically range in size from 4 feet by 4 feet to 6 feet by 6 feet.
3) They should provide a clean, dry environment for the ewe and her lamb.
4) Pens should have plenty of clean, dust-free bedding, a small hay feeder, and water in a container that is small enough so that the lamb cannot fall in and drown.
5) The facilities should be cleaned and disinfected.
6) Although the area should be free of drafts, it should have good ventilation to avoid ammonia buildup from manure and urine.
7) If heat lamps are used, they should be positioned to prevent the ewe from coming into contact with them.
8) Ewes and their lambs can be grouped, but pens should hold no more than 10 ewes and their lambs.

3. Ask students what a producer might do to assist with a normal birth. What potential problems may occur? Show students TM 3.1 to illustrate the normal lambing position.

What practices should be used to assist with normal births?

a) Producers should give the ewe time to give birth unassisted.
1) The beginning of the birth process is marked by the ewe lying down on her side with her nose pointed upward.
2) The ewe should be able to give birth within an hour and a half to two hours.
3) The normal position is with the front feet first and the head between them.
4) After the birth, the producer should wipe the mucus from the lamb's nose.

b) If the lamb has trouble breathing, the producer should hold it firmly by the hind legs and swing it sharply up and down in an arc to expel any mucus.

4. Ask students to describe some problems that may occur during parturition. Show students TM 3.2 to illustrate malpresentations. Point out that in addition to these presentations, sheep may display many of the same malpresentations as cattle; if necessary, show the students TM 1.1 from Lesson 1 of this unit. Discuss how complications should be handled.

What practices should be used to assist with abnormal births?

a) If a ewe has been struggling for an hour after the water bag has broken or for two hours of labor with no success, the ewe requires assistance.

b) The first step is to determine whether the lamb is in an abnormal position.
1) The producer should begin by washing his or her hands and arms as well as the genital area of the ewe and then putting on gloves.
2) Lubricate one hand and pass it gently into the birth canal.

3) The producer feels for legs to determine if the legs are the hind legs or the front legs.
   (a) Hind legs - obvious tendon, and the knee joint bends in the opposite direction from the joint at the back foot
   (b) Front legs - prominent muscles in the upper leg, and both joints bend in the same direction
4) For multiple births, the producer may also need to determine which legs belong to which lamb.

c) After the lamb's position has been determined, attempt to adjust it to the normal presentation.
   1) Repositioning is done as gently as possible, taking care not to snap the umbilical cord.
   2) Lambing snares and loops can be very useful tools for both repositioning and pulling.

d) When the lamb is the normal position, the producer assists the ewe by pulling the lamb outward and downward in conjunction with the ewe's contractions.

e) If it is simply too difficult to reposition the lamb to the normal presentation or if the ewe is in great pain and has been in labor for more than an hour, a veterinarian should provide assistance.

5. Discuss the care needed by the ewe after lambing.

How is the ewe managed after parturition?

a) After the stress of lambing, a ewe is thirsty and should be given warmed water, perhaps with a little molasses in it.

b) The producer should evaluate the ewe's milk production.
   1) Poor production can lead to poor lamb performance.
   2) If the ewe produces too much milk in the first day, the producer may want to milk the ewe and freeze some of her colostrum for emergency use in the future.

c) The feed intake of the ewe should be evaluated.
   1) The amount of feed should be halved for the first two to three days after parturition.
   2) Excess feed may cause the ewe to produce more milk than the offspring can consume, which can lead to mastitis problems.

6. Have students list information that should be recorded after lambing. Have students complete AS 3.1.

What records should be kept?

a) Birth date
b) Sire
c) Identification number
d) Sex of the lamb
e) Type of birth (single or twin)
f) Type of rearing
g) Birth weight
h) Milking ability
i) Inverted eyelids and other defects
j) Problems during parturition such as a prolapse or malpresentation

F. ***Other Activities***

1. Have the students visit local producers to observe lambing.

2. Have students interview sheep producers about lambing problems. What kinds of problems have they had? What are the most common problems?

G. ***Conclusion***

Lambing times are the most labor-intensive period for any sheep enterprise. The flock manager should keep precise records to know when lambing will occur. Before lambing, the facilities, equipment, and the ewes themselves should be prepared for parturition. Producers must be able to recognize the signs of parturition to be ready to assist with lambing. Little or no assistance may be required with a normal birth, but producers should know how to assist the ewe if complications occur. After lambing, the ewe will require special care to produce milk to nurse her lamb and to prepare for rebreeding. Also, information about the birth should be recorded to provide data for the future.

H. ***Answers to Activity Sheet***

1. Let the ewe give birth without assistance.

2. Wash your arms and hands and the genitals of the ewe. Put on gloves. After applying lubricant to your hand, gently insert it into the ewe and check the position of the lamb.

3. Call the veterinarian.

4. Gently pull the lamb in conjunction with the contractions.

5. Gently reposition the lamb using your hands or a snare or loop.

6. The hind legs have an obvious tendon, and the knee joint bends in the opposite direction from the joint at the back foot. The front legs have prominent muscles in the upper leg, and both joints bend in the same direction.

I. ***Answers to Evaluation***

1. a
2. d

3. Answers may include any three of the following: seeking solitude; an uneasy disposition; repetitively standing up only to lay back down again; digging into the ground before laying down (nest-building); being more vocal; dropping; a relaxed, slightly more pink vulva; and a broken water bag.

4. Shearing the wool from the crotch, udder, and stomach a few inches in front of the udder

5. Answers may include any two of the following: birth date, sire, identification number, sex of the lamb, type of birth, type of rearing, birth weight, milking ability, inverted eyelids and other defects, and problems during parturition such as a prolapse or malpresentation.

6. Lambing snare or loop

7. Answers may include either preventing wool blindness or causing the ewe to seek shelter in poor weather conditions for both herself and her lamb.

8. Milk the ewe and freeze some of her colostrum for emergency use in the future

UNIT V - PARTURITION Name _____

Lesson 3: Lambing Date _____

EVALUATION

Circle the letter that corresponds to the best answer.

1. After the ewe has struggled to lamb for _____ hours, the producer should provide assistance.

   a. 2
   b. 3
   c. 4
   d. 5

2. When may producers shear their ewes?

   a. 1 to 2 days before lambing
   b. 3 to 4 days before lambing
   c. 1 to 2 weeks before lambing
   d. 3 to 4 weeks before lambing

Complete the following short answer questions.

3. What are three signs of parturition in sheep?

   a.

   b.

   c.

4. What is crotching?

5. What are two examples of information that should be included in records?

   a.

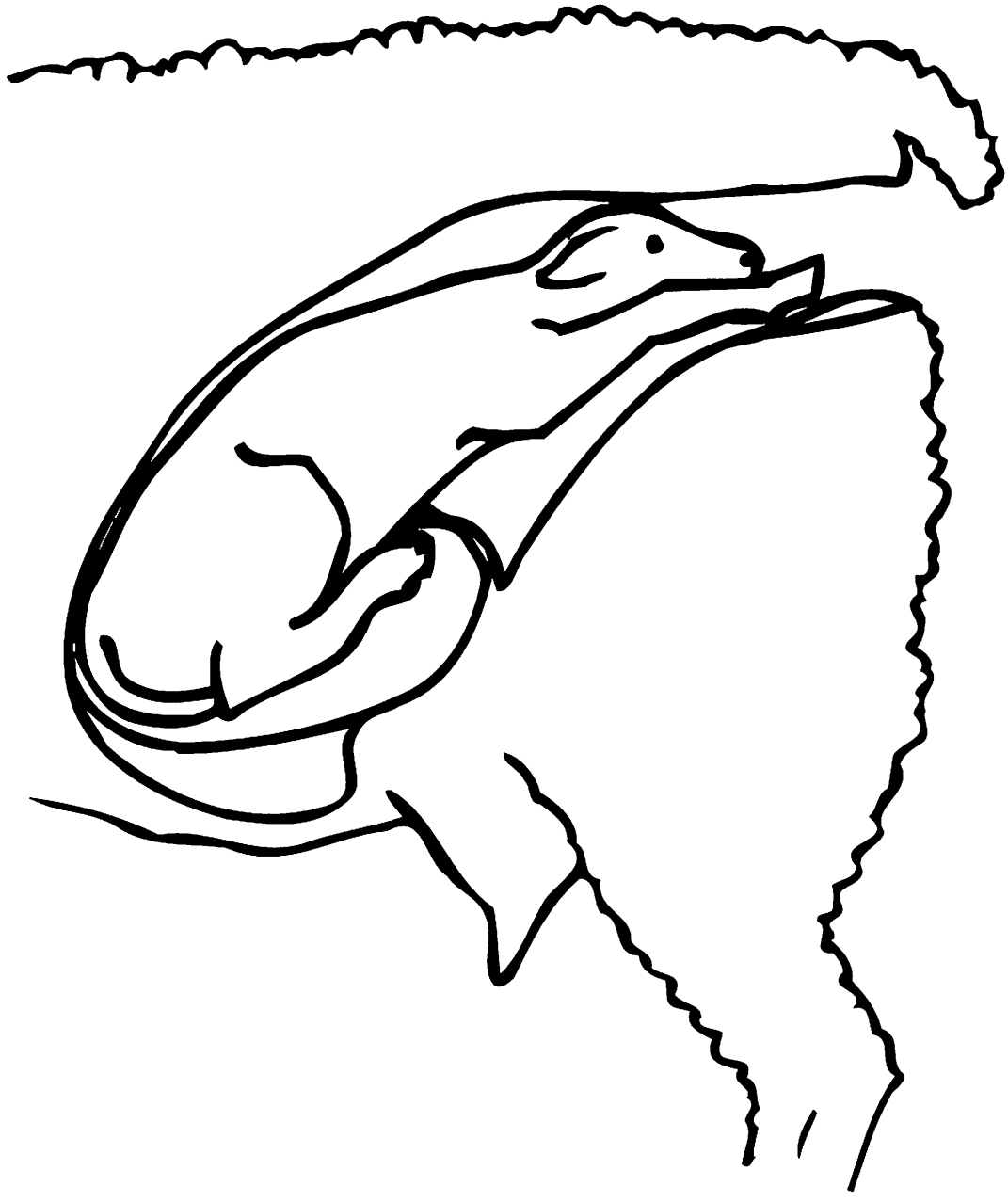
   b.

6. What tool can be used to help reposition and pull lambs?

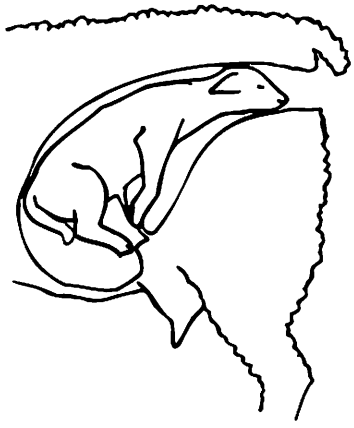
7. What is an advantage of facing ewes?

8. What might the producer want to do if the ewe produces too much milk in the first day after lambing?

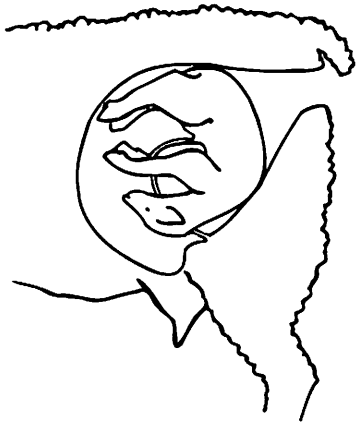
Normal Presentation



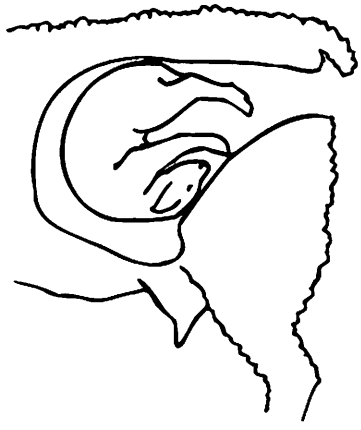
Abnormal Presentations



Head With Fore Legs Back

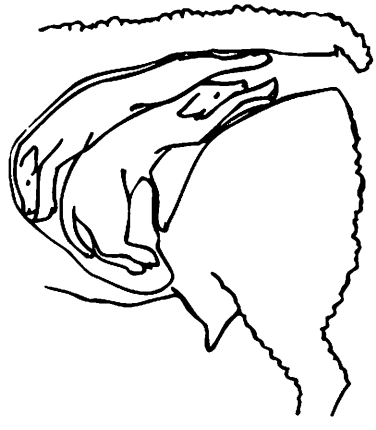


Lamb Crossways



Four Legs Presented

Twins Coming Out Together



Twins Presented Together with One Backwards

Lesson 3: Lambing Name _____

Assisting with Lambing

Objective: Determine management procedures for assisting with lambing.

Read the following descriptions of various lambing situations. Describe what should be done to assist the ewe and lamb.

1. A ewe begins labor. The lamb emerges within an hour, positioned with its feet first and its nose between its legs.

2. The ewe has been struggling to give birth for 2 hours. How do you determine the problem?

3. The ewe has been in labor for over an hour and is in great pain. The lamb is in an abnormal position, and you cannot reposition it correctly.

4. The lamb is in the normal position, but the ewe has been struggling for over an hour.

5. The ewe has been struggling for over an hour. When examining her, you realize that the lamb has its leg bent back.

6. The ewe has been struggling for over an hour. You are having trouble determining which legs are the hind legs and which are the front legs. What should you feel for to help determine the difference?

UNIT V - PARTURITION

Lesson 4: Foaling

Competency/Objective: Create and implement production management strategies for parturition of horses.

Study Questions

1. **What are the signs of parturition for horses?**
2. **What management techniques should be used before and during parturition?**
3. **What practices should be used to assist with normal births?**
4. **What practices should be used to assist with abnormal births?**
5. **How is the mare managed after parturition?**
6. **What records should be kept?**

References

1. *Advanced Livestock Production and Management* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit V.
2. Transparency Master
   a) TM 4.1: Normal Presentation
3. Activity Sheet
   a) AS 4.1: Assisting with Abnormal Presentations

UNIT V - PARTURITION

Lesson 4: Foaling

TEACHING PROCEDURES

A. ***Review***

Lesson 3 discussed parturition for sheep. Lesson 4 will discuss parturition in horses. Because horses can be a costly investment, breeders should be familiar with the management techniques necessary to prepare for and assist with foaling. This knowledge will help them to minimize losses if complications occur.

B. ***Motivation***

Ask students to compare and contrast parturition in cattle, pigs, sheep, and horses based on their knowledge of the animals. Discuss the similarities and differences between the species.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Ask students what behavior a horse might exhibit to indicate that she is near foaling. What sorts of physical signs might she show?

   What are the signs of parturition for horses?

   a) Dropping of the foal, causing a sunken appearance along the mare's flanks and on both sides of the root of the tail
   b) Filling of the udder with milk
   c) Waxing, or the appearance of dried colostrum on the ends of the mare's teats
   d) Relaxation and elongation of the vulva
   e) Seeking solitude
   f) Irritability
   g) Restlessness demonstrated by repeatedly laying down and then standing back up
   h) Pawing at the ground
   i) Curling the upper lip
   j) Preparing an area for foaling by making a nest with the bedding or urinating in small amounts
   k) Sweating
   l) Passage of the cervical plug
   m) Breaking of the water bag

2. Ask students what might be done to prepare for parturition. Discuss the different management techniques.

   What management techniques should be used before and during parturition?

   a) Before foaling occurs, necessary equipment and supplies should be assembled, including clean towels, iodine solution, tail bandages, tape, soap, obstetrical gloves, and obstetrical lubricant.
   b) A mare kept in a stable should be moved to foaling quarters two weeks before the expected foaling date.
      1) A foaling stall should be large enough to allow the mare to lay down and stretch out.

2) It should be free of drafts and have clean, deep, dust-free bedding.

c) The breeder should take several steps to prepare the mare for foaling after placing her in the foaling quarters.
   1) The mare's tail should be wrapped and taped, with the wrappings extending 12 to 14 inches from the base of the tail.
   2) The external genital area is washed with soap followed with a mild disinfectant rinse of 7 percent iodine solution.
   3) The breeder should also wash and disinfect the udder area so the foal does not ingest dirt and bacteria.
      (a) Dirty buildup should be removed from between the halves of the udder.
      (b) The area is rinsed with clean water so the foal does not swallow any disinfectant.

d) Mares may also foal on pasture.
   1) A mare should not be pastured with geldings because they may harm the newborn foals.
   2) The pasture should be as free as possible of potential hazards.
   3) If possible, mares should be kept where the breeder can observe them easily.

3. Show students TM 4.1. Ask them why this is the safest presentation for both the mare and the foal. Discuss the practices used to assist with normal births.

What practices should be used to assist with normal births?

a) The mare should give birth within an hour after the onset of sharp contractions.
b) Sometimes a mare may stop pushing and rest with the foal halfway out of the birth canal.
c) The foal will exit the birth canal front feet first with its nose between its legs.
d) Mares often prefer to lay down while foaling; if they are aware of being observed, they may choose to foal standing up, and the breeder should support the foal.
e) When the foal's head is outside of the mare's body, remove the membranes that cover the muzzle.
   1) Clean mucus from the foal's mouth by reaching in and gently removing any excess fluids.
   2) Make sure that the foal is breathing freely.
f) If a foal is not breathing, stimulate respiration.
   1) Stick a piece of straw inside one of the foal's nostrils to cause it to sneeze.
   2) Throw a glass of cold water over the foal's head to shock it into breathing.
   3) Hoist the foal up by its hind legs so that it hangs upside down.
      (a) Clean its throat out with the hands and then slap the foal repeatedly on the chest, first on the right side and then on the left.
      (b) Continue to slap the foal for ten minutes, stopping every three minutes to tickle its nostrils with a piece of straw, until it starts to breathe.
   4) Use an oxygen mask from a veterinarian
   5) A veterinarian can also inject the foal with a drug that stimulates the areas of the brain that control the respiratory system.
g) The navel cord has a natural breaking point, but sometimes it does not break immediately.
   1) If the newborn foal remains connected by the navel cord to fetal membranes that are still within the mare's body, leave the two animals alone as long as the mare is calm.
   2) Let the foal alone if it is attached to membranes that the mare has already expelled.
   3) The cord is usually broken as the foal struggles to stand up.

4. Ask students to describe some possible abnormal presentations. When do they think a veterinarian should be called? Discuss what can be done to assist with abnormal births. Have students complete AS 4.1.

What practices should be used to assist with abnormal births?

a) The mare does not require assistance unless she has not foaled after an hour of labor, and the veterinarian should then be called immediately.
b) Having one leg appear 6 to 8 inches ahead of the other is not considered abnormal, but any other position is.
c) If the mare is trying to foal and part of the foal is showing but no progress is made within the next 3 or 4 contractions, examine the mare to determine if the foal is positioned abnormally.
    1) Put on obstetrical gloves.
    2) Slide a lubricated hand gently into the mare's vulva, taking care to avoid catching an arm between the foal and the mare's pelvic bone.
    3) Try to find the legs and feet to determine the direction of the foal.
        (a) The hind legs have a small, triangular hock, while the front legs have large, bony knees.
        (b) The hind feet will usually point down, with the bottom of the hooves facing upward.
        (c) The front feet will point upward, with the bottom of the hooves facing downward.
    4) Try to feel for the tail to confirm whether the hind legs are being presented.
d) Try to correct the foal's position while waiting for the veterinarian to arrive.
    1) If the foal's head is bent back or if three legs are presented at once, push the foal back into the birth canal, then turn it around to straighten it out into the normal foaling position.
    2) If the foal is exiting hind feet first, it must be pulled from the mare's body within five minutes, because the umbilical cord will break.
        (a) Grasp the hind feet of the foal using clean towels to get a good grip.
        (b) Pull the foal downward, as if the mare's hind heels were to meet the foal's.
        (c) Try to work with the mare, pulling fairly hard but timing each pull to the contractions of the mare.
    3) Sometimes a foal's front feet will push into the mare's rectum or in the direction of the rectum.
        (a) The position will be apparent externally, with the mare exhibiting a bulge in the rectal area.
        (b) Immediately grip the foal's hooves and pull forward and downward, away from the rectum, until the foal exits the birth canal normally.

5. Ask students what sort of care a mare should receive after foaling. Emphasize the large investment associated with horses as a reason for giving special care.

How is the mare managed after parturition?

a) Observe the placenta, which should be expelled from the mare's body within one or two hours after the birth.
    1) Spread the afterbirth out on the ground and examine it to be sure that it is normal and that none of it remains inside the mare.
    2) If the placenta has not been passed after eight hours, a veterinarian should remove it.
    3) If the placenta is abnormal, the mare should not be bred during her post-parturition estrus.
b) Examine the mare after foaling, especially if it was a difficult birth.
    1) Gently rinse the mare's genital area with iodine.
    2) Spread apart the vagina and search for any signs of bruising or tearing.
    3) The vaginal area of the mare will usually be a little redder than normal.
    4) Bruises will appear blue-black.
c) After a difficult birth, the mare should have an internal examination to determine if her reproductive organs were damaged.

1) Insert an arm into the vagina and feel around for cuts or tears.
2) The mare is healthy if the vaginal walls feel smooth.
3) If any tears are present, a veterinarian should further inspect the mare to determine if they need suturing.

6. Have students list information that should be kept about parturition. Why are these records important?

What records should be kept?

a) Information about the birth
   1) Sire
   2) Date of foaling
   3) Temperament of the mare at foaling
   4) Any problems with parturition
   5) Vigor of the foal
   6) Sex of the foal
   7) Identification of the foal
b) Signs of foaling to predict foaling in the future
   1) Number of days of gestation
   2) When the udder begins to fill
   3) When the mare begins to wax

F. ***Other Activities***

1. Have students call various veterinarians to ask about their experiences with foaling. What seems to be the most common problem with horse parturition? What types of postpartum procedures may be necessary?

2. Watch a mare foal, either in person or on video.

3. Show students the video "The Nature of Foaling" (VEP) available from MRCCTE.

G. ***Conclusion***

As with other livestock, mares will exhibit common behavioral and physical signs of parturition, although they may sometimes be difficult to distinguish. Breeders should watch mares closely for signs of foaling, especially for the passing of the cervical plug, which indicates that a mare will foal within a few hours. Before parturition, a pregnant mare may be moved to foaling quarters, or she may be allowed to foal in the pasture. When parturition occurs, breeders should be prepared to provide any assistance necessary. With normal parturition, breeders may not need to provide much assistance. If there are complications, however, a veterinarian should be called immediately, and the breeder may attempt to assist delivery while the veterinarian is on the way. After parturition, the mare should be examined internally, especially if the birth was difficult. Accurate records should always be kept to determine whether the mare will be used for breeding in the future.

H. ***Answers to Activity Sheet***

1. Call the veterinarian. Pull the foal from the mare's body within 5 minutes by grasping the hind feet of the foal and pulling downward so that the mare's heels meet the hind legs of the foal. After foaling, complete an internal exam of the mare.

2. Call the veterinarian. Push the foal back into the mare's body and reposition it to the normal presentation. After foaling, complete an internal exam of the mare.

3. Call the veterinarian. Immediately reach inside the mare and grip the feet of the foal. Pull downward and forward, away from the rectum, until the foal can exit the birth canal normally. After foaling, complete an internal exam of the mare.

4. Call the veterinarian. Push the foal back into the mare's body and reposition it to the normal presentation. After foaling, complete an internal exam of the mare.

I. ***Answers to Evaluation***

1. c
2. b
3. c
4. d
5. So the foal does not ingest dirt and bacteria

6. Answers may include any three of the following: dropping of the foal, filling of the udder with milk, waxing, relaxation and elongation of the vulva, seeking solitude, irritability, restlessness, pawing at the ground, curling the upper lip, preparing an area for foaling by making a nest with the bedding or urinating in small amounts, sweating, passage of the cervical plug, and breaking of the water bag.

7. The foal will exit the birth canal front feet first with its nose between its legs.

8. Answers may include any two of the following: sire, date of foaling, temperament of the mare at foaling, any problems with parturition, vigor of the foal, sex of the foal, identification of the foal, number of days of gestation, when the udder begins to fill, and when the mare begins to wax.

UNIT V - PARTURITION Name _____

Lesson 4: Foaling Date _____

EVALUATION

Circle the letter that corresponds to the best answer.

1. If a mare is held in a stable, she should be moved to foaling quarters _____ prior to her expected foaling date.

   a. 1 week
   b. 1.5 weeks
   c. 2 weeks
   d. 2.5 weeks

2. In a normal presentation, a mare will give birth within _____ after the onset of labor.

   a. 30 minutes
   b. 1 hour
   c. 1.5 hours
   d. 2 hours

3. If the foal is exiting hind feet first:

   a. Pull it upward.
   b. Pull it straight out.
   c. Pull it downward.
   d. Push it back in.

4. If the placenta has not been passed after _____, the veterinarian should remove it.

   a. 2 hours
   b. 4 hours
   c. 6 hours
   d. 8 hours

Complete the following short answer questions.

5. Why should a mare's udder area be washed and disinfected before foaling?

6. What are three signs of parturition in horses?

   a.

   b.

   c.

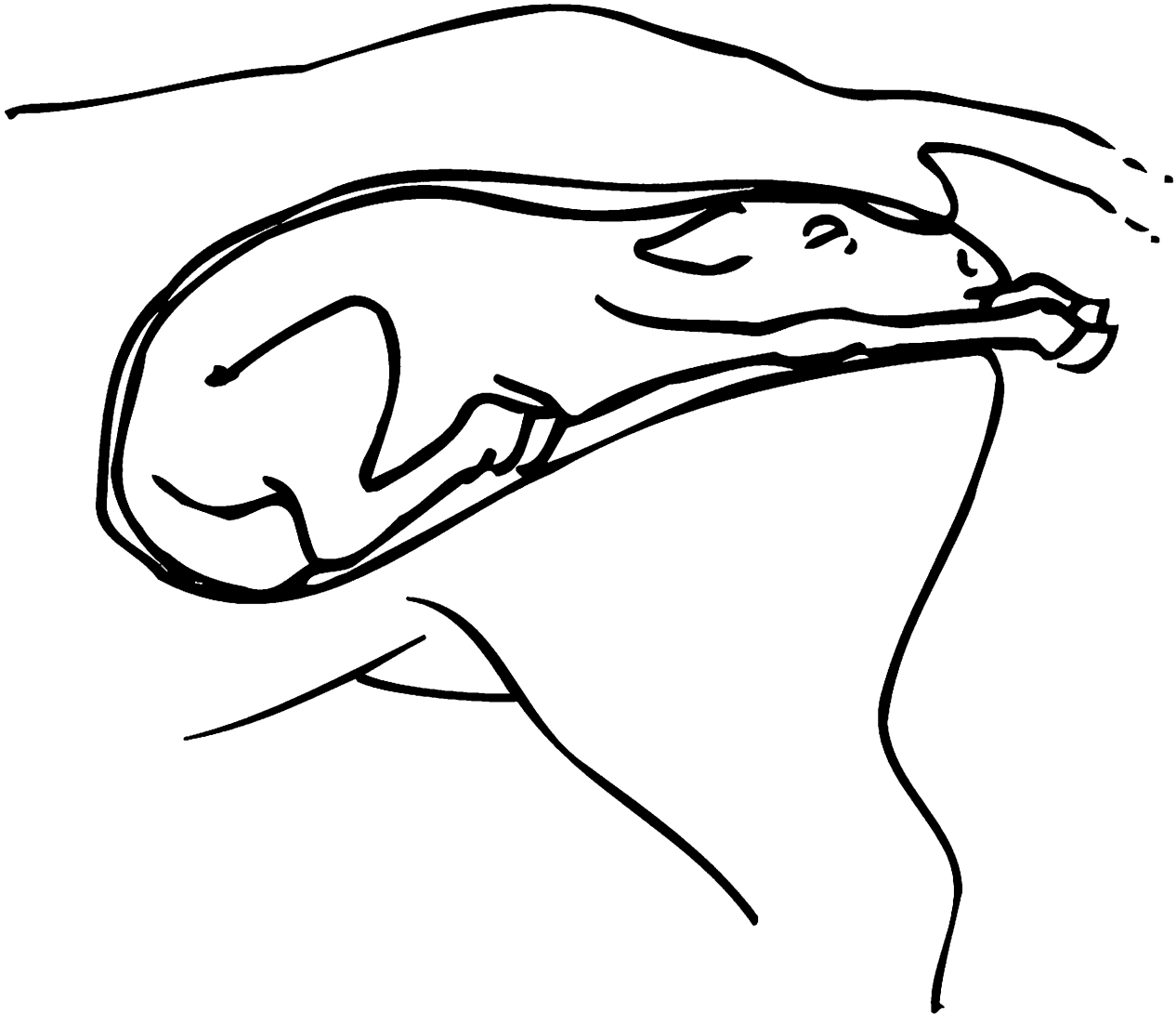
7. What is the normal presentation for a foal?

8. What are two examples of information that should be included in records?

   a.

   b.

Normal Presentation



Lesson 4: Foaling Name _____

Assisting with Abnormal Presentation

Objective: Describe strategies for assisting with abnormal presentation in horses.

Fill in the chart to create a guidesheet for assisting with abnormal presentations. Include information about techniques used for assisting the mare and foal, whether a veterinarian is needed, and postpartum care requirements for the mare.

Complication	Assistance
Exiting the birth canal with the rear feet first	
Head bent back	
Front feet pushing into the rectum	
Three legs presented	

UNIT V - PARTURITION

Lesson 5: Incubation and Hatching of Poultry

Competency/Objective: Create and implement production management strategies for incubation and hatching in poultry.

Study Questions

1. **What are the incubation periods for different species of poultry?**
2. **What are the appropriate conditions for egg incubation?**
3. **What are the appropriate conditions for egg hatching?**
4. **What records should be kept?**

References

1. *Advanced Livestock Production and Management* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit V.
2. Activity Sheet
   a) AS 5.1: Incubating and Hatching Eggs

UNIT V - PARTURITION

Lesson 5: Incubation and Hatching of Poultry

TEACHING PROCEDURES

A. ***Review***

Lesson 4 described paturition management in horses. In horses and the other mammals discussed in this unit, offspring are born alive, and the producer may have to assist in the birthing process. In contrast, the growth of the embryo occurs within an egg in poultry. Managing the process of reproduction involves overseeing the incubation process as the embryo develops before hatching.

B. ***Motivation***

Bring in a small family-flock incubator or visit a poultry facility with large incubators. Discuss how the system provides an environment similar to that which a brooding hen would provide. If it is not possible to closely observe a real incubator, obtain pictures to use during the discussion.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Ask students which of the poultry species listed below would require the longest incubation period. Discuss the length of incubation for the different species.

   What are the incubation periods for different species of poultry?

   a) Chicken - 21 days
   b) Turkey - 28 days
   c) Duck - 28 days
   d) Muscovy duck - 33-35 days
   e) Goose - 28-34 days
   f) Pheasant - 23-28 days
   g) Bobwhite quail - 23 days
   h) Guinea - 28 days

2. Ask students to think about the environment provided when a hen hatches eggs. How do artificial incubators provide the same environment?

   What are the appropriate conditions for egg incubation?

   a) Eggs in the incubators with the large end up
      1) Allows for pipping, or pecking open the shell
      2) Develops with the embryo's head in the air pocket of the egg to breathe when it begins to use its lungs
   b) Temperature
      1) Still-air machine - 101 degrees Fahrenheit for chickens
      2) Forced-draft machine - 99.5 degrees Fahrenheit plus or minus 0.5 degrees for chickens
      3) 99.5 degrees Fahrenheit for turkeys
      4) Changes in the temperature - affect hatchability
   c) Relative humidity
      1) 65 percent for chickens

2) 80 to 85 percent for turkeys
3) Prevents moisture from evaporating from the eggs
4) Without proper humidity, will stick to the shell membrane; have trouble hatching or may not hatch at all

d) Turning
1) Will stick to the shell membrane if the eggs are not turned regularly
2) Rotated 90 degrees five or more times a day
3) May turn each egg individually or the entire tray

e) Ventilation
1) Provide a constant supply of oxygen
2) Remove the carbon dioxide given off by the embryo during respiration
3) Proper ventilation necessary in the room that holds the incubator so that the machine has enough fresh air to pump into the incubator

f) Sanitation
1) Should not incubate unsound eggs
(a) Eggs with cracks
(b) Abnormally shaped eggs
(c) Eggs with droppings on them
(d) Dirty eggs
2) Should be cleaned and disinfected between batches by fumigating with sanitizer

3. Compare the conditions needed for incubation with those needed for hatching chicken eggs.

What are the appropriate conditions for egg hatching?

a) Transfer the chicken eggs to the hatching incubators three days prior to the expected hatching date.
b) Set the hatching incubators to provide slightly different environmental conditions.
1) Lower temperature - 98.5 degrees Fahrenheit
2) Relative humidity - 70 percent
3) Increased ventilation
4) No turning; eggs on side in hatching tray

4. Ask students what sorts of records should be kept and why.

What records should be kept?

a) Machine number
b) Date set
c) Number of eggs set
d) Temperatures that are checked and recorded periodically
e) Information about testing for infertile eggs and dead germs
1) Date of testing
2) Number
3) Percentage of the total number of eggs
f) Hatching rates
1) Number of chicks
2) Percentage of fertile eggs
g) May also include information on ventilation, turning, and relative humidity

F. ***Other Activities***

1. Have students research the cost and efficiency of different incubators on the market to determine which is the best buy.

2. Hatch eggs in the classroom with incubators set at different settings. How are hatching rates affected?

G. ***Conclusion***

To hatch eggs successfully, they must be incubated for an appropriate period under the proper environmental conditions. Incubators are built to simulate the environment a hen would naturally provide for her eggs. They maintain temperatures and humidity levels, provide ventilation, and turn the eggs. A sanitary environment must also be provided within the incubators. Two types of incubators are used in the poultry industry, one for developing embryos and one for hatching. It is important that precise records be kept of the number of eggs set and number hatched, the number of infertile eggs and dead germs, and the conditions within the incubator.

H. ***Answers to Activity Sheet***

1. Sanitizer
2. Large
3. 99.5 degrees Fahrenheit; 65 percent
4. 5 or more
5. 18
6. 98.5 degrees Fahrenheit; 70 percent
7. 0
8. 21; pipping

I. ***Answers to Evaluation***

1. d
2. c
3. b
4. c
5. c
6. a
7. d
8. So the embryo develops with its head in the air pocket to allow it to breathe and to allow for pipping

9. For proper sanitation

10. Answers may include any two of the following: machine number, date set, number of eggs set, temperatures that are checked and recorded periodically, information about testing for infertile eggs and dead germs, hatching rates, and information on ventilation, turning, and relative humidity.

UNIT V - PARTURITION Name_____

Lesson 5: Incubation and Hatching of Poultry Date_____

EVALUATION

Circle the letter that corresponds to the correct answer.

1. The incubation period for turkeys and ducks is _____.

   a. 19 days
   b. 21 days
   c. 25 days
   d. 28 days

2. The incubation period for chickens is _____.

   a. 17 days
   b. 19 days
   c. 21 days
   d. 26 days

3. _____ is a term that describes how a chick pecks at its shell as it attempts to emerge from it.

   a. Pecking
   b. Pipping
   c. Hacking
   d. Tapping

4. Four factors crucial to the proper development of an embryo within an egg are temperature, humidity, ventilation, and turning. A fifth factor important to efficiency is _____.

   a. Stocking density
   b. Light
   c. Sanitation
   d. Weather

5. A major cause of an embryo sticking to the sides of a shell is:

   a. Too much ventilation.
   b. Setting the eggs with the small end up.
   c. Lack of turning.
   d. Changes in temperature.

6. When eggs are moved to a hatching machine from an incubator the temperature should be _____, and the humidity should be _____.

   a. Lower; higher
   b. Lower; lower
   c. Higher; lower
   d. Higher; higher

7. Relative humidity should be set at _____ percent when incubating chicken eggs.

   a. 50
   b. 55
   c. 60
   d. 65

Complete the following short answer questions.

8. Why are eggs set with the large end up?

9. Why are incubators fumigated with sanitizer?

10. What are two items of information that should be recorded about hatching and incubation?

    a.

    b.

Lesson 5: Incubation and Hatching of Poultry Name _____

Incubating and Hatching Eggs

Objective: Describe the proper conditions for incubating and hatching a chicken egg.

Fill in the blanks with information on incubation and hatching for a chicken egg. Note that the steps are listed in chronological order.

1. Disinfect the incubator using _____.

2. Set the egg in the forced-draft incubator with the _____ end up.

3. Set the incubator controls.

   Temperature _____

   Humidity _____

4. Turn the egg _____ times per day.

5. After _____ days, move the egg to the hatching machine.

6. Set the hatching machine controls.

   Temperature _____

   Humidity _____

7. Turn the egg _____ times per day.

8. After _____ days, the chick will try to break out of its shell in a process that is referred to as _____.

UNIT VI - ANIMAL HEALTH

Lesson 1: Health Problems in Cattle

Competency/Objective: Identify common problems associated with beef and dairy herd health.

Study Questions

1. **What are everyday practices for observing herd health?**
2. **What are indications of health problems with cattle?**
3. **What animal health problems are common in beef cattle?**
4. **What animal health problems are common in dairy cattle?**

References

1. *Advanced Livestock Production and Management (Student Reference).* University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit VI.
2. Activity Sheets
   a) AS 1.1: Identifying Symptoms
   b) AS 1.2: Understanding Health Problems in Cattle
   c) AS 1.3: Illustrating a Healthy Udder

UNIT VI - ANIMAL HEALTH

Lesson 1: Health Problems in Cattle

TEACHING PROCEDURES

A. ***Introduction***

Any livestock operation is bound to encounter some health problems occasionally. This lesson will discuss how producers can detect problems and some of the common health problems that affect beef and dairy cattle.

B. ***Motivation***

Ask students to list some health problems that affect cattle and explain how they would prevent these problems. Some students may have cattle and had experiences that they can share with the class.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Discuss the importance of good observation of a herd. Point out to students that if problems go unnoticed, they will only increase in severity. Therefore, keeping a close eye on cattle is important.

   What are everyday practices for observing herd health?

   a) Observation is important for achieving and maintaining good herd health.
   b) Becoming familiar with the livestock makes it easier to observe the health condition of different animals.
   c) Frequency of observation depends on a producer's particular herd health situation
      1) Once daily for most healthy animals
      2) More often if a producer is experiencing a particular problem, such as a disease in the herd
      3) Observing animals more frequently during calving time in case any cows or heifers need assistance
   d) The way in which animals are observed depends on personal preferences.
      1) Beef cattle
         (a) Some people may choose to drive through them, while others may call them in and observe them while feeding.
         (b) When animals are observed, producers must see them all.
         (c) A producer should always be prepared to go looking for an animal if he or she cannot account for all of them.
      2) Dairy cattle
         (a) Animals can be observed at milking time every day.
         (b) A producer should take time each day to observe animals, including dry cows, steers, and heifers, and check for any abnormalities.
   e) Counting cattle is a good idea to ensure that no animals are missing, which may be a sign of a sick or injured animal.

2. Discuss how to detect when a health problem exists. Discuss the common symptoms of unhealthy cattle.

   What are indications of health problems with cattle?

a) Indicators of poor health
   1) Loss of appetite
   2) Hanging head
   3) Hump in the back
   4) Droopy ears
   5) Lack of spirit
   6) Depression
   7) Separation from the herd
   8) Coughing or wheezing
b) Signs commonly observed in dairy cattle
   1) Decrease in milk production
   2) Abnormalities in milk
   3) Swollen or misshapen udder
c) Abnormal vital signs
   1) Normal body temperature - 101.5° Fahrenheit
   2) Normal respiration rate - 30 breaths/min.
   3) Normal heart rate - 50 beats/min.

3. Discuss which health problems are the most common and the most likely to be encountered. These problems may vary from area to area, so it may be useful to talk to some local producers and/or a local veterinarian to determine the most prominent problems in your area. Have students complete AS 1.1.

What animal health problems are common in beef cattle?

a) Scours
   1) Causes
      (a) *Escherichia coli* bacteria
      (b) Rotavirus
      (c) Corona virus
      (d) Feeding too much milk
      (e) Improperly formulated milk replacers
   2) Symptoms
      (a) Rough coat
      (b) Weakness
      (c) Loss of appetite
      (d) Diarrhea
      (e) Dehydration
   3) Treatment
      (a) Fluid therapy to prevent dehydration
      (b) Antibiotics to prevent secondary infections
   4) Viral scours
      (a) More severe symptoms
      (b) Fluid treatment not effective
      (c) Animal dies within several days
   5) Early diagnosis important
b) Bovine viral diarrhea (BVD)
   1) Caused by bacteria and viruses
   2) Symptoms
      (a) Diarrhea
      (b) Digestive ulcers
      (c) Coughing
      (d) Fever
      (e) Nasal discharges
      (f) Oral lesions
      (g) Reduced feed intake
      (h) Damage to immune system

3) Diagnosis
   (a) Visual observation, specifically looking for:
      (1) Depression
      (2) Lack of appetite
      (3) Separation from herd
   (b) Blood testing
4) Low mortality rate
5) Acute BVD - can kill within 48 hours
6) Prevention - vaccination during calfhood
7) Treatment
   (a) Antibiotics
   (b) Sulfonamide

c) Brucellosis
1) Caused by *Brucella* bacteria
2) Dangerous to humans, causing undulant fever
3) Also known as contagious abortion or Bang's disease
4) Modes of spreading through entire herd
   (a) Any physical contact
   (b) Milk
   (c) Aborted fetus
   (d) Afterbirth
5) Symptoms
   (a) Abortions during the last half of pregnancy
   (b) Sterility
   (c) Decreased milk production
   (d) Weight loss
   (e) Lameness
   (f) Drop in fertility
   (g) Poor conception rates
   (h) Uterine infections
   (i) Inflamed joints
6) Prevention - vaccination during calfhood
7) Treatment
   (a) No treatment
   (b) Animals must be slaughtered

d) Vibriosis
1) Reproductive disease
2) Spread among females by bull during breeding
3) Caused by bacteria in the reproductive tract
4) Symptoms
   (a) Delays in becoming pregnant
   (b) Come into heat at irregular times
   (c) Abortions
   (d) Decreased fertility
5) Hard to diagnose - few outward signs
6) Prevention - vaccination
7) Treatment - none
8) Strong immunity in recovered cows to prevent reinfection

e) Leptospirosis
1) Caused by bacteria in water
2) Spread through the urine of infected animals, including wildlife and rodents
3) Infected when abrasions or mucus membranes in the eyes or mouth come into contact with bacteria
4) Symptoms
   (a) Fever
   (b) Rapid respiration
   (c) Lack of appetite

(d) Abortions
(e) Drop in milk production
(f) Inflamed udder
(g) Bloodstained or yellow milk

5) Can be fatal to calves
6) Prevention - vaccination
7) Treatment - antibiotics
8) Infected animals isolated

f) Infectious bovine rhinotracheitis (IBR)
1) Also referred to as rednose
2) Symptoms
(a) Respiratory ailments
(b) Nasal discharge
(c) Fever
(d) Abortions
(e) Pinkeye
(f) Stillborn calves
3) Spread by coughing, nose-to-nose contact, and sexual contact
4) Prevention - vaccination
5) Treatment - antibiotics to decrease secondary infections
6) Infected animals isolated

g) Bovine respiratory syncytial virus (BRSV)
1) Infects preweaning and weaning calves and yearlings
2) Symptoms
(a) Acute viral pneumonia
(b) Dry, hacking cough
(c) Slobbering
(d) Tearing
(e) Clear nasal discharge
(f) Increased respiratory rate
(g) Mild depression
3) Prevention - two injections of BRSV vaccine
4) Treatment
(a) Antibiotics
(b) Antihistamines
(c) Vitamins
(d) Supportive therapy
(1) Administer fluids through stomach tube
(2) Keep infected animal out of the cold
(e) Increased fluids to combat dehydration

h) Shipping fever
1) Respiratory disease
2) Affects calves after they are transported from cow/calf operations to feedlot
3) Biggest killer of cattle in feedlots
4) Caused by three different bacteria
(a) *Pasteurella haemolytica*
(b) *P. multocida*
(c) *Haemophilus somnus*
5) Symptoms
(a) Decreased appetite
(b) Fever
(c) Diarrhea
(d) Coughing
(e) Nasal discharge
6) Surviving beef cattle - poor growth; need more time and feed to reach market weight
7) Prevention - vaccine

i) Parainfluenza (PI-3)
   1) Generally works with other diseases, including IBR, BVD, and BRSV
   2) Found worldwide
   3) Infects other species of farm animals
   4) Can infect humans
   5) Form of shipping fever
   6) Difficult to distinguish from other virus-induced pneumonia in cattle
   7) Symptoms
      (a) Increased respiration rates
      (b) Coughing
      (c) Fever
      (d) Watery to yellow discharge from the eyes and nose
   8) Prevention
      (a) Feeding good quality feeds
      (b) Providing ready access to fresh water and shelter during adverse conditions
      (c) Vaccinations
   9) Treatment - antibiotics

j) Pinkeye
   1) Infectious eye ailment
   2) Bacterial form
      (a) Vitamin A deficiency
      (b) Eye injuries
      (c) Dust
      (d) Insects
      (e) Strong sunlight
   3) Spread
      (a) Direct contact between animals
      (b) Flies
   4) Symptoms
      (a) Liberal flow of tears
      (b) Tendency to keep the eyes closed
      (c) Redness and swelling of the membrane lining the eyelids and sometimes the visible part of the eye
      (d) Advanced stages
         (1) Discharge of pus
         (2) Ulcers of the cornea
         (3) Blindness
      (e) Widespread across the United States
      (f) Affects about 3 percent of all cattle
      (g) Prevention
         (1) Good nutrition with adequate vitamin A in the ration
         (2) Vaccination
         (3) Controlling flies
      (h) Treatment
         (1) Application of antibiotics or sulfa drugs to the affected eye in the form of an ointment, powder, or spray
         (2) Commercially produced eye patch that drops off in seven to ten days

k) Fescue toxicosis
   1) Also called summer slump
   2) Caused by endophytic fungus - *Acremonium coenaphialum*
   3) Symptoms
      (a) Reduced rate of gain
      (b) Lameness
      (c) Greater susceptability to heat stress
      (d) Roughened hair
      (e) Reddish hair on a black animal
      (f) No milk production

(g) Loss of extremities
(1) Hooves
(2) Tails

4) Prevention
(a) Feeding endophyte-free fescue
(b) Adding legumes to endophyte-affected fescue stands

l) Bloat
1) Caused by formation of stable foam in rumen that traps gas in stomach
2) Symptoms
(a) Abdominal distention on the left side
(b) Decreased milk production
(c) Frequent urination
(d) Heavy breathing
(e) Restless movements
3) Can lead to death due to suffocation
4) Treatment
(a) Insertion of cannula
(b) Stomach tube
(c) Defoaming agent

m) Grass tetany
1) Generally found in cattle during lactation
2) Occurs most often when cattle are grazing on pastures that are deficient in magnesium
3) Symptoms
(a) Excitement
(b) Loss of appetite
(c) Loss of coordination
(d) Trembling
(e) Convulsions
(f) Coma
4) Can die quickly, sometimes within 30 minutes
5) Prevention
(a) Feeding magnesium in the ration in areas where this element is deficient in the soil
(b) Including legumes in the ration
6) Treatment
(a) Injecting a calcium and magnesium solution into the jugular vein
(b) Should handle the animal carefully because stress may kill it

n) Nitrate poisoning
1) Caused by animals consuming feeds with high nitrate levels due to the application of fertilizer, drought, or other causes
2) May also be caused by the animals ingesting nitrates through contact with fertilizers or drinking pond water containing fertilizer
3) Poisoning by the nitrate being converted to nitrites by the digestive system
4) Symptoms
(a) Accelerated respiration
(b) Accelerated pulse rate
(c) Bluish mucous membranes
(d) Frothing from the mouth
(e) Diarrhea
(f) Frequent urination
(g) Loss of appetite
(h) Weakness
(i) Staggering gait
(j) Dark brown blood
5) Prevention - good management to limit access to sources of nitrates

6) Treatment - intravenous solution consisting of a 4 percent solution of methylene blue in either a 5 percent glucose solution or a 1.8 percent solution of sodium sulfate

o) Prussic acid poisoning
   1) Sorghums and some other plants
      (a) Capable of releasing prussic acid
      (b) Has to be damaged to cause the acid to form
         (1) Chewing
         (2) Hard freeze
         (3) Mechanical action, such as that caused by a hay crimper
   2) Prevents the cells from receiving oxygen
   3) Symptoms
      (a) Excitement
      (b) Rapid pulse
      (c) Muscle tremors
      (d) Rapid and labored breathing
      (e) Staggering
      (f) Collapse
      (g) Bright cherry red blood just prior to and during death
   4) Prevention
      (a) Avoiding turning cattle into a new sorghum field until they have been fed some hay
      (b) Using rotational grazing methods to prevent the overgrazing of lush young growth
      (c) Allowing plants to reach 18 to 24 inches in height before grazing
      (d) Preventing grazing after a frost until all the plants have cured
      (e) Avoiding the application of excessive nitrogen fertilizer
   5) Treatment - administration of sodium thiosulfate and sodium nitrate

4. Discuss the common health problems that are likely to be encountered among dairy cattle. Emphasize that along with illnesses that occur in beef cattle, some health problems are more commonly encountered in dairy breeds. Have students complete AS 1.2.

What animal health problems are common in dairy cattle?

a) Diseases that affect beef cattle
b) Mastitis
   1) Caused by bacteria
      (a) *Streptococci*
      (b) *Staphylococci*
      (c) *E. coli*
   2) Infects mammary tissue
   3) Affects milk production
   4) Enters udder through teat end
   5) Very common
   6) Most costly disease among dairy cattle in the United States
   7) Can be caused by injury or leaving the milker on too long
   8) Symptoms
      (a) Inflammation of the udder
      (b) Decreases in milk production
      (c) Fever
      (d) Abnormalities in milk
         (1) Watery
         (2) Yellow clots
   9) Treatment - intramammary or intravenous injection of antibiotics
c) Milk fever
   1) Caused by blood calcium deficiency
   2) Occurs at the onset of lactation within 72 hours of parturition

3) Symptoms
   (a) Muscle weakness
   (b) Lack of coordination
   (c) Loss of appetite
   (d) Dullness
   (e) Coma
4) Prevention
   (a) Properly balancing calcium and phosphorous in a 1:1 ratio in the diet of dry cows
   (b) Feeding grassy forages and avoiding legumes during the dry period
   (c) Possibly supplementing dry cow rations with anionic salts
5) Treatment - intravenous injection of a calcium product

d) Ketosis
1) Nutritional problem that may be seen in cows during the period of high lactation shortly after calving
   (a) Lack of sufficient carbohydrates in the diet
   (b) Results in an excessive metabolism of stored fats to supply energy
   (c) Accumulation of ketones as a result of this process
   (d) Become toxic to the animal
2) Symptoms
   (a) Lack of appetite
   (b) Depression
   (c) Weight loss
   (d) Fruity odor to the breath and milk
   (e) Reduced milk production
3) Prevention - good management of the cow's diet, especially during the week before calving
4) Treatment
   (a) Intravenous administration of glucose
   (b) Glucocorticoid injection

e) Laminitis
1) Also referred to as founder
2) Usually caused by overeating concentrated feeds or lush pastures
3) Symptoms
   (a) Extreme abdominal pain
   (b) High fever
   (c) Reluctance to move
   (d) If neglected, degeneration of the joining between the foot and the laminae
   (e) Distortion of the hoof
   (f) With severe degeneration, rotation of the coffin bone, which comes through the bottom of the foot
   (g) Poor milking performance
4) Prevention - good management to avoid overeating
5) Treatment
   (a) No standard method of treatment
   (b) Mineral oil given to the animal to aid in the passage of the feed
   (c) Painkillers to provide relief
   (d) Antibiotics to prevent infections of the foot
   (e) Foot trimming

f) Uterine infections
1) Caused by bacteria at time of calving
2) Symptoms
   (a) Swollen vulva
   (b) Inflamed uterus
   (c) Pus in the uterus
3) Early detection - important in treatment
4) Treatment

(a) Antibiotics
(b) Hormones
(c) Prostaglandin

F. ***Other Activities***

1. Have a veterinarian or supplier of animal health products speak to the class about health problems in beef or dairy cattle.

2. Obtain pharmaceutical catalogs (from Jeffers Vet Supply or other companies) and have students examine the health care products available.

3. Because mastitis is by far the most common ailment in dairy operations, obtain pictures of udders exhibiting extreme cases of the disease.

4. Purchase an antibacterial injection kit and show students how it is used.

G. ***Conclusion***

Any time producers raise livestock, they can expect to encounter some problems. Even though they manage the livestock to the best of their ability, health problems cannot be totally eliminated. With this in mind, producers must be able to identify health problems and know what to do if a problem exists. Early and proper identification and treatment can cause a health problem to be much less devastating than if it had gone unnoticed.

H. ***Answers to Activity Sheet***

AS 1.1

1. b
2. k
3. f
4. h
5. c
6. e
7. m
8. i
9. a
10. l
11. d
12. n
13. g
14. o
15. j

AS 1.2

Health Problem	Cause	Signs	Prevention/Treatment
IBR	Virus	Respiratory ailments, nasal discharge, fever, abortions, pinkeye, stillborn calves	Prevented by vaccination; treated by antibiotics to decrease secondary infections

Health Problem	Cause	Signs	Prevention/Treatment
Mastitis	Bacteria - *Streptococci, Staphylococci, E. coli*	Inflammation of the udder, decreases in milk production, fever, abnormalities in milk	Treated by intramammary or intravenous injection of antibiotics
Grass tetany	Grazing on pastures that are deficient in magnesium	Excitement, loss of appetite, loss of coordination, trembling, convulsions, coma	Prevented by feeding magnesium in the ration in areas where this element is deficient in the soil and including legumes in the ration; treated by injecting a calcium and magnesium solution into the jugular vein
Ketosis	Accumulation of ketones as a result of lack of sufficient carbohydrates in the diet	Lack of appetite, depression, weight loss, fruity odor to the breath and milk, reduced milk production	Prevented by good management of the cow's diet, especially during the week before calving; treated by intravenous administration of glucose and glucocorticoid injection
Scours	*Escherichia coli* bacteria, rotavirus, corona virus, feeding too much milk, improperly formulated milk replacers	Rough coat, weakness, loss of appetite, diarrhea, dehydration	Treated by fluid therapy to prevent dehydration and antibiotics to prevent secondary infections
Laminitis	Overeating concentrated feeds or lush pastures	Extreme abdominal pain, high fever, reluctance to move, degeneration of the joining between the foot and the laminae, distortion of the hoof, rotation of the coffin bone, poor milking performance	Prevented by good management to avoid overeating; treated by mineral oil given to the animal to aid in the passage of the feed, painkillers to provide relief, antibiotics to prevent infections of the foot, and foot trimming
BVD	Bacteria and viruses	Diarrhea, digestive ulcers, coughing, fever, nasal discharges, oral lesions, reduced feed intake, damage to immune system	Prevented by vaccination during calfhood; treated by antibiotics and sulfonamide
Milk fever	Blood calcium deficiency	Muscle weakness, lack of coordination, loss of appetite, dullness, coma	Prevented by properly balancing calcium and phosphorous in a 1:1 ratio in the diet of dry cows, feeding grassy forages and avoiding legumes during the dry period, and possibly supplementing dry cow rations with anionic salts; treated by intravenous injection of a calcium product

Health Problem	Cause	Signs	Prevention/Treatment
Fescue toxicosis	Endophytic fungus - *Acremonium coenaphialum*	Reduced rate of gain, lameness, greater susceptibility to heat stress, roughened hair, reddish hair on a black animal, no milk production, loss of extremities	Prevented by feeding endophyte-free fescue and adding legumes to endophyte-affected fescue stands
Uterine infections	Bacteria at time of calving	Swollen vulva, inflamed uterus, pus in the uterus	Treated by antibiotics, hormones, and prostaglandin
Prussic acid poisoning	Sorghums and other plants capable of releasing prussic acid	Excitement, rapid pulse, muscle tremors, rapid and labored breathing, staggering, collapse, bright cherry red blood just prior to and during death	Prevented by avoiding turning cattle into a new sorghum field until they have been fed some hay, using rotational grazing methods to prevent the overgrazing of lush young growth, allowing plants to reach 18 to 24 inches in height before grazing, preventing grazing after a frost until all the plants have cured, and avoiding the application of excessive nitrogen fertilizer; treated by administration of sodium thiosulfate and sodium nitrate
BRSV	Virus	Acute viral pneumonia, dry/hacking cough, slobbering, tearing, clear nasal discharge, increased respiratory rate, mild depression	Prevented by two injections of BRSV vaccine; treated by anti-biotics, antihistamines, vitamins, supportive therapy, and increased fluids to combat dehydration
Nitrate poisoning	Consuming feeds with high nitrate levels due to the application of fertilizer, drought, or other causes	Accelerated respiration, accelerated pulse rate, bluish mucous membranes, frothing from the mouth, diarrhea, frequent urination, loss of appetite, weakness, staggering gait, dark brown blood	Prevented by good management to limit access to sources of nitrates; treated by intravenous solution consisting of a 4 percent solution of methylene blue in either a 5 percent glucose solution or a 1.8 percent solution of sodium sulfate
Brucellosis	*Brucella* bacteria	Abortions during the last half of pregnancy, sterility, decreased milk production, weight loss, lameness, drop in fertility, poor conception rates, uterine infections, inflamed joints	Prevented by vaccination during calfhood; no treatment
Vibriosis	Bacteria in the reproductive tract	Delays in becoming pregnant, come into heat at irregular times, abortions, decreased fertility	Prevented by vaccination; no treatment

Health Problem	Cause	Signs	Prevention/Treatment
Bloat	Formation of stable foam in rumen that traps gas in stomach	Abdominal distention on the left side, decreased milk production, frequent urination, heavy breathing, restless movements	Treated by insertion of cannula, stomach tube, and defoaming agent
Leptospirosis	Bacteria in water	Fever, rapid respiration, loss of appetite, abortions, drop in milk production, inflamed udder, bloodstained or yellow milk	Prevented by vaccination; treated by antibiotics
Shipping fever	Bacteria - *Pasteurella haemolytica, P. multocida, Haemophilus somnus*	Decreased appetite, fever, diarrhea, coughing, nasal discharge	Vaccination
Pinkeye	Vitamin A deficiency, eye injuries, dust, insects, strong sunlight	Liberal flow of tears, tendency to keep the eyes closed, redness and swelling of the membrane lining the eyelids and sometimes the visible part of the eye	Prevented by good nutrition with adequate vitamin A in the ration, vaccination, controlling flies; treated by application of antibiotics or sulfa drugs to the affected eye in the form of an ointment, powder, or spray, and a commercially produced eye patch that drops off in seven to ten days
Parainfluenza		Increased respiration rates, coughing, fever, watery to yellow discharge from the eyes and nose	Prevented by feeding good quality feeds, providing ready access to fresh water and shelter during adverse conditions, and vaccinations; treated by antibiotics

AS 1.3

Drawings will vary.

I. ***Answers to Evaluation***

1. c
2. j
3. o
4. l
5. f
6. r
7. a
8. h
9. i
10. e
11. g
12. m
13. k
14. t
15. p

16. q
17. d
18. s
19. b
20. n
21. c
22. a
23. b
24. a
25. To make sure to observe all the animals
26. Injury and leaving the milker on too long
27. Answers may include any two of the following: loss of appetite, hanging head, hump in the back, droopy ears, lack of spirit and depression, separation from the herd, or coughing or wheezing.
28. The animal would have a distended abdomen and possibly difficulty breathing. To treat bloat, one could use a cannula, stomach tube, or defoaming agent.

UNIT VI - ANIMAL HEALTH

Name _____

Lesson 1: Health Problems in Cattle

Date _____

EVALUATION

Match the name of health problems in beef and dairy cattle on the right with the description of symptoms on the left.

1. _____ Distended abdomen on the left side of the animal
2. _____ Inflammation of the udder, decreased milk production, and abnormalities in milk
3. _____ Extreme diarrhea in young animals
4. _____ Decreased fertility, abortions, and irregular heat patterns
5. _____ Dry, hacking cough and pneumonia seen most frequently in younger animals
6. _____ Swollen vulva and inflamed uterus
7. _____ Reduced rate of gain, lameness, and loss of extremities in severe cases
8. _____ Nasal discharge, respiratory ailments, pinkeye, and stillborn calves
9. _____ Fever, diarrhea, coughing, and poor growth
10. _____ Weakness, lack of coordination, poor appetite, dullness, and coma
11. _____ Fever, diarrhea, and possibly digestive ulcers
12. _____ Sterility and abortion during the last half of pregnancy
13. _____ Loss of appetite, rapid respiration, bloodstained or yellow milk, and abortions
14. _____ Muscle tremors, staggering, and cherry red blood
15. _____ Tears and redness and swelling of the eyelids' lining
16. _____ Coughing and watery to yellow discharge from the eyes and nose
17. _____ Distortion of the hoof and poor milking performance
18. _____ Staggering, weakness, and dark brown blood
19. _____ Loss of coordination, trembling, and convulsions
20. _____ Weight loss and fruity odor to the breath and milk

a. Fescue toxicosis
b. Grass tetany
c. Bloat
d. Laminitis
e. Milk fever
f. BRSV
g. BVD
h. IBR
i. Shipping fever
j. Mastitis
k. Leptospirosis
l. Vibriosis
m. Brucellosis
n. Ketosis
o. Scours
p. Pinkeye
q. Parainfluenza
r. Uterine infections
s. Nitrate poisoning
t. Prussic acid poisoning

Circle the letter that corresponds to the best answer.

21. The frequency with which the herd is observed depends on:

    a. The producer's personal preference.
    b. The producer's health.
    c. The producer's herd health situation.
    d. The producer's choice of breed.

22. The normal body temperature of cattle is:

    a. 101.5°F.
    b. 98.6°F.
    c. 105.1°F.
    d. 96.8°F.

23. Which of the following is an indication of illness that is more apparent in dairy cattle?

    a. Increased appetite
    b. Abnormalities in milk
    c. Weakness
    d. Drooping tail

24. Milk fever is a result of low levels of _____ in the blood.

    a. Calcium
    b. Magnesium
    c. Borogluconate
    d. Milk

Complete the following short answer questions.

25. Why would a producer count the cattle in the herd when checking their health?

26. What are two causes of mastitis?

    a.

    b.

27. What are two general symptoms of illness seen in both beef and dairy cattle?

    a.

    b.

28. How is bloat diagnosed? What can be done to correct it?

Lesson 1: Health Problems in Cattle Name _____

Identifying Symptoms

Objective: Identify symptoms associated with cattle herd health problems.

Match each symptom with the corresponding health problem.

Health Problem	Symptoms
1. _____ Bloat	a. Fever, decreases in appetite, diarrhea, coughing, and poor growth
2. _____ Fescue toxicosis	b. Distended abdomen on the left side of the animal
3. _____ Scours	c. Abortion during the last half of pregnancy, as well as sterility
4. _____ BVD	d. Excitement, loss of coordination, trembling, and convulsions
5. _____ Brucellosis	e. Nasal discharge, respiratory ailments, pinkeye, and stillborn calves
6. _____ IBR	f. Extreme diarrhea, especially seen in young animals
7. _____ Vibriosis	g. Fever, labored breathing, coughing, and watery to yellow discharge from the eyes and nose
8. _____ Leptospirosis	h. Fever, diarrhea, and digestive ulcers
9. _____ Shipping fever	i. Loss of appetite, rapid respiration, bloodstained or yellow milk, and abortions
10. _____ BRSV	j. Excitement, muscle tremors, staggering, and bright cherry red blood
11. _____ Grass tetany	k. Reduced rate of gain, lameness, and the loss of extremities
12. _____ Pinkeye	l. Dry, hacking cough and pneumonia; mostly found in younger animals
13. _____ Parainfluenza	m. Decreased fertility, abortions, and irregular heat patterns
14. _____ Nitrate poisoning	n. Tears, tendency to keep the eyes closed, and redness and swelling of the lining of the eyelids
15. _____ Prussic acid poisoning	o. Diarrhea, frequent urination, staggering, weakness, and dark brown blood

Lesson 1: Health Problems in Cattle Name _____

Understanding Health Problems in Cattle

Objective: Describe the causes, symptoms, and treatment or prevention of cattle diseases.

Fill in the table below, providing descriptions of the causes, signs of illness, and measures that can be taken to treat or prevent each of the health problems listed.

Health Problem	Cause	Signs	Prevention/Treatment
IBR			
Mastitis			
Grass tetany			
Ketosis			

Health Problem	Cause	Signs	Prevention/Treatment
Scours			
Laminitis			
BVD			
Milk fever			
Fescue toxicosis			
Uterine infections			

Health Problem	Cause	Signs	Prevention/Treatment
Prussic acid poisoning			
BRSV			
Nitrate poisoning			
Brucellosis			
Vibriosis			
Bloat			

Health Problem	Cause	Signs	Prevention/Treatment
Leptospirosis			
Shipping fever			
Pinkeye			
Parainfluenza			

Lesson 1: Health Problems in Cattle Name _____

Illustrating a Healthy Udder

Objective: Draw a healthy, mastitis-free dairy udder.

Because a healthy udder is important in dairy enterprises, understanding what constitutes a healthy udder is important. Find an example of a healthy udder in textbooks covering milk production, and draw it below. Include a cutaway of one teat as well as the four quarters of the udder. Identify the central ligament, the fine membrane separating individual quarters, the interlobular duct, the lobar duct, the gland cistern, the teat cistern, and the streak canal.

UNIT VI - ANIMAL HEALTH

Lesson 2: Herd Health for Cattle

Competency/Objective: Develop a health plan for beef and dairy cattle.

Study Questions

1. **What local, state, and federal regulations should be followed when buying and selling beef and dairy cattle?**

2. **Which management practices should be followed when introducing new animals into the herd?**

3. **What are the routine vaccination practices for herd health management?**

4. **What is anaphalactic shock, and how is it treated?**

5. **How are internal and external parasites controlled?**

6. **What records need to be kept?**

References

1. *Advanced Livestock Production and Management (Student Reference).* University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit VI.

2. *Dairy 10-Point Quality Control Program Mastitis Treatment Records (G3652).* University of Missouri Extension agricultural publications, 1993. Available at: http://muextension.missouri.edu/xplor/agguides/dairy/g03652.htm

3. Transparency Masters

   a) TM 2.1: Certificate of Veterinary Inspection
   b) TM 2.2: Sample Beef Herd Health Calendar
   c) TM 2.3: Sample Dairy Herd Health Calendar

4. Activity Sheets

   a) AS 2.1: Developing a Dairy Herd Health Plan
   b) AS 2.2: Life Cycle of Internal Parasites
   c) AS 2.3: Controlling Parasites

UNIT VI - ANIMAL HEALTH

Lesson 2: Herd Health for Cattle

TEACHING PROCEDURES

A. ***Review***

In Lesson 1, practices for recognizing diseases and descriptions of diseases were covered. The success of any beef or dairy operation depends on the overall health of the herd. This lesson will discuss methods for maintaining and documenting herd health.

B. ***Motivation***

Ask students why regulations concerning animal health must be followed when purchasing or selling cattle. What is the purpose of these regulations?

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Discuss the importance of the following regulations when transporting cattle that have been bought or sold. Explain that without transportation regulations, outbreaks of infectious diseases like brucellosis or tuberculosis would be more likely to occur. When discussing entry permits, emphasize that permits can be obtained by calling the Missouri Department of Agriculture at (573) 751-4359 during normal business hours.

   NOTE: Local regulations may vary, so research may be necessary to find out if any local regulations affect your area.

   What local, state, and federal regulations should be followed when buying and selling beef and dairy cattle?

   a) Regulations affecting transportation have been set forth by the Department of Agriculture at the federal and state level.
   b) All animals entering Missouri must be accompanied by a Certificate of Veterinary Inspection.
      1) It certifies that an animal is free of any sign of infectious or contagious diseases.
      2) The only exception is animals being transported to a federal- or state-supervised slaughter facility within the state.
   c) All animals being transported within Missouri or into Missouri from another state must be certified as free of brucellosis.
      1) The only animals that are exempt are heifers less than twenty-four months of age that have been consigned to an approved slaughter facility where they will be quarantined.
      2) If animals are not from a certified brucellosis-free herd, they must have been officially calfhood vaccinated or tested within the previous thirty days.
      3) All animals that have been tested are identified by an official ear tag, tattoo, brand, or registration number on the Certificate of Veterinary Inspection.
      4) Three options exist for handling any animals being transported into Missouri that have been exposed to brucellosis or are of unknown status.
         (a) They may be returned to the state of origin.
         (b) They may be quarantined to the farm of origin or farm of destination for retesting at intervals of 30, 120, and 300 days.

(c) They may be tagged, branded with an "S" on the left jaw, and shipped directly to slaughter on a quarantined feedlot.

d) An entry permit from the state Department of Agriculture is required for animals entering Missouri from other states.

2. Discuss the importance of controlling the spread of infectious diseases in any herd. Point out that using proper management techniques when introducing new animals to a herd is very important to the health of the existing animals.

Which management practices should be followed when introducing new animals into the herd?

a) One method of controlling the spread of disease is purchasing animals from producers with effective herd health programs.
b) The most effective method of controlling the spread of disease by new animals is isolating them.
   1) The animals should be placed in an area separate from the existing stock where the producer can easily observe them.
   2) New stock should be separated from the rest of the herd for no less than 21 days.
c) A producer should be sure to see the Certificate of Veterinarian Inspection accompanying the animals.

3. Discuss the importance of controlling disease not only by separating animals from the herd, but also by vaccinating cattle for common infectious diseases. Discuss the potential consequences of not vaccinating livestock. Have students complete AS 2.1. Refer to *Dairy 10-Point Quality Control Program Mastitis Treatment Records (G3652)*. See References for details.

What are the routine vaccination practices for herd health management?

a) Should check with a local veterinarian to determine which diseases are a problem
b) Methods of administration
   1) Intramuscular (IM) injections - vaccine injected into a muscle
   2) Subcutaneous injections - given under the skin
   3) Feeding or drinking
   4) Through the nasal passages as a spray or aerosol
   5) Drenching - using a syringe to introduce health products into the mouth
c) Administering vaccines
   1) Proper needle size
      (a) As recommended by a veterinarian
      (b) Dependent on the stage of growth of the animal
   2) Selection of an intramuscular (IM) site for injections - may cause damage and reduce the value of the meat animal when slaughtered
   3) Air kept out of the syringe
      (a) Small amount of air drawn into the syringe prior to inserting it into the vaccine bottle
      (b) Air injected into the bottle
      (c) Proper amount of vaccine slowly drawn out, allowing the syringe to fill without permitting air to enter
      (d) Could harm the animal with injections of air bubbles into the bloodstream
   4) Label directions
      (a) Read and follow directions
      (b) Correct vaccine used for the ailment
      (c) Always follow the instructions on the bottle for usage and storage
   5) Clean equipment - may transmit diseases and infections by the use of dirty needles and syringes
   6) Contaminating injectables - should not insert dirty needles and/or needles used with another type of vaccine into a bottle of vaccine

7) Vaccine warmed to room temperature before injecting it
8) Clean area of the animal injected

d) Beef cattle
   1) Calves
      (a) Preventive measures taken before calving - vaccine given to cows approximately three weeks before calving to guard against calf scours
      (b) 5-way vaccination program
         (1) Used by most producers
         (2) Leptospirosis
         (3) IBR
         (4) BVD
         (5) PI-3
         (6) Clostridial group
      (c) Feeder calves - may be vaccinated for BRSV
      (d) Replacement bulls and heifers - may be vaccinated for vibriosis
      (e) All replacement heifers - vaccinated against brucellosis at four to twelve months
      (f) Some vaccines - require booster shots after the original vaccination
   2) Mature cows - booster shots for leptospirosis, vibriosis, BVD, IBR, clostridial group

e) Dairy cattle
   1) Birth to 6 months of age
      (a) IBR
      (b) Pasteurella
      (c) Clostridial group
      (d) BRSV
      (e) BVD - two weeks after administering any other vaccines
   2) 4 to 6 months of age - brucellosis
   3) 13 months of age to 2 months before breeding
      (a) Leptospirosis
      (b) Vibriosis
      (c) Boosters
         (1) IBR
         (2) BVD
         (3) BRSV
   4) Mature animals - Boosters
      (a) Leptospirosis
      (b) Vibriosis
      (c) IBR
      (d) BVD

4. Certain animals may be allergic to some vaccinations. Producers should be aware of the potential for allergic reactions. Discuss anaphylactic shock and its treatment.

What is anaphylactic shock, and how is it treated?

a) Anaphylactic shock - allergic reaction that occurs in sensitized animals following injections of vaccines or drugs, ingestion of certain foods, or insect bites
b) Primarily affects the lungs, although the blood vessels are also affected
   1) Constricts airways and pulmonary veins
   2) Causes pooling of the blood in the veins and severe respiratory distress
   3) Results in shock, colic, agitation, nausea, hypersalivation, and in severe cases, death
c) Treated with an intravenous injection of epinephrine to counteract the effects

5. Describe how internal and external parasites affect animals and discuss the problems that they can cause. Discuss ways of controlling parasites. Have students complete AS 2.2 and 2.3.

How are internal and external parasites controlled?

a) Internal parasites
   1) Examples
      (a) Stomach worms
      (b) Grubs
      (c) Tapeworms
      (d) Lungworms
      (e) Intestinal roundworms
      (f) Whipworms
   2) Can be prevented using sound management practices
      (a) Controlling climatic conditions
      (b) Controlling intermediate hosts
      (c) Keeping animals from grazing where infected animals have been so that they do not ingest the parasites or their eggs
   3) Treated with anthelmintics
      (a) Drenching
      (b) Administering boluses
      (c) Mixing drugs with feed or minerals
      (d) Injecting drugs
b) External parasites
   1) Examples
      (a) Flies
      (b) Lice
      (c) Ticks
      (d) Mites that cause mange
   2) Controlled by using insecticides
      (a) Sprays
      (b) Foggers
      (c) Dusts
      (d) Insecticide ear tags
      (e) Back rubbers treated with chemicals
      (f) Pour-on treatments
         (1) Should not be used for *Bos indicus* cattle, which have large pores in their skin; absorption of the chemicals may kill them
         (2) Should also not be administered to lactating cows

6. Emphasize the importance of keeping accurate records. Explain how good records can be beneficial to the effective management of a beef or dairy operation.

What records need to be kept?

a) Veterinary record showing all routine health care for the animal
   1) Implants
   2) Additives
   3) Date and types of vaccinations
   4) Worming dates
   5) Withdrawal periods
   6) Vaccination or implant sites
b) Records regarding any health problems
   1) Symptoms
   2) Diagnoses
   3) Treatment dates
   4) Type of treatments
   5) Results
   6) Mastitis treatment records especially important for dairy cattle because the milk from cows receiving treatment cannot be sold

F. ***Other Activities***

1. Have students research different types of anthelmintics and insecticides used for external parasite control and describe why and how they are used.

2. Give students a list of parasites and have them research what part of the body they affect and how they can be controlled. Have them list different products that can be used to control each type of parasite.

3. Obtain syringes with needles and oranges for every student. Have students practice giving shots using the oranges.

G. ***Conclusion***

The success of any beef or dairy operation depends on the health of its animals. To keep animals healthy, producers should devise a health plan. This plan should address all potential problems and how to solve them. Following the plan closely is very important. A veterinarian can help the producer formulate a program, but the producer must make sure that it is always followed.

H. ***Answers to Activity Sheet***

AS 2.1

Refer to *Dairy 10-Point Quality Control Program Mastitis Treatment Records (G3652).* See References for details.

AS 2.2

Answers will vary.

AS 2.3

Answers will vary.

I. ***Answers to Evaluation***

1. c
2. b
3. a
4. c
5. d
6. a

7. Answers may include any three of the following: implants, additives, dates and types of vaccinations, worming dates, withdrawal periods, and vaccination and implant sites.

8. Answers may include any three of the following: drenching, administering boluses, mixing drugs with feed or minerals, or injecting drugs.

9. Answers may include any three of the following: flies, lice, ticks, or mites.

10. Because the milk from cows receiving treatment cannot be sold

11. With an intravenous injection of epinephrine

12. *Bos indicus* and lactating cattle

UNIT VI - ANIMAL HEALTH Name _____

Lesson 2: Herd Health for Cattle Date _____

EVALUATION

Circle the letter that corresponds to the best answer.

1. State regulations require which document for animals entering Missouri?

   a. Registration certificate
   b. Bill of sale
   c. Certificate of Veterinary Inspection
   d. Certificate of Ownership

2. Cattle being transported must be certified free of which of the following diseases:

   a. Vibriosis.
   b. Brucellosis.
   c. Tuberculosis.
   d. Leptospirosis.

3. At four to twelve months of age, all replacement beef heifers should be vaccinated for:

   a. Brucellosis.
   b. IBR.
   c. PI3.
   d. Pasturella.

4. For how long should all new animals be separated from the existing herd?

   a. At least 7 days
   b. At least 14 days
   c. At least 21 days
   d. At least 28 days

5. Which of the following vaccinations is given to replacement bulls and heifers but not feeder calves?

   a. IBR
   b. Pasturella
   c. BRSV
   d. Vibriosis

6. The only animals exempt from brucellosis testing are heifers under 24 months being transported to:

   a. An approved slaughter facility.
   b. An approved sale barn.
   c. An approved feedlot.
   d. An approved veterinary office.

Complete the following short answer questions.

7. What are three items of information that appear on a veterinary record for cattle?

   a.

   b.

   c.

8. What are three ways that producers can administer anthelmintics?

   a.

   b.

   c.

9. What are three external parasites?

   a.

   b.

   c.

10. Why is it important to keep mastitis treatment records for dairy cattle?

11. How is anaphylactic shock treated?

12. For which two classes of cattle should pour-ons not be used?

    a.

    b.

Certificate of Veterinary Inspection

MISSOURI DEPARTMENT OF AGRICULTURE
VETERINARY DIVISION
P.O. BOX 630, JEFFERSON CITY, MO 65102

CERTIFICATE OF VETERINARY INSPECTION

CERTIFICATE NO. 204676

☐ EXHIBITION ☐ SALE

CONSIGNOR | PERMIT NO

NAME

ADDRESS

ORIGIN ADDRESS (IF DIFFERENT FROM ABOVE)

CONSIGNEE OR PURCHASER

NAME

ADDRESS

DESTINATION ADDRESS (IF DIFFERENT FROM ABOVE)

AREA STATUS	SPECIES
☐ TUBERCULLIN ☐ BRUCELLOSIS ☐ A ☐ B ☐ C	☐ CATTLE ☐ HORSES ☐ SHEEP ☐ POULTRY ☐ SWINE ☐ _____
HERD OR FLOCK STATUS	NO. OF ANIMALS SHIPPED
☐ A ACCREDITED ☐ B CERTIFIED ☐ C VALIDATED	PURPOSE OF MOVE ☐ BREEDING ☐ FEEDING ☐ SLAUGHTER ☐ OTHER MARKET

QUALIFIED NEGATIVE HERD DATES

A	B	C

CARRIER

☐ AIR ☐ RAIL ☐ TRUCK ☐ TRAIL ☐ WATER

NAME

ADDRESS

NO.	TEMP. ID	EAR TAG NO., TATOO OR OTHER PERMANENT ID	SEX	AGE	BREED
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19					
20.					
21.					
22.					

TUBERCULIN (INTRADERMAL)		BRUCELLOSIS TEST					VACCINATION	OTHER TEST
		TEST DATE						NAME
INJ	DATE						DATE OR TATOO SYMBOL	
	HOUR	LAB						DATE
OBS	DATE							PRODUCT
	HOUR	TEST DILUTION				RESULT		RESULTS
TEST RESULTS								

I certify, as an accredited veterinarian, that the above described animals have been inspected by me and that they are not showing signs of infectious, contagious, and/or communicable disease, (except where noted). The vaccinations and results of test are indicated on the certificate. To the best of my knowledge, the animals listed on this certificate meet the state of destination and federal interstate requirements. No warranty is made or implied.

The animals in this shipment are those certified to and listed on this certificate (where applicable).

ACCREDITED VETERINARIAN SIGNATURE	ADDRESS	DATE	VET CODE	OWNER/AGENT SIGNATURE

MO 150 0004 (5-85) DISTRIBUTION: WHITE — With Shipment PINK — State of Destination CANARY — State of Missouri GOLDENROD — Veterinarian

Sample Beef Herd Health Calendar

January
•Examine for mange.
•Treat for lice.
•Check for abortions.

February
•Watch for foot rot.
•Consider administering *E. coli* vaccines for control of calf scours given to cow before calving.

March
•Provide a clean, dry calving stall.
•Prepare for calving.

April
•Prevent grass tetany by providing magnesium oxide in the mineral mixture.
•Deworm all cows before turning out to pasture; repeat in three weeks.
•Castrate and implant all bull calves.
•Dehorn before fly season.

May
•Check bulls for fertility.
•Vaccinate open cows for vibriosis, IBR, BVD, and leptospirosis before breeding.
•Begin fly control program.
•Vaccinate all calves and young stock for pinkeye.

June
•Prepare for AI or natural breeding.
•Check on the use of estrus synchronization products.
•Implant calves with growth promotant for calves.

July
•Vaccinate all calves more than three months old for pinkeye, clostridial group, pasteurella, and BRSV.
•Vaccinate heifer replacements for brucellosis at 4 to 12 months.

August
•Check for pinkeye; treat with antibiotics.

September
•Observe for grass tetany and foot rot.
•Check fly control.

October
•Pregnancy-check cows.
•Deworm and treat cows and calves for external parasites.

November
•Wean calves.

December
•Check cows for abortion and heat.

Sample Dairy Herd Health Calendar

Newborn Calves:
•Hand-feed first colostrum.
•Treat naval with iodine.

Vaccination:
•2 to 6 months of age: brucellosis.
•4 to 6 months of age:
IBR, parainfluenza, clostridial group, and BRSV.
BVD, two weeks after those above.
•11 to 13 months of age, or two months before breeding:
Leptospirosis.
Repeat IBR, BVD, and BRSV.
•Mature cow: Administer booster vaccinations for leptospirosis, IBR, and BVD.

Reproduction:
•Herd examination by a veterinarian every three weeks.
•Pregnancy exam of cows 30 to 45 days after breeding.
•Exam of cows that have not conceived after 3 or 4 services.
•Exam of cows by two weeks after calving and about 30 days after calving.
•Exam of cows in which heat is not observed by 60 days after calving.

Parasite Control:
•Worm heifers during first grazing season.
•Use approved insecticide on all stock continuously for control of external parasites.

Mastitis:
•Use recommended milking practices.
•Monitor with the California Mastitis Test and/or somatic cell count reports.
•Identify all cows treated for mastitis and withhold milk.

Emergencies:
•Call veterinarian at calving on very large and/or abnormal presentations.
•Arrange for immediate examination by a veterinarian for aborted fetuses and dead animals.

Lesson 2: Herd Health for Cattle Name_____

Developing a Dairy Herd Health Plan

Objective: Develop a dairy herd health plan.

Ten quality control guidelines for milk production are outlined on University Extension guide sheet G3652 (available at http://muextension.missouri.edu/xplor/agguides/dairy/g03652.htm). List the ten important aspect of a dairy herd health plan as defined by the American Veterinary Medical Association and the National Milk Producers Federation.

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

Lesson 2: Herd Health for Cattle Name _____

Life Cycle of Internal Parasites

Objective: Describe the life cycle of a common internal parasite.

One of the most common internal parasites that affects cattle and other livestock species is the intestinal roundworm. In the space below, provide a brief description of the life cycle of this parasite using information from the Internet or encyclopedias. Include a basic drawing of its life cycle.

Lesson 2: Herd Health for Cattle Name _____

Controlling Parasites

Objective: Describe health products for dealing with common parasites that affect beef and dairy cattle.

Fill in the chart below describing products for controlling internal and external parasites. Information may be obtained from pharmaceutical catalogs or the Internet.

Parasite	Brand Name	How Administered	Price per Dose	Special Precautions
Stomach worm				
Mites				
Tapeworm				
Lice				

Lungworm				
Ticks				
Whipworm				
Flies				

UNIT VI - ANIMAL HEALTH

Lesson 3: Health Problems in Swine

Competency/Objective: Identify common problems associated with swine herd health.

Study Questions

1. **What are everyday practices for observing herd health?**

2. **What are indications of health problems with swine?**

3. **What animal health problems may be encountered?**

References

1. *Advanced Livestock Production and Management (Student Reference).* University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit VI.

2. Activity Sheet

   a) AS 3.1: Researching Vaccines

UNIT VI - ANIMAL HEALTH

Lesson 3: Health Problems in Swine

TEACHING PROCEDURES

A. ***Review***

Lesson 2 focused on developing a herd health plan for beef and dairy operations. Like any other type of livestock operation, swine production is hard work, and health problems are likely. A knowledge of diseases and indications of illnesses can allow problems to be handled effectively, making them much less costly and time consuming.

B. ***Motivation***

Talk with local producers and find out what problems are the most common in your area. Explain to students that many diseases can occur in hogs. Emphasize that being able to diagnose your own problems can save money and increase profits.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Discuss the idea that a profitable swine operation depends on high levels of production and the level of production depends on the health of the animals. Point out that observing all of the animals is important to detect infectious diseases early.

   What are everyday practices for observing herd health?

   a) Proper observation is the key to maintaining a high level of herd health.
   b) Hogs should be observed at least once daily and possibly more often if health problems exist.
   c) Some producers choose to walk through the pens slowly and observe each animal.
      1) They should pay close attention to feeders and waterers at this time.
      2) Producers with large operations may need several employees to assist in this practice.
   d) For swine being pastured, animals may be observed by driving through the pasture or when they are fed.
   e) Young pigs are especially susceptible to disease and therefore generally require more observation and attention than do mature animals.
      1) Their health should be monitored constantly to ensure that any disease, infection, or injury is taken care of quickly.
      2) Methods of observation will vary depending on the size and type of operation.
      3) A method should be chosen that allows the producer to observe each animal and provide early treatment for any problems.
   f) Observation of growers/finishers is also an important part of production.
      1) As with nursery pigs, producers should take time to examine each animal and deal with each problem accordingly.
      2) Observing animals regularly two to three times a day is best.
   g) Observation of breeding stock is important to the success of an operation.
      1) In most confinement operations, breeding animals are usually kept separate from one another, making it easy to observe and treat each individual animal.
      2) In most nonconfinement operations, checking animals when they are fed is usually most convenient.

2. Ask students to list signs of illness in swine. Emphasize that observation is only effective when combined with a knowledge of these signs.

What are indications of health problems with swine?

a) Listlessness
b) Lowered head or humped back
c) Isolation from other animals
d) Coughing or wheezing
e) Abnormal feces or urine
f) Reluctance to move or an inability to move well
g) Loss of appetite - one of the earliest and most costly signs

3. Ask students to name diseases of swine with which they are familiar. Discuss the diseases listed below. Have students complete AS 3.1.

What animal health problems may be encountered?

a) Brucellosis
    1) Spread through close contact among animals
        (a) Sow to sow by infected boars through mating
        (b) Sows to suckling pigs
        (c) Common in breeding hogs but can also occur in younger pigs
    2) Symptoms
        (a) Abortions
        (b) Sterility (permanent or temporary)
        (c) Lameness
        (d) Abscesses in the extremities
    3) Treatment - none
b) Leptospirosis
    1) Spread through urine of infected hogs or wildlife
    2) Infection of the mucous membranes
    3) Symptoms
        (a) Fever
        (b) Hemorrhages
        (c) Anorexia
        (d) Spasms
        (e) Poor weight gain
        (f) Circling (appearing dizzy or disoriented)
        (g) Abortions
        (h) Stillbirths
    4) Can lead to death
    5) Prevention - vaccination
    6) Treatment - antibiotics
c) Atrophic rhinitis
    1) Caused by bacteria
    2) Characterized by atrophy of bones in nasal passages
    3) Symptoms
        (a) Sneezing
        (b) Nose rubbing
        (c) Eye discharge
        (d) Excessive yellow to white nasal drainage
        (e) Bleeding from nostrils
        (f) Distortion of nasal septum
        (g) Shortening or twisting of upper jaw
        (h) Reduced market weight
        (i) Carcass degradation

(j) Small body structure

4) Prevention
   (a) Improving ventilation
   (b) Improving sanitation
   (c) Protecting pigs from cold air drafts and unexpected temperature changes
   (d) Vaccination
5) Treatment - antibiotics

d) Pseudorabies
1) Extremely infectious virus in herpesvirus group
2) Symptoms
   (a) Fever
   (b) Sudden death in pigs less than three weeks old
   (c) Loss of appetite
   (d) Labored breathing
   (e) Trembling
   (f) Lack of coordination
   (g) Abortion
   (h) Reproductive failure
3) Transmitted through fluids like semen
4) Prevention - vaccination
5) Treatment
   (a) None
   (b) Infected animals quarantined and slaughtered

e) Transmissible gastroenteritis (TGE)
1) Caused by a virus
2) Symptoms
   (a) High death rate in pigs less than three weeks old
   (b) Vomiting
   (c) Watery to yellow diarrhea
   (d) Weakness
   (e) Reduced milk production
   (f) Dehydration
3) Occurs most often in winter
4) Highly transmissible
5) Prevention
   (a) Vaccination of sows
   (b) Exposing animals to the disease to promote herd immunity by feeding minced intestines from infected animals
6) Treatment
   (a) Antibiotics to cut down on secondary infections
   (b) Fresh water
   (c) Warm, draft-free environment

f) Colibacillosis
1) Caused by the bacteria *E. coli*
2) Symptoms
   (a) Watery, pale diarrhea
   (b) Rapid dehydration
3) Prevention
   (a) Vaccinating sows if the specific strain of *E. coli* can be identified as its cause
   (b) Good sanitation
   (c) Good nutrition
4) Treatment
   (a) Specific antibiotics (depending on strain)
   (b) Fluid therapy
   (c) Keeping pigs warm, clean, and dry

g) Swine dysentery
1) Also known as bloody scours

2) Affects hogs from 40 pounds to market weight
3) Causes degeneration and inflammation of the large intestine
4) Symptoms
   (a) Diarrhea with blood and mucus
   (b) Severe dehydration
   (c) Rapid weight loss
   (d) Weakness
   (e) Emaciation
5) Can eventually cause death
6) Treatment
   (a) Antibiotics
   (b) Water medications most effective

h) Mycoplasmal pneumonia
1) Generally mild
2) Symptoms
   (a) Dry cough
   (b) Retarded growth
   (c) Lung lesions
   (d) Labored breathing
   (e) Lowered rate of gain
3) Spread by nose to nose contact
4) Prevention - vaccination
5) Treatment - mass treatment with antibiotics during an outbreak

i) Clostridial enteritis
1) Form of scours
2) Affects young pigs
3) Caused by a bacteria
4) Symptoms
   (a) Diarrhea
   (b) Dehydration
5) May die within a few hours to two days
6) Transmitted through overcrowding
7) Treatment - none

j) Parvovirus (PPV)
1) Virus that causes reproductive failure in gilts and sows
2) Passes from infected pigs in feces and is ingested orally or nasally
3) Two to four day incubation period
4) Symptoms
   (a) Delayed return to estrus
   (b) Small litters
   (c) Mummified offspring
   (d) Stillbirths
   (e) Abortion
5) Prevention - vaccination
6) Treatment - none

k) Erysipelas
1) Caused by a bacteria
2) Occurs in three forms
   (a) Acute
   (b) Sub-acute
   (c) Chronic
3) Symptoms
   (a) Fever
   (b) Lethargy
   (c) Depressed appetite
   (d) Discolored or reddened skin
   (e) Vomiting

(f) Diarrhea
(g) Eye discharge
(h) Abortion
(i) Reluctant to move because of pain and swollen joints

4) Prevention - vaccination
5) Treatment
(a) Combination of penicillin and erysipelas serum
(b) Isolate infected animals

l) Porcine reproductive and respiratory syndrome (PRRS)
1) First reported in the United States in North Carolina in 1987
2) Considered to be one of the most difficult and costly swine health problems in the United States by the mid-1990s
3) Symptoms of the reproductive component
(a) Late term abortions at day 107 to 112 of gestation
(b) Stillbirths
(c) Mummies
(d) Weak pigs
4) Symptoms of the respiratory component in piglets in farrowing and nursery houses
(a) Labored breathing
(b) Loss of appetite
(c) Gauntness
(d) Rough hair coats
5) Prevention
(a) Evaluating the status of the herd
(b) Segregating age groups to better control transmission of the virus
(c) Isolating incoming replacement boars and gilts a minimum of 60 days
(d) Operating an all-in, all-out management system
(e) Depopulating nurseries if necessary
(f) Vaccinating pigs under 16 weeks of age
6) Treatment
(a) No specific treatment
(b) Helped by good nursing and good feed
(c) Antibiotics to reduce secondary infections

F. *Other Activities*

Have students research how medications are developed by animal health companies to treat and prevent diseases. What steps do they follow to secure Food and Drug Administration (FDA) approval?

G. *Conclusion*

No matter what type of swine operation a producer chooses, she or he can count on two things--hard work and herd health problems. The negative effect these problems can have on an operation can be dramatically decreased if the producer has a knowledge of common problems and how to deal with them.

H. *Answers to Activity Sheet*

AS 3.1

Answers will vary.

I. *Answers to Evaluation*

1. d
2. h
3. g

4. c
5. b
6. f
7. a
8. e
9. i
10. c
11. b
12. d
13. a
14. a
15. d
16. Proper observation

17. Answers may include any two of the following: listlessness, lowered head or humped back, isolation from other animals, coughing or wheezing, abnormal feces or urine, reluctance to move or inability to move well, or loss of appetite.

UNIT VI - ANIMAL HEALTH Name_____

Lesson 3: Health Problems in Swine Date_____

EVALUATION

Match the name of the health problem on the right with the description of symptoms on the left.

1. _____ Trembling, lack of coordination, abortion, and reproductive failure
2. _____ Diarrhea with blood and mucus, severe dehydration, and rapid weight loss; seen in older hogs
3. _____ Discolored or reddened skin, lethargy, vomiting, and diarrhea
4. _____ Diarrhea and dehydration seen in young pigs; can cause rapid death
5. _____ Abortions, sterility, lameness, and abscesses
6. _____ Watery, pale diarrhea and rapid dehydration
7. _____ Dry cough, labored breathing, and retarded growth
8. _____ Abortions, stillbirths, and mummified offspring
9. _____ Labored breathing in young pigs, along with late-term abortions in sows

a. Mycoplasmal pneumonia
b. Brucellosis
c. Clostridial enteritis
d. Pseudorabies
e. Parvovirus
f. Colibacillosis
g. Erysipelas
h. Swine dysentery
i. PRRS

Circle the letter that corresponds to the best answer.

10. _____ is one of the earliest and most costly signs of poor health in swine.

    a. Hemorrhage
    b. Fever
    c. Loss of appetite
    d. Weight loss

11. For which disease is a mass treatment with antibiotics given during an outbreak?

    a. Pseudorabies
    b. Mycoplasmal pneumonia
    c. Transmissable gastroenteritis (TGE)
    d. Colibacillosis

12. The disease _____ is indicated by the degeneration of the bones in the nasal passage.

    a. Leptospirosis
    b. TGE
    c. Pneumonia
    d. Atrophic rhinitis

13. Which animals are usually the most susceptible to disease?

    a. Young pigs
    b. Market hogs
    c. Breeding stock
    d. Boars

14. Circling, spasms, and anorexia are all symptoms of:

    a. Leptospirosis.
    b. Rhinitis.
    c. TGE.
    d. Gastroenteritis.

15. Which of the following is a symptom of TGE?

    a. Trembling
    b. Lung lesions
    c. Eye discharge
    d. Watery to yellow diarrhea

Complete the following short answer questions.

16. What is the key factor in maintaining a high level of herd health?

17. What are two general signs of poor health in swine?

    a.

    b.

Lesson 3: Health Problems in Swine Name_____

Researching Vaccines

Objective: Research information about vaccines, dosages, price per dose, and any special precautions needed.

Using a veterinary supply catalog that describes vaccines for swine, complete the chart.

Disease	Brand Name	Dosage	Price per Dose	Special Precautions
Leptospirosis				
Atrophic rhinitis				
Pseudorabies				
TGE				

Colibacillosis				
Mycoplasmal pneumonia				
Erysipelas				
Clostridial enteritis				
Parvovirus				
PRRS				

UNIT VI - ANIMAL HEALTH

Lesson 4: Herd Health for Swine

Competency/Objective: Develop a health plan for swine.

Study Questions

1. **What federal, state, and local regulations should be followed when buying or selling swine?**

2. **Which management practices should be followed when introducing new animals into the herd?**

3. **What are the routine vaccination practices for herd health management?**

4. **How are internal and external parasites controlled?**

5. **What records need to be kept?**

References

1. *Advanced Livestock Production and Management (Student Reference).* University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit VI.

2. *Pork Quality Assurance (booklet).* Copies can be obtained at the Missouri Pork Producers Council, 573-445-8375.

3. Transparency Master

   a) TM 4.1: Sample Swine Herd Health Calendar

4. Activity Sheet

   a) AS 4.1: Herd Health and Quality Assurance

UNIT VI - ANIMAL HEALTH

Lesson 4: Herd Health for Swine

TEACHING PROCEDURES

A. ***Review***

In Lesson 3, some of the more common health problems associated with swine production were discussed, as well as the need for frequent observation to detect signs of illness. This lesson will examine what is involved in developing a health plan to prevent these problems, including proper practices for vaccinations and treatment of parasites.

B. ***Motivation***

Ask students to list the products of different pork enterprises. Discuss how herd health affects these products.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Discuss the importance of following rules and regulations when buying or selling swine. Knowing and following these regulations is not only required by law but will also increase the success of a swine operation.

   NOTE: Check to see if any local regulations affect the transportation of swine in your area.

   What federal, state, and local regulations should be followed when buying or selling swine?

   a) Swine being transported into or within the state must be inspected by a veterinarian, who issues a Certificate of Veterinary Inspection.
   b) Animals being brought into the state must also have entry permits.
   c) Animals that pass health inspections must be identified by an official ear tag, ear notch, or tattoo.
   d) Animals that do not pass inspection are tagged with an official ear tag and are either shipped directly to slaughter or remain on (or are returned to) the farm of origin.
   e) All animals must be quarantined for thirty days after any change of ownership.
   f) All breeding stock, regardless of age, must be from a herd that is certified brucellosis and pseudorabies free.

2. Discuss the importance of knowing the health status of any animals that are being introduced into the herd and isolating them after they are received to watch for symptoms of any infectious diseases.

   Which management practices should be followed when introducing new animals into the herd?

   a) The health status of the herd that animals are being acquired from should be known prior to their purchase.
   b) Isolation of new animals is important even if their health status is known.
   c) Animals being brought into the herd must be quarantined for at least 60 days.

d) The length of time for which new animals are isolated should be adequate to achieve certain outcomes.
   1) Stabilization of the animals
   2) Diagnosis and control of any diseases or parasitic infections in the animals
   3) Identification of new animals
   4) Exposure to pathogens already present in the herd
e) After any contact with isolated animals, the producer should shower and change clothes before returning to the herd.

3. Emphasize that prevention of disease depends on an effective vaccination schedule. Review vaccination practices; if necessary, have students review general practices from Lesson 2 of this unit. Discuss when different types of vaccinations may be given. If possible, supply students with the *Pork Quality Assurance* booklet, and have them complete AS 4.1.

What are the routine vaccination practices for herd health management?

a) May combine vaccinations, reducing the number of shots that must be given
b) Vaccinations
   1) Adult swine - given in the neck using intramuscular injections
   2) Young pigs that are easily held by the producer - given in the flank of the rear leg
   3) Never given in the front or rear leg; bruising and staining of the muscle will lead to economic losses
c) Vaccinations given to sows and gilts prior to breeding
   1) Leptospirosis
   2) Erysipelas
   3) Parvovirus
d) Vaccinations given to sows and gilts prior to farrowing
   1) Clostridial enteritis
   2) Erysipelas
   3) Colibacillosis
   4) TGE in the winter
e) Vaccinations given to pigs after farrowing
   1) Atrophic rhinitis
   2) Erysipelas
   3) Mycoplasmal pneumonia
f) Vaccines given at the grower stage - pseudorabies, in areas where pseudorabies are prevalent

4. Ask students to list different types of external and internal parasites. Point out the devastating effect that parasites can have on a herd if left uncontrolled.

How are internal and external parasites controlled?

a) Internal parasites
   1) Ensuring proper sanitation
   2) Creating unfavorable (cool and dry) conditions for parasites
   3) Destroying intermediate hosts
   4) Making sure animals do not ingest parasites or their eggs
   5) Using anthelmintics
      (a) Mixed with drinking water or given as an injection
      (b) Sows and gilts - wormed prior to breeding and again prior to farrowing
      (c) Pigs - wormed at approximately 40 pounds
      (d) Frequency - depends on the situation of the particular operation
b) External parasites
   1) Insecticides, such as sprays, foggers, and dusts
   2) Some products given as injections

5. Explain to the students that a major factor in the success of any hog operation is adequate and complete records.

   What records need to be kept?

   a) Worming dates
   b) Vaccination records of the animals
   c) Records of any health tests administered
   d) May also include a history of illnesses

F. ***Other Activities***

Have a pork producer speak to the class about common diseases that affect his or her swine herd, emphasizing the need for a herd health plan to prevent losses.

G. ***Conclusion***

Producing swine is a labor intensive and difficult process, but it can also be rewarding and profitable if sound management practices are used. One of these management practices is the implementation of an effective herd health program that details ways to prevent diseases. Keeping accurate records will also help in evaluating performance and monitoring the health status of the herd.

H. ***Answers to Activity Sheet***

1. Establish an efficient, effective herd health management plan.
   - Provide a clean, healthy environment.
   - Develop a herd health checklist.
   - Develop a vaccination program.
   - Complete the plan with approval of a veterinarian.

2. Establish a valid veterinarian/client/patient relationship.
   - Agree to instructions provided by the veterinarian.
   - Trust the veterinarian's knowledge of swine health.
   - The veterinarian should be readily available to help with health problems.

3. Store all drugs correctly.
   - Follow label instructions and observe expiration dates.
   - Have a cool, dry place for storage.
   - Keep out of reach of children.
   - Discard used needles and drug bottles properly.

4. Use only FDA-approved or prescription drugs.
   - Prescription drugs can only be administered by a licensed veterinarian.
   - The producer may use over-the-counter drugs.
   - Buy drugs only from reputable suppliers.

5. Administer the injectable drugs and oral medications properly.
   - Use smallest recommended needle to avoid stress.
   - Know the types of delivery systems for injectable drugs (intramuscular, subcutaneous, etc.).
   - Know where to give the drugs (not the ham muscle, etc.).
   - Restrain animals to avoid needle breakage.

6. Follow label instructions for feed additives.
   - Keep mixer and/or scale calibrated.
   - Keep written records of feeding.
   - Clean the mixer or mill properly.

- Store feed additives properly.
- Follow withdrawal times as recommended on the label.

7. Maintain proper treatment records.
   - Identify treated animals.
   - Record health-related events.

8. Use drugs residue tests when appropriate.
   - on sows culled from farrowing house and sold immediately
   - on animals that receive extra medications
   - on pigs sold directly to individuals for roasting, etc.
   - on swine shown at fairs

9. Implement employee/family awareness of proper drug use.
   - Educate employee and family members on drug use.
   - The producer is ultimately responsible.

10. Complete the quality assurance checklist annually.
    - It must be done with residing veterinarian.
    - Consider the checklist as a "minimum."
    - The checklist assesses one's attitude, knowledge, and commitment to the pork industry.

I. ***Answers to Evaluation***

1. b
2. c
3. a
4. d
5. a

6. Answers may include any three of the following: worming dates, vaccination records of the animals, records of any health tests administered, and a history of illnesses.

7. Answers may include any two of the following: stabilization of the animals, diagnosis and control of any diseases or parasitic infections in the animals, identification of new animals, and exposure to pathogens already present in the herd.

8. Animals that do not pass inspection are tagged with an official ear tag and are either shipped directly to slaughter or remain on (or are returned to) the farm of origin.

9. Answers may include any three of the following: maintaining proper sanitation, creating unfavorable (cool and dry) conditions for parasites, destroying intermediate hosts, making sure animals do not ingest parasites or their eggs, and using antihelmintics.

10. Shower and change clothes

UNIT VI - ANIMAL HEALTH Name _____

Lesson 4: Herd Health for Swine Date _____

EVALUATION

Circle the letter that corresponds with the best answer.

1. The use of _____ is effective in controlling internal parasites.

   a. Antibiotics
   b. Anthelmintics
   c. Penicillin
   d. Insecticides

2. How long are animals quarantined after a change in ownership?

   a. Forty days
   b. Fifty days
   c. Sixty days
   d. Seventy days

3. Which of the following vaccinations should be given to sows and gilts in the weeks prior to farrowing?

   a. Colibacillosis
   b. Leptospirosis
   c. Atrophic rhinitis
   d. Mycoplasmal pneumonia

4. Breeding stock must be from a herd that is certified free of which two diseases?

   a. Brucellosis, leptospirosis
   b. Leptospirosis, pseudorabies
   c. Vibriosis, pseudorabies
   d. Pseudorabies, brucellosis

5. At what stage should animals be vaccinated for leptospirosis?

   a. Before breeding
   b. Before farrowing
   c. After farrowing
   d. In the grower stage

Complete the following short answer questions.

6. What are three items that health records may include?

   a.

   b.

   c.

7. What are two outcomes that should be achieved during the time new animals are isolated from the herd?

   a.

   b.

8. What is done with animals that do not pass the health inspection?

9. What are three management practices that can be used to control internal parasites?

   a.

   b.

   c.

10. If contact with isolated animals is required during the isolation period, what should the producer do before returning to the main herd?

Sample Swine Herd Health Calendar

Birth to Market

1 day after farrowing
- Provide antitoxin for clostridial disease.

1 to 3 days
- Provide an iron injection.
- Clip needle teeth.
- Ear notch.
- Dock tails.
- Castrate.

3 to 7 days
- Vaccinate for atrophic rhinitis and TGE.
- Begin providing oral iron.

10 to 14 days
- Provide iron either by injection or orally.
- Start creep feeding.

3 to 4 weeks
- Vaccinate for atrophic rhinitis and mycoplasmal pneumonia.
- Expose to pre-starter feed.
- Wean.

Weaning + 10 days
- Deworm and treat for lice and mange.

Weaning + 20 days
- Vaccinate for erysipelas.

10 to 12 weeks
- Vaccinate for pseudorabies and revaccinate for erysipelas.

5 to 6 months
- Follow all feed medication and vaccination withdrawal times.

Breeding Boars

4 to 6 months
- Select and bring to farm at lease 60 days prior to breeding.
- Isolate for 60 days and test for diseases not already present in herd.

First 30 days following purchase in isolation
- Test for brucellosis, leptospirosis, parvovirus, TGE, and pseudorabies.
- Deworm and treat for lice and mange.
- Feed unmedicated feed.
- Observe for lameness, diarrhea, pneumonia, and ulcers.

Second 30 days following purchase in isolation
- Vaccinate for erysipelas, leptospirosis, and parvovirus.
- Observe desire and ability to breed.
- Begin fence line and contact with gilts and sows.

Every 6 months
- Revaccinate for pseudorabies, leptospirosis, erysipelas, and parvovirus.
- Deworm and treat for lice and mange.

Breeding Gilts/Sows

6½ months of age
- Deworm.
- Treat for lice and mange.
- Provide fence line contact with boars.
- Vaccinate for leptospirosis, erysipelas, parvovirus, and pseudorabies.
- Select gilts.
- Isolate purchased gilts for 60 days and test for diseases not already present in the herd.

7½ months of age
- Repeat vaccinations.

8 months of age
- Breed on the second or third heat period.

3 weeks post-breeding
- Pregnancy-check animals that have not returned to heat.

9 months
- Pregnancy-check 35 to 60 days after breeding.

6 weeks prior to farrowing
- Vaccinate for clostridial disease.

4 to 6 weeks prior to farrowing
- Vaccinate for *E. coli*, pasteurella, mycoplasmal pneumonia, TGE, and pseudorabies.
- Treat for lice and mange.

2 weeks prior to farrowing
- Vaccinate for *E. coli*, clostridial disease, mycoplasmal pneumonia, TGE, and atrophic rhinitis.
- May include feed additives for clostridial diseases through lactation.

7 to 10 days prior to farrowing
- Deworm and treat for lice and mange.
- Wash sows thoroughly with detergent before placing them in farrowing facilities.

Farrowing
- Assist with farrowing.

3 to 5 weeks post-farrowing
- Vaccinate for leptospirosis, parvovirus, pseudorabies, and erysipelas.
- Treat for lice and mange.
- Wean pigs.

Lesson 4: Herd Health for Swine Name _____

Herd Health and Quality Assurance

Objective: Describe the steps relating to herd health required for completion of the Pork Quality Assurance Program.

Outline the ten critical control points and their components relating to herd health and drug regulation that a pork producer needs to follow to be certified with the Pork Quality Assurance program. The *Pork Quality Assurance* booklet can be obtained from the state pork producers association or a county pork producers organization.

1.

2.

3.

UNIT VI - ANIMAL HEALTH

Lesson 5: Health Problems in Sheep

Competency/Objective: Identify problems associated with sheep flock health.

Study Questions

1. **What are everyday practices for observing flock health?**

2. **What are indications of health problems in sheep?**

3. **What health problems may be encountered by sheep producers?**

References

1. *Advanced Livestock Production and Management (Student Reference).* University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit VI.

2. Activity Sheet

   a) AS 5.1: Understanding Sheep Health Problems

UNIT VI - ANIMAL HEALTH

Lesson 5: Health Problems in Sheep

TEACHING PROCEDURES

A. ***Review***

Lesson 4 described measures that can be taken to maintain herd health in swine. The costs associated with animal health in the United States are staggering. As with swine, the key to managing health problems is to have a good health program. Maintaining sheep flock health begins with observing the flock regularly for signs of illness. Being familiar with the health problems that affect sheep is also important for prevention.

B. ***Motivation***

Explain to students that the cost of health care for sheep is expensive, just as it is for humans. Talk with local producers and veterinarians to identify problems that are most common in your area and the costs associated with handling them. Discuss these diseases and their costs with the class. Emphasize the importance of observation and recognizing the signs of illnesses in reducing costs.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Discuss the idea that a profitable sheep operation is one with a high level of production. Achieving a high level of production involves monitoring and managing the health of the flock. Discuss the importance of observing all animals daily in order to prevent health problems in the flock or to identify problems in their early stages.

   What are everyday practices for observing flock health?

   a) Sheep should be observed at least once a day.
   b) A flock with health problems should be checked more frequently.
   c) A producer may also observe the flock more frequently if the sheep are experiencing stress because many diseases appear as a result of stress.
   d) Producers must make sure to observe each animal.
   e) Monitoring flock health is usually easiest when sheep are gathered together for feeding or when they are brought in at night.

2. Emphasize that observation is effective only if you know what to look for. Discuss the signs of health problems in sheep

   What are indications of health problems in sheep?

   a) General signs of illness
      1) Reduced feed consumption or grazing
      2) Grinding teeth
      3) Coughing or wheezing
      4) Panting
      5) Isolation from the flock
      6) Abnormal feces or urine
      7) Lack of movement
      8) Lack of spirit and depressed appearance

9) Loss of wool or stringy wool

b) Abnormal vital signs
   1) Normal temperature - 102.5° Fahrenheit
   2) Normal respiratory rate - 20 breaths/min.
   3) Normal heart rate - 75 beats/min.

3. Many diseases and other health problems can occur in sheep. Ask students to list diseases in sheep with which they are familiar. Discuss symptoms and possible treatments or preventive measures of different diseases. Have students complete AS 5.1.

What health problems may be encountered by sheep producers?

a) Coccidiosis
   1) Caused by single-celled protozoa called coccidia
   2) Infected by ingesting fecal matter
      (a) Suckling
      (b) Nosing around the environment
      (c) Eating and drinking contaminated feed or water
   3) Symptoms
      (a) Blackish, blood-tinged diarrhea
      (b) Reluctant to eat
   4) Can be mild to severe
   5) Prevention
      (a) Sanitation management in barns and lots
      (b) Medicating lambs prior to and during risk periods
      (c) Keeping bedding clean
   6) Treatment - dose of a coccidiostat
   7) Build up immunity after six weeks of age

b) White muscle disease
   1) Caused by selenium and/or vitamin E deficiency
   2) Two forms of the disease
      (a) Affects newborn lambs as result of underfeeding vitamin E or selenium to the pregnant ewe
      (b) Causes a poor rate of growth and an unthrifty body condition
   3) Symptoms
      (a) First form
         (1) Reluctant to move
         (2) Prefer to lie down
         (3) Painful to stand
         (4) Stiffness of hind legs
         (5) Arched back
      (b) Second form - poor antibody response
   4) Prevention - providing ewes and lambs with adequate amounts of selenium and vitamin E in their diet
   5) Treatment - feeding commercially made selenium/vitamin E product

c) Diarrhea
   1) Caused by dietary changes
      (a) Increases in creep feed intake
      (b) Ingesting lush grass high in moisture, protein, and soluble carbohydrates
   2) Feces unpelleted - higher risk for fly strike

d) Enterotoxemia
   1) Commonly called overeating or pulpy kidney disease
   2) Losses as high as 40 percent
   3) Caused by a bacterium, *Clostridium perfringens*
   4) Symptoms
      (a) Depression
      (b) Abdominal pain

(c) Teeth grinding
(d) Frothing at mouth
(e) Diarrhea
(f) Convulsions

5) Can lead to death
6) Prevention
(a) Good feeding management
(b) Sound vaccination program
7) Treatment - usually ineffective

e) Soremouth
1) Viral disease
2) Attacks all ages of sheep but is most common in sheep under one year of age
3) Symptoms
(a) Attacks the skin and mucous membranes of the lips and nostrils, forming pustules and finally scabs
(b) Makes eating painful, resulting in weight loss
4) Prevention - vaccination early in life or when an outbreak occurs
5) Treatment
(a) Treating lesions with Nolvasan disinfectant to reduce the sores
(b) Care used in treating sheep because it can affect humans, causing sores like blisters on the skin

f) Acidosis
1) Commonly known as grain overload or founder
2) Commonly occurs in older lambs when their diet is changed from roughage or grazing to grain
3) Symptoms
(a) Loss of appetite
(b) Depression
(c) Loss of consciounsess
4) Can lead to death
5) Prevention
(a) Roughage decreased and grain increased gradually
(b) 5 to 10 percent change in grain to roughage ratio every two to three days
6) Treatment - decreasing levels of acid in rumen
(a) Bicarbonate of soda
(b) Antacid

g) Polio
1) Caused by lack of thiamine (vitamin B1) in diet
2) Symptoms
(a) Loss of appetite
(b) Goes down on side and paddles its feet with head thrown back
3) Prevention
(a) Ration management
(b) Thiamine injections
4) Early treatment effective - repeated injections of thiamine hydrochloride over several days

h) Scours
1) Caused by bacteria
2) Common in feeder lambs
3) Associated with stress
(a) Weaning
(b) Shipping
(c) Changes in feed intake
(d) Crowding
4) Symptoms
(a) Going off feed
(b) Yellowish-green odorous diarrhea

(c) Depression
(d) Tenderness and irritation of hindquarters

5) Prevention
(a) Good sanitation
(b) Stressful conditions avoided
(c) Good feed management program

6) Treatment - expensive and discouraging because finding the correct antibiotic is difficult

7) Also transmitted to humans - wash hands thoroughly after handling

i) Pneumonia

1) Causes - viruses with bacteria, commonly pasteurella

2) Symptoms
(a) Go off feed
(b) Become gaunt
(c) Breathe rapidly and heavily
(d) Seems to hurt to walk far
(e) Fever
(f) Nasal discharge
(g) Loss of appetite
(h) Coughing

3) Prevention
(a) Good sanitation
(b) Dry bedding
(c) Good ventilation

4) Treatment - multi-day antibiotic treatment

j) Copper toxicity

1) Occurs when sheep are fed or exposed to cattle or hog feed or to the mineral itself

2) Excessive copper stored in liver

3) No damage noticed until a toxic level is reached, causing death

4) Prevention - good feed management program

k) Chlamydiosis

1) Also referred to as enzootic abortion (EAE)

2) Highly contagious infection

3) Results in severe economic loss in sheep industry

4) Caused by a group of organisms called chlamydia

5) Spread through exposure to aborted fetuses or infected afterbirth

6) Causes abortions 60 to 90 days after infection

7) Prevention
(a) Breaking infective cycle
(1) Removing infected ewes from flock
(2) Burying aborted fetuses and afterbirth
(3) Cleaning the spot where the fetus and afterbirth were found
(b) Immunizations

8) Treatment - ineffective

l) Toxoplasmosis

1) Caused by a microorganism carried by cats

2) Occurs when sheep feed is contaminated with fecal matter from cats

3) Lambs absorbed by the ewe, stillborn, or born weak

4) Prevention - breaking the cycle of infection

5) Treatment - none

m) Brucellosis

1) Caused by bacteria

2) Causes infectious swelling that blocks transfer of sperm

3) Spread through sexual contact

4) Can affect pregnant ewes
(a) Causes abortions
(b) Causes small, weak lambs

n) Pregnancy toxemia
   1) Commonly referred to as ketosis
   2) Occurs in ewes almost ready to lamb
   3) Usually occurs in older ewes carrying multiple lambs or thin or fat ewes
   4) Causes
      (a) Diet deficient in energy
         (1) Liver not able to convert fat stores
         (2) Ketone bodies accumulate
      (b) Stress
         (1) Dogs
         (2) Predators
         (3) Bad weather
         (4) Old age
         (5) Poor teeth
         (6) Heavy worm infestations
         (7) Other diseases
   5) Symptoms
      (a) Listlessness
      (b) Teeth grinding
      (c) Labored breathing
      (d) Frequent urination
      (e) Odor to breath
      (f) Loss of appetite
      (g) Depressed attitude
   6) Can lead to death
   7) Prevention - proper nutrition for ewes
   8) Treatment - intravenous glucose injections
o) Mastitis
   1) Inflammation of the tissue of the udder
   2) Caused by bacteria entering through the teat end
   3) Abnormal milk
      (a) Clots
      (b) Chunks
      (c) Thickness similar to pus
   4) Diagnosis
      (a) Observing ewe
      (b) Examining udder
   5) Prevention - good sanitation
   6) Treatment
      (a) Intramammary or injectable antibiotic
      (b) Drugs to reduce inflammation and fever
p) Vibriosis
   1) Caused by bacteria
   2) Transmission
      (a) Contaminated feed or water
      (b) Carrier ewes
      (c) Birds
      (d) Rodents
   3) Causes abortions
   4) Causes death from retained fetuses
   5) Brownish, foul-smelling vaginal discharge following abortion
   6) May recover without treatment
   7) Prevention
      (a) Vaccinate
      (b) Practice strict sanitation during and prior to lambing
      (c) Isolate infected ewes
      (d) Destroy aborted fetuses and membranes

q) Leptospirosis
   1) Infected by coming in contact with infected cattle
   2) Causes abortion
   3) Symptoms
      (a) Fever
      (b) Anemia
      (c) Jaundice
      (d) Bloody urine
   4) Prevention - vaccination
   5) Treatment - antibiotics

r) Scrapie
   1) Slow degenerative disease of the central nervous system of sheep
   2) Affects the brain and the tissue of the nervous system
   3) Unknown agent; exhibits itself only in sheep with a certain genetic makeup
   4) Symptoms
      (a) Tremors of the neck and head
      (b) Itching
      (c) Lack of coordination
      (d) Excessive tremors and a convulsion-like state caused by sudden movement or handling
   5) Prevention - avoid introducing it into the flock through replacement stock
      (a) Reviewing the health history of the source flock
      (b) Checking on unexplained deaths
      (c) Purchasing animals from scrapie control program members
   6) Treatment - None

s) Urinary calculi
   1) Also referred to as water belly
   2) Metabolic disease that primarily affects male sheep; salts that are usually passed out of the body in urine instead form calculi, or stones, that can lodge in kidneys, ureters, the bladder, or the urethra
   3) Stones more easily excreted in females than in males due to anatomical differences
   4) Wethers at the greatest risk because castration affects the urethra
   5) Symptoms
      (a) Retention of urine
      (b) Abdominal pain
      (c) Urine dribbling
      (d) Loss of appetite
      (e) Humped appearance
      (f) Distention and rupture of the urethra
   6) Causes death if it is untreated
   7) Prevention
      (a) Properly balancing calcium and phosphorous at a ratio of 2:1 in the ration
      (b) Providing an adequate amount of water
      (c) Making sure water sources are not high in minerals
   8) Treatment
      (a) Snipping off the end of the penis to dislodge the calculi
      (b) Feeding ammonium chloride to acidify the urine and dissolve the calculi.
      (c) Surgery for valuable animals

t) Fescue toxicosis
   1) Also called fescue foot
   2) Symptoms
      (a) Reduced rate of gain
      (b) Lameness
      (c) In extreme cases, loss of extremities, such as hooves, ears, and tails
      (d) Reduces conception rates in exposed ewes
   3) Prevention

(a) Feeding fescue that is free of the endophytic fungus *Acremonium coenophialum*
(b) Keeping pastures clipped with a mower because fescue that gets too tall can break and provide a place for the endophyte to enter the plant.

u) Foot rot
1) Caused by a bacterial infection of the feet
2) Bacteria
(a) Live in warm, moist environments
(b) Usually enter the foot through an injury
(c) Attack the portion of the foot under the hoof and sole
3) Symptoms
(a) Distorted hoof growth
(b) Lameness
(c) Strong odor in advanced stages
4) Prevention
(a) Purchasing sheep from herds that are free of this condition
(b) Cleaning and disinfecting trucks and trailers from other sheep farms that enter the operation
(c) Providing a foot bath of a bactericidal solution
5) Treatment
(a) Hoof trimming
(b) Application of a bactericide as a spray or foot bath

F. ***Other Activities***

Have students pick one of the above diseases or another condition that may affect sheep and prepare an extensive research paper containing a more detailed description of the disease, its causes, and methods of prevention and treatment.

G. ***Conclusion***

Maintaining the health of the sheep flock is necessary if producers wish to make a profit. Producers should observe the animals consistently and be able to recognize signs of poor health. A knowledge of the health problems that affect sheep is also necessary to prevent or control them effectively. Understanding the health problems common to sheep can save the producer a great deal of time, labor, and money.

H. ***Answers to Activity Sheet***

Health Problem	Cause	Signs	Prevention/Treatment
Soremouth	Virus	Pustules and scabs on the skin and mucous membranes of the lips and nostrils, weight loss	Prevented by vaccination early in life or when an outbreak occurs; treated by using a Nolvasan disinfectant to reduce the sores
Enterotoxemia	Bacteria - *Clostridium perfringens*	Depression, abdominal pain, teeth grinding, frothing at the mouth, diarrhea, convulsions	Prevented by good feeding management and vaccinations
Scours	Bacteria	Going off feed, yellowish-green odorous diarrhea, depression, tenderness and irritation of the hindquarters	Prevented by good sanitation, avoiding stressful conditions, and good feed management

Health Problem	Cause	Signs	Prevention/Treatment
Scrapie	Unknown agent	tremors of the neck and head, itching, and a lack of coordination, excessive tremors and a convulsion-like state caused by sudden movement or handling	Prevented by avoiding introducing it into the flock through replacement stock
White muscle disease	Selenium and/or vitamin E deficiency	First form - reluctant to move, lies down, painful to stand, stiffness of hind legs, arched back; second form - poor antibody response	Prevented by providing ewes and lambs with selenium and vitamin E in their diet; treated by feeding a selenium/vitamin E product
Acidosis	Change in diet from roughage or grazing to grain	Loss of appetite, depression, loss of consciousness	Prevented by decreasing roughage and increasing grain at 5 to 10 percent change in the grain to roughage ratios every 2 to 3 days; treated with bicarbonate of soda or antiacid
Pneumonia	Viruses with bacteria, commonly pasteurella	Goes off feed, becomes gaunt, breathes rapidly and heavily, elevated temperature, hurts to walk far, nasal discharge, loss of appetite, coughing	Prevented by good sanitation, dry bedding, and good ventilation; treated using a multi-day antibiotic treatment
Mastitis	Bacteria entering through the teat end	Inflamed udder tissue, abnormal milk	Prevented by good sanitation; treated using intramammary or injectable antibiotic and drugs to reduce fever and inflammation
Pregnancy toxemia	Diet deficient in energy or stress	Listlessness, teeth grinding, labored breathing, frequent urination, odor to breath, loss of appetite, depression	Prevented through proper nutrition; treated with intravenous glucose injections
Polio	Lack of thiamine (vitamin B1) in the diet	Loss of appetite, goes down on side and paddles with head thrown back	Prevented with ration management and thiamine injections; treated with repeated injections of thiamine hydrochloride
Foot rot	Bacteria	Distorted hoof growth, lameness, and a strong odor	Prevented by purchasing sheep from unaffected herds, cleaning and disinfecting trucks and trailers from other sheep farms, and providing a foot bath of a bactericidal solution; treated by hoof trimming and the application of a bactericide
Chlamydiosis	Group of organisms called chlamydia	Abortions	Prevented by breaking the infective cycle and immunizations
Vibriosis	Bacteria	Abortions followed by brownish, foul-smelling vaginal discharge	Prevented through proper vaccination, strict sanitation prior to and during lambing, isolating infected ewes, and destroying aborted fetuses and membranes

I. ***Answers to Evaluation***

1. c
2. e
3. g
4. j
5. a
6. i
7. f
8. b
9. d
10. h
11. b
12. d
13. a
14. b
15. c
16. b
17. d
18. Because many diseases appear as a result of stress
19. When the sheep are gathered together at feeding or when they are brought in at night

20. Answers may include any two of the following: reduced feed consumption or grazing, grinding teeth, coughing or wheezing, panting, isolation from the flock, abnormal feces or urine, lack of movement, and lack of spirit or depressed appearance.

UNIT VI - ANIMAL HEALTH Name _____

Lesson 5: Health Problems in Sheep Date _____

EVALUATION

Match the name of the health problem with the description of symptoms on the left.

1. _____ Abortions followed by a brownish, foul-smelling vaginal discharge
2. _____ Stiffened hind legs and arched back
3. _____ Nasal discharge, coughing, breathing rapidly and heavily
4. _____ Goes down on side and paddles with the head thrown back
5. _____ Tremors of the neck and head, itching, and a lack of coordination
6. _____ Distorted hoof growth, lameness, and a strong odor
7. _____ Abdominal pain, grinding teeth, frothing at the mouth, diarrhea, convulsions
8. _____ Pustules and scabs on the skin and mucous membranes of the lips and nostrils
9. _____ Blackish, blood-tinged diarrhea
10. _____ Abdominal pain, urine dribbling, humped appearance

a. Scrapie
b. Soremouth
c. Vibriosis
d. Coccidiosis
e. White muscle disease
f. Enterotoxemia
g. Pneumonia
h. Urinary calculi
i. Foot rot
j. Polio

Circle the letter that corresponds to the best answer.

11. Which of the following is not a vital sign commonly used in diagnosing illnesses in sheep?

    a. Rectal temperature
    b. Pupil dilation
    c. Respiratory rate
    d. Heart rate

12. Which of the following diseases causes abnormalities in milk?

    a. Toxoplasmosis
    b. Copper toxicity
    c. Acidosis
    d. Mastitis

13. Founder is another name for:

    a. Acidosis.
    b. Enterotoxemia.
    c. Pregnancy toxemia.
    d. Ketosis.

14. What is the cause of white muscle disease?

    a. Intestinal microorganism
    b. Selenium/vitamin E deficiency
    c. Poisonous plants
    d. Dietary changes

15. Which of the following is characterized by yellowish-green diarrhea?

    a. Enterotoxemia
    b. Pneumonia
    c. Scours
    d. Coccidiosis

16. Which disease may lead to a loss of the sheep's hooves, ears, or tail?

    a. Foot rot
    b. Fescue toxicosis
    c. Copper toxicity
    d. White muscle disease

17. Which of the following disease can affect humans, causing sores like blisters on the skin?

    a. Foot rot
    b. Scrapie
    c. Urinary calculi
    d. Soremouth

Complete the following short answer questions.

18. Why would a producer observe sheep that are under stress more often for signs of illness?

19. When is a good time for observation of the flock?

20. What are two general signs of illness that may be observed in sheep?

    a.

    b.

Lesson 5: Health Problems in Sheep Name_____

Understanding Sheep Health Problems

Objective: Describe the causes, symptoms, and treatment or prevention of sheep diseases.

Fill in the table below, providing descriptions of the causes, signs of illness, and measures that can be taken to treat or prevent each of the health problems listed.

Health Problem	Cause	Signs	Prevention/Treatment
Soremouth			
Enterotoxemia			
Scours			

Health Problem	Cause	Signs	Prevention/Treatment
Scrapie			
White muscle disease			
Acidosis			
Pneumonia			

Health Problem	Cause	Signs	Prevention/Treatment
Mastitis			
Pregnancy toxemia			
Polio			
Foot rot			

Health Problem	Cause	Signs	Prevention/Treatment
Chlamydiosis			
Vibriosis			

UNIT VI - ANIMAL HEALTH

Lesson 6: Flock Health for Sheep

Competency/Objective: Develop a flock health plan for sheep.

Study Questions

1. **What local, state, and federal regulations should be followed when buying or selling sheep?**

2. **Which management practices should be followed when introducing new animals into the flock?**

3. **What are the routine vaccination practices for flock health management?**

4. **How are internal and external parasites controlled?**

5. **What records need to be kept?**

References

1. *Advanced Livestock Production and Management (Student Reference).* University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit VI.

2. Transparency Master

   a) TM 6.1: Sample Flock Health Calendar

3. Activity Sheet

   a) AS 6.1: Administering Oral Medication

UNIT VI - ANIMAL HEALTH

Lesson 6: Flock Health for Sheep

TEACHING PROCEDURES

A. ***Review***

In Lesson 5, methods of observation and signs of illness were discussed, along with some of the health problems associated with sheep production. This lesson will examine what is involved in developing a health plan to prevent these problems, including vaccination schedules and treatments for parasites. Following regulations for transporting animals that have been bought and sold and isolating newly purchased animals are also important aspects of maintaining flock health.

B. ***Motivation***

Ask students to name the products of sheep enterprises. Discuss how poor flock health affects the products.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Discuss the importance of always following the rules and regulations set forth by the U.S. Department of Agriculture, the Missouri Department of Agriculture, and local authorities when buying or selling sheep.

   NOTE: Checking with local authorities may be necessary to learn whether any local regulations affect your area.

   What local, state, and federal regulations should be followed when buying or selling sheep?

   a) Sheep being moved into Missouri
      1) Must be inspected by a licensed, approved veterinarian
         (a) Issued a Certificate of Veterinary Inspection
         (b) Do not have to be inspected if they are going directly to a slaughter facility
      2) Must also be accompanied by an entry permit issued by the state
      3) Must be dipped or treated within ten days of entry if the sheep come from scabies-infected areas
   b) Transportation within the state of Missouri
      1) Does not require an inspection
      2) Must be certified as being free of any infectious diseases by a local veterinarian

2. Ask students how producers can make sure that new animals do not pass on diseases to the rest of the flock.

   Which management practices should be followed when introducing new animals into the flock?

   a) Producers should do research to make sure that animals are healthy.
      1) One way is for the producer's veterinarian to contact the veterinarian associated with the farm from which the livestock will be purchased.

2) Producers should purchase animals from flocks with a health status that is equal to or better than their own.

b) Isolation of new animals is important even if their health status is known.
   1) Avoiding contact with infected animals is the best way to prevent diseases.
   2) Sheep must be quarantined for three to four weeks.
   3) The producer should achieve certain goals.
      (a) Diagnosis and control of any diseases or parasitic infections in the animals
      (b) Adjustment of the animals to new surroundings
      (c) Development of immunity to pathogens already present in the flock

c) After any contact with isolated animals, the producer should shower and change clothes before returning to the main flock.

3. Emphasize that prevention of disease depends in part on an effective vaccination schedule. Discuss when different types of vaccinations should be given. Show students the sample health calendar on TM 6.1. Assist students in determining dates that the various steps should be implemented. Hand out AS 6.1.

What are the routine vaccination practices for flock health management?

a) Should check with a veterinarian prior to beginning a vaccination schedule
b) Should tailor the vaccination schedule to the health problems that may affect the producer's flock
   1) Ewes
      (a) Vaccinated for reproductive diseases like leptospirosis, vibriosis, and chlamydiosis six to eight weeks before breeding
      (b) Given a booster shot for vibriosis 60 to 90 days after breeding
      (c) Vaccinated for enterotoxemia two to four weeks prior to lambing
   2) Lambs - vaccinated for enterotoxemia at about four to six weeks of age
c) Proper administration of vaccinations
   1) Most administered in the neck or under the inside of the front leg, in the foreflank area
   2) Generally not given on the outside of the front or rear leg
      (a) Bruising and staining - damage the meat and reduce the value of the animal at slaughter
      (b) Exception - vaccination for enterotoxemia, which should be given in the flank of the rear leg

4. Ask students to list some different types of external and internal parasites that affect sheep. Point out the devastating effect that parasites can have on a flock if left uncontrolled.

How are internal and external parasites controlled?

a) Internal parasites
   1) Examples
      (a) Tapeworms
      (b) Roundworms
      (c) Lungworms
   2) Management practices
      (a) Proper sanitation
      (b) Creating unfavorable conditions for parasite growth by keeping areas containing sheep dry
      (c) Making sure animals do not ingest parasites or their eggs
         (1) Sheep - no grazing on contaminated pastures
         (2) Lambs - placed in clean, rested pastures after weaning
   3) Anthelmintics
      (a) Frequency - depends on the pasture and environmental conditions of the operation

(b) Most given to sheep orally by drenching
(1) Should be done carefully to avoid harming the sheep
(2) Should adequately restrain sheep for drenching
(3) Sheep's head held in a straight line with its body
(4) Muzzle tilted slightly upward but not high enough to induce choking.
(5) Drench gun placed carefully in the side of the mouth
(6) No resistance when the nozzle is in the correct location
(7) May cause pharynx or larynx damage through rough use of the drench gun, resulting in serious infection or difficulties in swallowing
(8) Should allow the sheep to calm down before the liquid is squirted into its mouth if it struggles
(9) May choke and breathe in the liquid if it is not calm, which could result in a fatal case of aspiration pneumonia
(10) Administered in the back of the sheep's mouth to prevent it from spitting the drug out
(11) Sheep's mouth kept closed until it swallows
(12) Marked after treatment

b) External parasites
1) Examples
(a) Sheep ticks
(b) Wool maggots from blow flies
(c) Lice
(d) Head bots
(e) Keds
(f) Mites that cause scabies
2) Controlled by the use of insecticides
(a) Sprays
(b) Dips
(c) Pour-ons
(d) Dusts

5. Discuss the health records needed for a sheep operation.

What records need to be kept?

a) Worming dates
b) Vaccination records
c) History of illnesses the animal has experienced

F. ***Other Activities***

1. Show the video "Sheep Management Practices-II" (44 min.) or "Selection and Care of Market Lambs" (44 min.) from Creative Educational Video (CEV). Both of the videos discuss different management practices, including health care.

2. Have a local sheep producer visit with the class about his flock health program.

G. ***Conclusion***

Producing sheep requires good management, including a flock health program. The health program should detail the management practices necessary to prevent and control diseases. Keeping accurate records will also help in monitoring the health status of the flock.

H. ***Answers to Activity Sheet***

Answers may vary. Suggested answers are as follows.

1. Drenching may be accomplished by using one of two basic types of guns. One would be a single-dose syringe and the other a multi-dose gun attached to a bag. Both pieces of equipment have an extended tube 4 to 5 inches in length that enters the sheep's mouth.

2. Do not feed the sheep for six hours before and after drenching to improve its effectiveness. Make sure the drench dose is mixed properly according to body weight of the animal. Make sure the animal is adequately but gently restrained. It is important the first drench of a young animal not be an unpleasant experience. After drenching, keep the animals in a clean, confined area for about 48 hours for observation.

3. The head of the animal should be in a straight line with its body. The muzzle should be tilted slightly upward but not high enough to induce choking. Place the drench gun in the side of the mouth, with the end of the gun nozzle in the center of the back of the mouth. There should be no resistance when placing the nozzle in the correct position. If struggling occurs, allow the animal to calm down before injecting the liquid into its mouth. Keep the animal's mouth closed until the drug is swallowed.

4. Advantages:

    - No puncture wound in meat as caused by an injection
    - May be used for more than parasite control. Also used to administer hormones that initiate estrus and to treat conditions such as copper toxicity
    - With proper handling equipment, easy for one person to treat animals

    Disadvantages:

    - Chance of wasting medication if the producer is not experienced in mouth placement
    - Wool staining from leaky drench equipment or careless use

I. ***Answers to Evaluation***

1. d
2. c
3. c
4. b

5. Sheep should not be grazed on contaminated pastures. Lambs should be placed in clean, rested pastures after weaning.

6. By avoiding contact with infected animals
7. The neck and under the inside of the front leg

8. Answers may include any two of the following: worming dates, vaccination records, and a history of the illnesses the animal has experienced.

9. Sheep must be dipped or treated within ten days of entry.

10. It may choke and breathe in the liquid if it is not calm, which could result in a fatal case of aspiration pneumonia.

UNIT VI - ANIMAL HEALTH Name _____

Lesson 6: Flock Health for Sheep Date _____

EVALUATION

Circle the letter that corresponds to the best answer.

1. The requirement for transporting sheep into the state of Missouri from another state is to obtain a:

   a. Scabies treatment.
   b. Brucellosis test.
   c. Vaccination for enterotoxemia.
   d. Certificate of Veterinary Inspection.

2. Anthelmintics are most often administered using:

   a. Injections.
   b. Boluses.
   c. Drenching.
   d. Sprays.

3. How long should sheep being brought into the flock be isolated from the rest of the animals?

   a. One to two weeks
   b. Two to three weeks
   c. Three to four weeks
   d. Four to five weeks

4. Lambs should be vaccinated for:

   a. Leptospirosis.
   b. Enterotoxemia.
   c. Vibriosis.
   d. Chlamydiosis.

Complete the following short answer questions.

5. What are two management practices that can be used to make sure sheep do not ingest parasites?

   a.

   b.

6. What is the best method of preventing diseases from entering the flock?

7. What are two locations where vaccines are generally administered?

   a.

   b.

8. What are two items of information that may be included in health records?

   a.

   b.

9. What measures are outlined in the state regulations for sheep from scabies-infected areas?

10. Why should a sheep be calm before drenching?

Sample Flock Health Calendar

Rams - Six to Eight Weeks Before Breeding

- Test for the Brucella ovis when selecting or purchasing new rams.
- Isolate for at least 30 days and observe daily for health problems.
- Conduct a breeding soundness evaluation.
- Deworm all rams and treat for external parasites; worm again in 17 to 21 days.
- Give vaccinations as required. Seek advice from a local veterinarian.
- Provide adequate energy, protein, salt, minerals, and water so rams are in top physical condition.

Ewes - Six to Eight Weeks Before Breeding

- Conduct a thorough physical examination for general health. Give special attention to teeth, feet, and udder.
- Plan a flushing program two to three weeks prior to breeding.
- Deworm prior to breeding; worm again in 17 to 21 days.
- Vaccinate ewes for previously unvaccinated diseases, especially reproductive diseases.

During Gestation

- Vaccinate any bred replacement ewes.
- Increase energy and protein in the ration.
- Use ultrasound for pregnancy testing.
- Vaccinate for vibriosis 100 days after breeding.
- Deworm two weeks prior to lambing.
- Start a coccidia program two weeks prior to lambing.

Lambing Period

- Clip and treat navel with iodine.
- Observe ewes and lambs for mastitis, scours, and pneumonia. Treat as needed.
- Dock and castrate lambs.

During Growth and Weaning

- Vaccinate lambs with clostridium agents.
- Maintain a nutritional program for ewes and lambs to promote health.
- Monitor ewes for mastitis.
- Sort and cull ewes with poor teeth and excessive thinness.
- Conduct internal and external parasite control on all sheep (ewes, lambs, rams).

Lesson 6: Flock Health for Sheep Name_____

Administering Oral Medication

Objective: Describe how to administer oral medications to sheep.

One of the common ways medication is given to sheep is by drenching. The lesson discussed the use of this method. Provide a more detailed description of drenching by answering the following questions.

1. What are the different types of equipment that may be used? Describe them.

2. How is this process done?

3. How should the sheep's head be positioned to accomplish this process?

4. What are the advantages and disadvantages of drenching?

UNIT VI - ANIMAL HEALTH

Lesson 7: Health Problems In Horses

Competency/Objective: Identify problems associated with horse health.

Study Questions

1. **What are everyday practices for maintaining herd health?**

2. **What are indications of health problems in horses?**

3. **What health problems may be encountered by horse producers?**

References

1. *Advanced Livestock Production and Management (Student Reference).* University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit VI.

2. Activity Sheet

   a) AS 7.1: Diseases of Horses

UNIT VI - ANIMAL HEALTH

Lesson 7: Health Problems in Horses

TEACHING PROCEDURES

A. ***Review***

Lesson 6 described the development of a flock health plan for sheep. Maintaining animal health is extremely important for horse producers because an owner may only own a relatively small number of horses with a high individual value. Producers must therefore limit losses as much as possible. This lesson will discuss how horse owners can detect health problems and recognize common diseases.

B. ***Motivation***

Using the descriptions of diseases provided in this lesson, give students some scenarios of horses displaying various symptoms. Ask them to try to identify the disease. Discuss the importance of recognizing common health problems in order to maintain horse health.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Discuss the importance of observing each animal on a daily basis in order to prevent or identify health problems.

   What are everyday practices for maintaining herd health?

   a) Producers should be familiar with the habits of each of their horses to help identify abnormal behavior.
   b) Usually horses are observed daily during feeding.
   c) Another good time for observation is during regular grooming or exercise.
   d) If a horse is missing from the herd, the producer should look for the animal.
   e) Producers may also want to check equipment and facilities daily.
      1) Damage to equipment or facilities could potentially cause injuries.
      2) Repairs need to be made promptly.

2. Emphasize the fact that observation is effective only if signs of poor health are recognized. Discuss the signs of health problems in horses.

   What are indications of health problems in horses?

   a) Signs of illness
      1) Reduced feed consumption or grazing
      2) Abnormal feces or urine
      3) Lack of movement and spirit
      4) Unusual demeanor (aggressive instead of calm)
      5) Floppy ears
      6) Rough or dull coat showing signs of balding or rubbing
      7) Dry, hazy eyes

b) Abnormal vital signs
   1) Normal temperature - 100.5° Fahrenheit
   2) Normal respiration rate - 8 to 16 breaths/min.
   3) Normal heart rate - 34 to 45 beats/min.

3. Describe health problems that may affect horses. Emphasize that most of these conditions should be treated in consultation with a local veterinarian. Hand out AS 7.1 to the students.

What health problems may be encountered by horse producers?

a) Azoturia
   1) Also called Monday morning disease
   2) Nutritional disorder
   3) Develops when horse is put to work after a period of idleness during which it received the same level of feeding as when working
   4) Symptoms
      (a) Becomes stiff
      (b) Sweats
      (c) Dark-colored urine
      (d) Muscles swollen, tense, and paralyzed
   5) Prevention
      (a) Decreased amount of grain fed when idle
      (b) Exercised while idle
      (c) Started back to work slowly
   6) Treatment
      (a) Stopped from working
      (b) Rested in a standing position
      (c) Not allowed to move
      (d) Kept warm and dry with blankets
      (e) Medicine, if necessary

b) Colic
   1) Disease complex encompassing conditions that affect a horse's digestive tract
   2) Results from some obstruction from gas, fluid, or feed that blocks the flow of feed through the intestine
   3) Causes
      (a) Presence of internal parasites
      (b) Nutritional factors
         (1) Ration too high in energy
         (2) Sudden changes in feed
         (3) High-fiber ration
         (4) Poor quality ration
         (5) Drinking large amounts of cold water before being cooled down after heavy exercise
   4) Symptoms
      (a) Abdominal pain
         (1) Looking at its flank
         (2) Getting up and down
         (3) Kicking at its belly
         (4) Sweating
         (5) Shifting weight
      (b) May lie down and roll
         (1) Should be prevented by haltering the horse
         (2) May cause a twisted gut and result in death
      (c) Increased pulse and respiration rate

(d) Congested mucous membranes
(e) Straining
(f) Sweating
(g) Bloating

5) Prevention - good management program
6) Treatment
(a) Walking the horse until the veterinarian arrives
(b) Surgery in some cases

c) Distemper
1) Also called strangles
2) Caused by bacteria
3) Spreads quickly from horse to horse
(a) Contaminated feed
(b) Contaminated troughs and tack
(c) Direct nose to nose contact
4) Symptoms
(a) High fever
(b) Loss of appetite
(c) Depression
(d) Pus-like discharge from nose
(e) Swollen lymph nodes in lower jaw and throat; may break open and discharge pus
5) Prevention - vaccination
6) Treatment
(a) Abscesses surgically drained by veterinarian
(b) Antibiotics after the abscess breaks or is lanced

d) Encephalomyelitis
1) Also called sleeping sickness
2) Caused by viruses carried by mosquitoes
3) Affects brain
4) Symptoms
(a) High fever
(b) Depression
(c) Lack of coordination
(d) Lack of appetite
(e) Drowsiness
(f) Drooping ears
(g) Circling
5) May recover or die; death rates from 20 to 90 percent
6) Prevention
(a) Vaccinations; should consult a veterinarian to determine which strains of the virus should be vaccinated for
(b) Controlling mosquitoes
7) Treatment - none other than good supportive care

e) Equine infectious anemia (EIA)
1) Also referred to as swamp fever
2) Serious blood disease
3) Caused by a virus carried by horse flies and mosquitoes
4) Symptoms
(a) High intermittent fever
(b) Depression
(c) Stiffness
(d) Weakness
(e) Loss of condition and weight

(f) Swelling
5) No vaccine available
6) Coggins test - blood test to detect swamp fever
7) Infected animals quarantined and slaughtered, unless it is a nursing foal that may be affect by antibodies from a mare that tests positive; may test negative once it is weaned and over six months of age

f) Equine influenza
1) Caused by viruses
2) Spreads quickly where large numbers of animals are together
3) Symptoms
(a) High temperature
(b) Lack of appetite
(c) Coughing
(d) Watery nasal discharge
4) Younger horses - more likely to become infected
5) Prevention
(a) Isolate infected animals
(b) Vaccinate to create immunity
6) Treatment
(a) Antibiotics to prevent secondary infections
(b) Rest for three to four weeks

g) Fescue toxicosis
1) Also called fescue foot
2) Caused by fungus that grows in tall fescue
3) Produces toxins that inhibit prolactin, a hormone essential in the last months of gestation
4) Symptoms
(a) Lameness
(b) Sloughing off the end of the tail
(c) Poor weight gain
(d) Increase in pulse rate, respiration, and body temperature
(e) Thickened placenta
(f) Foals stillborn or die at birth
(g) No milk production
5) Prevention
(a) Removed from fescue pasture when symptoms occur
(b) Pregnant mares
(1) Should not feed fescue hay or use it for bedding
(2) Removed from fescue pasture at least three months before foaling
(3) Fungus-resistant varieties of fescue available
6) Treatment - none

h) Laminitis
1) Also called founder
2) Nutritional disorder
3) Causes
(a) Overeating of concentrates or grass heads
(b) Sudden changes in feed
(c) Drinking too much water
(d) Standing in a stall for long periods
4) Symptoms
(a) Swelling of the laminae on one or more feet; leads to lameness
(b) Fever
(c) Sweating
(d) Distortion of the hoof during growth

5) Prevention
   (a) Care in feeding
   (b) Exercise
6) Treatment
   (a) Acute form
      (1) Cold water applied to the hooves
      (2) Medication
   (b) Chronic cases
      (1) Trimming the hoof
      (2) Shoeing the horse

i) Heaves
1) Also referred to as broken wind or asthma
2) Nutritional disorder
3) Affects the respiratory system
4) Caused by feeding moldy or dusty hay
5) More common in horses over five years of age
6) Symptoms
   (a) Difficulty in breathing
   (b) Dry cough
   (c) Nasal discharge
   (d) Loss of weight
7) Prevention - care in selecting feed
8) Treatment
   (a) Changing to a pelleted ration
   (b) Putting the horse on pasture
   (c) None for advanced cases

j) Tetanus
1) Also called lockjaw
2) Caused by bacteria
   (a) Enters the animal's body through wounds
   (b) Produces toxins
3) Symptoms
   (a) Nervousness
   (b) Stiffness
   (c) Muscle spasms
   (d) Paralysis
4) Death in untreated cases
5) About 30 percent recover with treatment
6) Prevention
   (a) Annual vaccination
   (b) Administering the tetanus antitoxin immediately after a known injury
7) Treatment
   (a) Muscle relaxants
   (b) Antitoxins

k) Blister beetle poisoning
1) Beetles
   (a) Produce a blistering agent in their blood
   (b) Affects animals that consume the dried remains of the beetle fed in hay
2) Causes irritation and damage to the lining of the stomach, small intestine, bladder, and urethra
3) Symptoms
   (a) Placing the muzzle in water and playing with the water with the lips and tongue
   (b) Signs of colic

(c) Fever
(d) Sweating
(e) Stiffness or an exaggerated "goose-step" gait
(f) Frequent straining and voiding of urine containing blood
(g) Drop in the levels of calcium and magnesium in the blood

4) Prevention - making sure that hay does not contain blister beetles
   (a) Spraying alfalfa before it is harvested
   (b) Buying hay only from trusted suppliers
   (c) Buying hay that was harvested before June or after September
   (d) Inspecting hay before feeding it

5) Treatment
   (a) Mineral oil
   (b) Fluids supplied intravenously by a veterinarian to prevent dehydration and increase the levels of calcium and magnesium in the blood

F. ***Other Activities***

Have a local veterinarian discuss the common problems affecting horses in the local area and what to do if signs of poor health are detected.

G. ***Conclusion***

With a good health management program, horses will be productive and perform to the satisfaction of the producer. An important part of health management is observing the horses regularly, looking for signs of poor health. A knowledge of the symptoms of diseases affecting horses is also useful for making a rough diagnosis of health problems. A veterinarian should always be consulted for an accurate diagnosis and to provide treatment.

H. ***Answers to Activity Sheet***

	1H	E	A	V	E	2S												
						W					3F							
						A				4D	E							
						M		5I		I	S							
		6S	7L	E	E	P	I	N	G	S	I	C	K	N	E	S	S	
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								A								D		
																E		
																R		

I. ***Answers to Evaluation***

1. d
2. h
3. g
4. b
5. i
6. f
7. c
8. e
9. a
10. a
11. b
12. c
13. b
14. b

15. Answers may include any three of the following: reduced feed consumption or grazing, abnormal feces or urine, lack of movement and spirit, an unusual demeanor, floppy ears, a rough or dull coat showing signs of balding or rubbing, and dry, hazy eyes.

16. During feeding and during regular grooming or exercise

UNIT VI - ANIMAL HEALTH

Name_____

Lesson 7: Health Problems In Horses

Date_____

EVALUATION

Match the name of the health problem with the description of symptoms on the left.

1. _____ Stiff with swollen, tense, and paralyzed muscles and dark-colored urine
2. _____ Difficulty breathing, dry cough, and nasal discharge
3. _____ Nervousness, stiffness, muscle spasms, and paralysis
4. _____ Pus-like discharge from nose and swollen lymph nodes that may break open and discharge pus
5. _____ Lack of coordination, drowsiness, and drooping ears
6. _____ Stiffness, signs of colic, and frequent straining or voiding of urine containing blood
7. _____ Lameness and sloughing off of the end of the tail
8. _____ Distortion of the hoof during growth
9. _____ High intermittent fever, stiffness, weakness, swelling, and loss of condition and weight

a. Swamp fever
b. Strangles
c. Fescue foot
d. Monday morning disease
e. Laminitis
f. Blister beetles
g. Tetanus
h. Heaves
i. Sleeping sickness

Circle the letter that corresponds to the best answer.

10. Which of the following is the average rectal temperature for a horse?

    a. 100.5° Fahrenheit
    b. 102.2° Fahrenheit
    c. 95° Fahrenheit
    d. 98.5° Fahrenheit

11. Which of the diseases is more likely to occur in horses over five years of age?

    a. Tetanus
    b. Heaves
    c. Colic
    d. Distemper

12. Which disease listed below is detected by conducting a Coggins test?

    a. Influenza
    b. Sleeping sickness
    c. Swamp fever
    d. Fescue toxicosis

13. Which disease affects the brain of the horse and may cause death losses of up to 90 percent?

    a. Equine influenza
    b. Encephalomyelitis
    c. Colic
    d. Tetanus

14. Which symptom listed below is characteristic of colic?

    a. Stiffness
    b. Abdominal pain
    c. Swollen lymph nodes
    d. Lack of coordination

Complete the following short answer questions.

15. What are three general signs of poor health in horses?

    a.

    b.

    c.

16. What are two opportunities for regular observation of the health of horses?

    a.

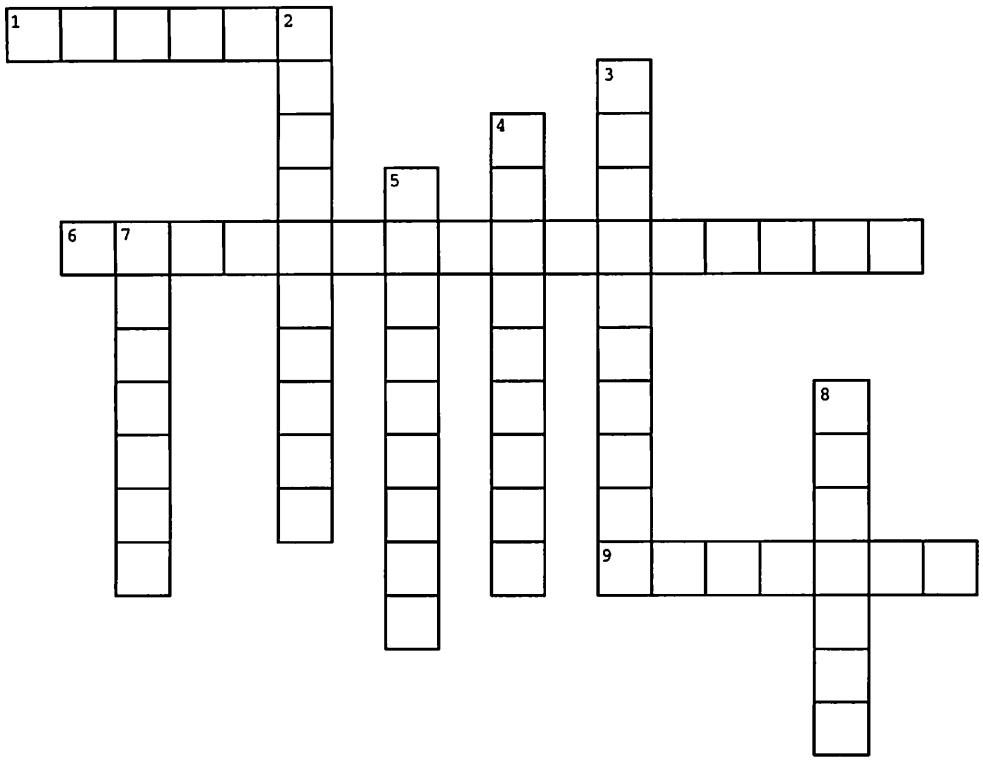
    b.

Lesson 7: Health Problems in Horses Name_____

Diseases of Horses

Objective: Identify diseases associated with horses.

Fill in the blanks in the crossword puzzle using the clues given.



Across:

1. Problem with the respiratory system caused by feeding
6. Illness caused by a virus carried by mosquitoes; causes a lack of coordination and drowsiness
9. Caused by bacteria that enter the body through wounds

Down:

2. Serious blood disease causing stiffness, fever, and weakness
3. Caused by a fungus from fescue pasture
4. Spread through contaminated feed; causes a pus-like discharge from nose
5. Symptoms include high temperature, coughing, and nasal discharge
7. Another name for tetanus
8. Nutritional disorder causing swelling of the feet and lameness

UNIT VI - ANIMAL HEALTH

Lesson 8: Herd Health for Horses

Competency/Objective: Develop a health plan for horses.

Study Questions

1. **What local, state, and federal regulations should be followed when buying or selling horses?**

2. **What management practices should be followed when introducing new horses into the herd?**

3. **What are the routine vaccination practices for horse health management?**

4. **How are internal and external parasites controlled?**

5. **What are routine horse care practices that are important for animal health?**

6. **What records should be kept?**

References

1. *Advanced Livestock Production and Management (Student Reference).* University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit VI.

2. Activity Sheets

   a) AS 8.1: Researching Vaccines
   b) AS 8.2: Internal and External Parasites of Horses

UNIT VI - ANIMAL HEALTH

Lesson 8: Herd Health for Horses

TEACHING PROCEDURES

A. ***Review***

Lesson 7 discussed signs, symptoms, and treatments of diseases that may occur in horses. This lesson will examine methods of maintaining herd health for horses, including following regulations for transporting animals that have been bought or sold, isolating new animals from the rest of the herd, instituting good vaccination practices, and controlling parasites.

B. ***Motivation***

Display some of the items used to maintain herd health: syringes for vaccinations, sprays for eliminating external parasites, different anthelmintics, etc. Ask students why each of these items are important for horse health.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Ask students why it is important to follow the regulations for transportation when buying or selling horses. Discuss these regulations.

   NOTE: Checking with local authorities may be necessary to learn whether any regulations affect the area.

   What local, state, and federal regulations should be followed when buying or selling horses?

   a) Horses being transported into the state
      1) Inspected by a licensed, accredited veterinarian who issues a Certificate of Veterinary Inspection
      2) Have an official negative Coggins test for equine infectious anemia (EIA)
         (a) Done within the 12 months prior to entry into the state
         (b) Not required for suckling foals accompanied by their mothers.
      3) Accompanied by a VS Form 10-11, which provides a graphic description of all markings
      4) Horses entering Missouri from a farm of origin to a licensed livestock market
         (a) Accompanied by a waybill or owner/shipper statement showing their origin and destination
         (b) Do not have to have a Coggins test
            (1) Blood samples collected for testing at the market before the sale at the owner's expense
            (2) May be sold without the results of the test known but must be kept in quarantine until test results are received

   b) Horses within the state of Missouri
      1) Have an official certificate indicating a negative EIA test within the 12 months prior to the change of ownership
      2) Completed VS Form 10-11 required for identification
      3) May be moved from a farm of origin to a licensed market without a Coggins test; same procedures followed for testing and quarantine

c) Horses kept at boarding, breeding, or training stables
    1) Tested negative for EIA within the last 12 months
    2) Owner or manager responsible for maintaining proof of current negative tests

2. Discuss the importance of isolating horses after they are received. Why is it important to know the health status of horses being introduced into the herd?

What management practices should be followed when introducing new animals into the herd?

a) Producers should examine horses for abnormalities and indications of possible health problems prior to purchase.
b) A producer may request to see an animal's health records.
c) The producer may also have his or her veterinarian contact the current owner's veterinarian to discuss the horse or the health status of the horses on the farm of origin.
d) Producers should isolate new horses brought into the herd.
    1) Quarantined for at least three to four weeks
    2) May choose to isolate them for a longer period
    3) Enables the producer to deal with any health problems they might have
    4) Allows animals to adjust to their new environment
    5) Should be sure not to carry any disease-causing agents from the isolated animals to the main herd; may want to shower and change clothes

3. Emphasize that disease prevention depends on an effective vaccination schedule. Discuss the need to tailor the vaccination schedule to the horse enterprise based on the advice of a veterinarian. Have students complete AS 8.1.

What are the routine vaccination practices for horse health management?

a) Veterinarian consulted prior to beginning a vaccination schedule
    1) No standard vaccination plan
    2) Tailored to meet the needs of the individual operation
        (a) Local health risks
        (b) Size of the herd
        (c) Age
        (d) Uses
        (e) Value
        (f) Amount of exposure to horses from outside the herd
b) Vaccination for tetanus for all horses
    1) Foals
        (a) Vaccinated at three to four months of age
        (b) Given two doses about four weeks apart
    2) All horses
        (a) Given a booster shot every year because horses may wound themselves easily
        (b) Given another booster shot if a horse receives a wound and has not had a booster in the previous six months
    3) Mares - vaccinated prior to foaling to pass on immunity to the foal
c) Other diseases
    1) Encephalomyelitis
        (a) Foals
            (1) Vaccinated at some point between three and six months of age
            (2) Given two doses three to four weeks apart
        (b) All horses - given a booster shot before the beginning of mosquito season
    2) Influenza
        (a) Foals
            (1) Vaccinated for influenza beginning at three months

(2) Vaccinations repeated at six months
(b) Horses under six years of age at risk because of exposure to outside horses or because of stress - vaccinated three or four times a year
(c) Older horses or horses that are not often exposed to outside animals - vaccinated once or twice a year

3) Herpes viruses
(a) Foals
(1) Vaccinated at three months
(2) Given two doses four to six weeks apart
(b) Young horses and horses undergoing training - vaccinated every three to four months
(c) Other horses - given a booster once a year
(d) Broodmares - vaccinated in the fifth, seventh, and ninth month of pregnancy to prevent abortions

d) Must be given properly to provide immunity
1) Always check the label of the vaccine for directions on administration
2) Must be stored properly to be effective
3) Should check the date on the vaccine to make sure it is still usable

4. Ask students to list some different types of external and internal parasites that might be found in a horse herd. Point out the devastating effect that parasites can have on livestock if left uncontrolled. Describe methods for controlling parasites. Then hand out AS 8.2.

How are internal and external parasites controlled?

a) Internal parasites
1) Examples
(a) Pinworms
(b) Roundworms
(c) Bot worms
(d) Bloodworms
2) Management practices for control
(a) Proper handling of manure
(1) Should never be spread on horse pastures
(2) Should be cleaned up every couple of days in confined areas
(b) Overstocking pastures avoided
(c) Using rotational grazing practices to break the life cycle of the worms
(d) Alternating horses with other livestock on pastures
(e) Making sure water supplies are clean
(f) Feeding the horses in bunks to keep them from ingesting parasites
3) Anthelmintics - have horses wormed four times a year, although it may be done more frequently

b) External parasites
1) Examples
(a) Flies
(b) Mosquitoes
(c) Horse bots
(d) Mites that cause mange
2) Usually controlled by the use of insecticides
(a) Sprays
(b) Foggers
3) Management practices for control
(a) Good grooming to prevent infestation by horse bots and mites
(b) Good sanitation to reduce fly populations

5. Ask students to name some other routine practices that producers use to promote herd health. Discuss hoof and teeth care.

What are routine horse care practices that are important for animal health?

a) Most producers employ a farrier to shoe their horses, which is done every six to eight weeks.
b) Producers should know how to clean hooves and examine them for problems.
    1) Horses kept in a stall or small pen - hooves inspected and cleaned daily
    2) Hoof pick - used to clean the hoof
    3) Stalls that are too moist
        (a) Promote rapid drying of the hoof and erode natural oils and protective films
        (b) Should apply a hoof dressing containing animal fats like lanolin regularly
    4) Regular examinations - reveal problems like loose nails or the early stages of laminitis
    5) Hooves checked for gravel and other foreign objects each time a horse is ridden
c) Hooves should also be trimmed periodically.
    1) Horses kept in stalls or small pens - hooves trimmed every four weeks
    2) Horses that are used frequently or kept in pastures - trimmed every six weeks
    3) Done to keep hooves the proper length and shape
    4) Producers - able to trim the hooves of their horses themselves once they learn the proper procedures
    5) Trimming done by a farrier if a horse has problems with its hooves
d) Horses that are one year of age or older should have their teeth examined by a veterinarian at least once a year.
    1) Signs that an examination is necessary
        (a) Difficulty in chewing
        (b) Reluctance to drink cold water
        (c) Dropping food out of the mouth
        (d) Excessive amounts of unchewed grain in manure
        (e) Weight loss
        (f) Reluctance to accept a bit
    2) Floating - filing teeth down to remove any sharp edges or high spots that can interfere with chewing

6. Ask students why a producer would want to keep health records. Discuss the information that should be recorded.

What records should be kept?

a) Worming dates
b) Vaccination record
    1) Type of vaccine given
    2) Date of administration
c) History of illnesses the animal has experienced

F. ***Other Activities***

1. Have students research the products available for vaccinating horses or controlling parasites. Ask them to obtain information on costs as well as brand names and descriptions of the products.

2. Consult a local veterinarian about the diseases vaccinated for and the timing of vaccinations for horses in his or her practice. Discuss this information with the class to show how vaccination schedules may be tailored for a particular area or horse enterprise.

G. ***Conclusion***

Raising horses can be very rewarding and profitable if sound health management practices are used. Implementing an effective herd health program that details practices for vaccinations and parasite

control is necessary to prevent health problems. Keeping accurate health records will also help in monitoring the health status of the herd.

H. ***Answers to Activity Sheet***

AS 8.1

Answers will vary.

AS 8.2

Reports will vary.

I. ***Answers to Evaluation***

1. d
2. c
3. b
4. a
5. d
6. d
7. a

8. Answers may include any three of the following: proper handling of manure, avoiding overstocking pastures, using rotational grazing practices to break the life cycle of the worms, alternating horses with other livestock on pastures, making sure water supplies are clean, and feeding the horses in bunks to keep them from ingesting parasites.

9. Insecticides such as sprays and foggers

10. The type of vaccine given and the date of administration

11. Answers may include any two of the following: local health risks, the size of the herd, age, uses, value, and amount of exposure to horses from outside the herd.

12. Filing teeth down to remove any sharp edges or high spots that can interfere with chewing

UNIT VI - ANIMAL HEALTH Name _____

Lesson 8: Herd Health for Horses Date _____

EVALUATION

Circle the letter that corresponds with the best answer.

1. A VS Form 10-11 shows:

   a. Inspection by a veterinarian.
   b. A negative equine infectious anemia test.
   c. Transportation across state lines into Missouri.
   d. A graphic description of all markings.

2. How long should animals be quarantined before adding them to the herd?

   a. 1 to 2 weeks
   b. 2 to 3 weeks
   c. 3 to 4 weeks
   d. 4 to 5 weeks

3. Horses should receive a booster vaccination for _____ every year because they may wound themselves easily.

   a. Herpes viruses
   b. Tetanus
   c. Influenza
   d. Encephalomyelitis

4. Horses moving from a farm of origin outside of Missouri to a licensed livestock market must be accompanied by a:

   a. Waybill or owner/shipper statement.
   b. Certificate of Veterinary Inspection.
   c. VS Form 10-11.
   d. Negative EIA test.

5. How often do producers generally worm horses?

   a. Once a year
   b. Twice a year
   c. Three times a year
   d. Four times a year

6. All horses should be given a booster shot for encephalomyelitis:

   a. Three or four times a year.
   b. Before foaling season.
   c. Every summer and winter.
   d. Before the mosquito season.

7. How often should a producer trim the hooves of a horse kept in a stall?

   a. Every 4 weeks
   b. Every 8 weeks
   c. Every 12 weeks
   d. Every 16 weeks

Complete the following short answer questions.

8. What are three management practices that can be used to control internal parasites?

   a.

   b.

   c.

9. What products are generally used to control external parasites?

10. What two items of information should be included in a vaccination record?

    a.

    b.

11. What are two factors that may affect the type of vaccination schedule used for a particular horse enterprise?

    a.

    b.

12. What does floating teeth involve?

Lesson 8: Herd Health for Horses Name_____

Researching Vaccines

Objective: Research information about vaccines, dosages, price per dose, and any special precautions needed.

Using a veterinary supply catalog that describes vaccines for horses, complete the chart.

Disease	Brand Name	Dosage	Price per Dose	Special Precautions
Strangles				
Sleeping sickness				
Equine influenza				
Tetanus				

Lesson 8: Herd Health for Horses Name_____

Internal and External Parasites of Horses

Objective: Demonstrate a knowledge of internal or external parasites of horses.

Prepare a research paper on an internal or external parasite that affects horses. The report may be about one of the parasites discussed in this lesson or some other parasite that is a problem for horses. The paper should include causes of infestations, symptoms, methods of prevention, and possible treatments for the parasite.

UNIT VI - ANIMAL HEALTH

Lesson 9: Health Problems in Poultry

Competency/Objective: Identify common problems associated with poultry flock health.

Study Questions

1. **What are the daily practices for observing poultry flock health?**

2. **What are the indications of health problems with a poultry flock?**

3. **What health problems may be encountered in poultry production?**

References

1. *Advanced Livestock Production and Management (Student Reference).* University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit VI.

2. Activity Sheet

   a) AS 9.1: Evaluating Health Problems in the Poultry Flock

UNIT VI - ANIMAL HEALTH

Lesson 9: Health Problems in Poultry

A. ***Review***

Lesson 8 described herd health programs in horses. A major difference between poultry enterprises and enterprises raising horses is the number of animals raised together. In poultry production systems, large flocks of birds are housed in the same facility. Diseases are able to spread quickly throughout the flock. To prevent major losses, producers must carefully observe their flocks for signs of illness and be familiar with health problems that may affect poultry.

B. ***Motivation***

Obtain pictures from a poultry textbook showing chickens affected by some of the diseases discussed in this lesson. Ask students to try to identify the disease based on the picture. Discuss the importance of observing animals in order to recognize symptoms of illnesses.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Ask students to describe routine practices a poultry manager should perform to observe flock health. How much time should he or she spend observing the birds each day? Discuss good daily observation practices.

   What are the daily practices for observing poultry flock health?

   a) The flock should be observed daily for signs of health problems.
   b) If the birds are being raised in large floor units, a good manager will sit down for at least an hour within the unit to observe the birds' behavior.
   c) The producer can determine which birds are sick or are the cause of other problems, such as cannibalism, egg-eating, and picking.
   d) The producer should look for bits of egg or blood on the beaks.
   e) In houses with solid floors, the producer should examine litter conditions.

2. Ask students to think about their experiences with animals. What are some ways to tell that an animal is sick? Discuss the common signs of poor health in poultry flocks.

   What are the indications of health problems with a poultry flock?

   a) General appearance
      1) Listlessness
      2) Coughing
      3) Squinting
      4) Droopy combs
      5) Loss of plumage
      6) Ruffled plumage
      7) Bloody droppings
      8) Diarrhea
   b) Abnormal vital signs
      1) Average temperature - 106° Fahrenheit
      2) Heart rate - 200 to 400 beats/min.
      3) Respiration rate - 15 to 36 breaths/min.

c) Drop in egg production
d) Decreased egg shell quality
e) Decrease in feed or water consumption
f) Abnormal losses
    1) Losses exceeding 2 percent of the chicks or 3 percent of the poults during the first three weeks of production
    2) Losses per month exceeding 1 percent of either the turkey or chicken flock after three weeks of age

3. Discuss different diseases that may affect poultry flocks. Have students complete AS 9.1.

What health problems may be encountered in poultry production?

a) Marek's disease
    1) Sometimes referred to as range paralysis or acute leukosis
    2) Affects many different types of birds but is especially common in chickens
    3) Caused by a herpesvirus that is shed in sloughed off skin and feather cells
    4) Most often affects pullets between the ages of 6 and 16 weeks
    5) Symptoms
        (a) Paralysis of the legs
        (b) Sudden death
        (c) Blindness
        (d) Skin lesions
        (e) Significant weight loss
        (f) Diarrhea
    6) Decreased egg production in birds that recover
    7) No treatment
    8) Prevention - vaccinate day-old chicks at the hatchery
b) Newcastle disease
    1) Affects chickens and turkeys
    2) Caused by several highly contagious viruses that cause different forms of the disease, ranging from mild to deadly
    3) Spread through the air and by contaminated equipment and clothing
    4) Symptoms
        (a) Paralysis
        (b) Twisted neck
        (c) Respiratory problems, such as gasping, snorting, wheezing, coughing, and sneezing.
        (d) In laying hens, a large decrease in egg production or poor quality eggs with soft shells
        (e) Less intense in turkeys and may not be noticeable
    5) No treatment
    6) Prevention - vaccinations, including injections and sprays or dusts that treat the entire flock
c) Avian influenza
    1) Caused by a virus that is spread in the feces and nasal discharges of infected birds
    2) Easily transmitted by contaminated people and equipment
    3) Affects the respiratory and nervous systems of chickens and turkeys
    4) Symptoms
        (a) Coughing
        (b) Sneezing
        (c) Wheezing
        (d) Gasping for air
        (e) Diarrhea
        (f) Lack of coordination
        (g) In laying hens, a significant decrease in egg production or misshapen eggs

(h) No effective treatment, although antibiotics may reduce losses from secondary infections
(i) Recovered flocks - continue to transmit the virus
(j) Prevention - vaccinations

d) Fowl pox
1) Caused by a virus that affects both chickens and turkeys
2) Spread by direct and indirect contact between birds and by mosquitos
3) Symptoms
(a) Blisters around the face and comb
(b) Yellow sores in the mouth
(c) For turkeys, pale yellow sores in the throat
(d) Retards the growth of young birds, and layer hens produce fewer eggs
4) No treatment
5) Prevention - vaccination

e) Infectious bronchitis
1) Caused by a virus to which only chickens are susceptible
2) Spread through the air and on clothing and equipment
3) More prevalent in broilers than in laying hens
4) Symptoms
(a) Coughing
(b) Difficulty in breathing
(c) Gasping
(d) Rattling
(e) Sneezing
(f) Retarded growth in younger birds
(g) May stop production in laying hens almost entirely
(h) Small, soft-shelled, and misshapen eggs
5) No treatment
6) Prevention
(a) A number of vaccines available; should select the vaccine that contains the form of the virus that is prevalent in the area
(b) Strict management procedures, including moving entire flocks at once and thoroughly cleansing and sanitizing facilities between batches

f) Infectious bursal disease (gumboro)
1) Caused by a virus
2) Extremely contagious illness that affects young chickens three to six weeks of age
3) Found in most areas of concentrated poultry production
4) Damages the immune systems of birds that do survive, making them more susceptible to other illnesses
5) Spread by contact between birds, infected litter, and contaminated clothing and equipment
6) Symptoms
(a) Sleepiness
(b) Unsteady gait
(c) Decreases in food and water consumption
(d) Whitish diarrhea
7) No treatment
8) Prevention - vaccinations

g) Pullorum disease
1) Caused by a bacterium that affects both chickens and turkeys
2) Transmittal
(a) Contaminated clothing and equipment
(b) Contaminated facilities
(c) Chief mode of transmission - from a hen to her chicks by the egg
(d) Between contaminated chicks
3) Results in large losses in production due to the high death rate among chicks
4) Symptoms

(a) Young chicks - may die without showing any symptoms
(b) Ruffled feathers
(c) Difficulty in breathing
(d) Chills
(e) Droopiness
(f) White diarrhea
(g) Vent pasting

5) Treatment
(a) Different types of antibiotics
(b) Remain carriers, so recovered hens should not be kept to produce eggs

6) Prevention
(a) Perform blood tests on the breeder flocks and then cull the birds that carry the bacteria
(b) Purchase chicks or poults from hatcheries that have been certified free of pullorum

h) Fowl typhoid
1) Caused by a bacterium
2) Transmittal
(a) Same as pullorum
(b) Mechanical transmission more prevalent
3) Infection can occur at any age, but primarily occurs in young adults
4) Symptoms
(a) Sudden or sporadic death
(b) Listlessness
(c) Green or yellow diarrhea
(d) Loss of appetite
(e) Increased thirst
(f) Pale, anemic appearance of comb and wattles
5) Treatment - use same drugs as those used for pullorum
6) Prevention
(a) Purchase chicks or poults from hatcheries that have been certified free of pullorum
(b) Practice strict sanitation
(c) Provide clean feed and water
(d) Dispose of dead birds per state animal health agency policy

i) Colibacillosis
1) Caused by a microorganism called *Escherichia coli*
2) Symptoms
(a) Variety of symptoms resulting from infections of the respiratory system, digestive system, or blood
(b) Fever
(c) Difficulty in breathing
(d) Coughing
(e) Diarrhea
3) Perform laboratory testing to check for infections
4) Treatment
(a) Antibiotics
(b) Does not also respond well to treatment, so infected birds are generally culled
5) Prevention
(a) Good sanitation
(b) Management practices that reduce stress on the birds

j) Fowl cholera
1) Caused by a bacterium
2) Affects all types of poultry
3) Transmitted through the droppings of diseased birds, dead birds, contaminated water supplies, and contaminated equipment or clothing

4) Has two forms, a chronic form in which birds are sick for a long time and an acute form in which they become suddenly and severely sick
5) Symptoms
   (a) May die without showing any symptoms
   (b) Drowsiness
   (c) Fever
   (d) Loss of appetite
   (e) Rapid weight loss
   (f) Difficulty in breathing
   (g) Greenish-yellow droppings
   (h) Darkening of the head
   (i) Sitting with heads turned back over the wings
6) Treatment
   (a) Sulfa drugs and antibiotics
   (b) Remain carriers of the disease and should therefore be culled
7) Prevention
   (a) Good sanitation
   (b) Vaccinations

k) Coccidiosis
1) Most costly disease affecting poultry
2) Caused by coccidia, a protozoa
   (a) Chickens and turkeys affected by several species of coccidia
   (b) Affect different sections of the gut and cause varying symptoms
3) Transmitted in the droppings of infected birds, either directly to other birds or indirectly through contaminated clothing and equipment, insects, and rodents
4) Symptoms
   (a) Weakness
   (b) Anemia
   (c) Diarrhea
   (d) Bloody droppings
   (e) Droopiness
   (f) Decreases in food and water consumption
   (g) Decreases in egg production
5) Treatment - adding anticoccidial drugs called coccidiostats to food and water
6) Prevention
   (a) Good sanitation, especially keeping litter dry
   (b) Vaccinations

l) Infectious coryza
1) Also called roup
2) Respiratory disease caused by bacteria
3) Primarily affects chickens
4) May occur in turkeys, pheasants, and guinea fowl
5) Transmitted by direct contact, airborne droplets, and drinking water
6) Symptoms
   (a) Nasal discharge
   (b) Sneezing
   (c) Swelling of the face around the eyes
   (d) Reduced egg production in laying hens
7) Prevention
   (a) Vaccinations
   (b) Medications administered in feed and water
8) Treatment - erythromycin given in feed or water

m) Blackhead
1) Protozoal disease that affects turkeys, grouse, quail, and occasionally chickens.
2) Greatest mortality in turkeys about 12 weeks of age
3) Protozoa
   (a) Carried through fecal matter

(b) May live in the soil for many years

4) Symptoms
   (a) Listlessness
   (b) Drooping wings
   (c) Unkempt feathers
   (d) Sulfur-colored droppings
   (e) Dark head

5) Prevention
   (a) Strict sanitation
   (b) Medications administered in feed and water

6) Treatment - medications administered in feed and water

n) Enteritis - three forms

1) Coronaviral enteritis (bluecomb)
   (a) Caused by a virus
   (b) Affects turkeys
   (c) Symptoms
      (1) Marked depression
      (2) Anorexia
      (3) Diarrhea
      (4) Dehydration
      (5) Weight loss
   (d) Prevention
      (1) Good sanitation
      (2) Depopulation and complete disinfection techniques; best done during the summer months, with houses left vacant for about a month
   (e) Treatment - antibiotics

2) Hemorrhagic enteritis
   (a) Caused by a virus
   (b) Affects turkeys
   (c) Causes intestinal hemorrhaging
   (d) Symptoms
      (1) Bloody droppings
      (2) Depression
      (3) Death
   (e) Prevention
      (1) Good sanitation
      (2) Vaccination

3) Ulcerative enteritis
   (a) Bacterial disease
   (b) Affects both chickens and turkeys
   (c) Symptoms
      (1) Sleepiness
      (2) Whitish watery diarrhea
      (3) Humped posture
      (4) Loss of appetite
   (d) Prevention - good sanitation
   (e) Treatment - antibiotics

o) Dermatitis

1) Caused by bacteria
2) Characterized by a sudden onset, a sharp increase in mortality, and a gangrenous condition of the skin over the breast and thighs
3) Affects chickens and occasionally breaks out in turkeys
4) Symptoms
   (a) Extreme depression
   (b) Lameness
   (c) Prostration
   (d) Feather loss

(e) Sloughing off of the skin

5) Prevention
   (a) Maintaining proper litter conditions
   (b) Minimizing mechanical injury
   (c) Controlling cannibalism
   (d) Vaccination
6) Treatment - medication given in feed

p) Laryngotracheitis
1) Also referred to as gapes
2) Acute, highly contagious herpesvirus infection of chickens
3) Symptoms
   (a) Severe coughing
   (b) Gasping
   (c) Rattling
   (d) Extension of the neck
   (e) Loss of appetite
   (f) Becoming inactive
   (g) Bloodstained mouth due to tracheal hemorrhaging
4) Prevention - vaccinations using a modified strain of the virus
5) Treatment
   (a) Keeping birds quiet
   (b) Lowering dust levels
   (c) Using a mild expectorant

F. ***Other Activities***

Have a poultry producer talk to the class about common health problems in your area and strategies for observing flock health.

G. ***Conclusion***

An important part of a poultry producer's routine is to actually observe the behavior and general condition of the flock. Observation is important because it helps managers note disease symptoms and problematic birds early. By detecting symptoms early, treatment may be given immediately in order to prevent a disastrous and costly outbreak among the flock.

H. ***Answers to Activity Sheet***

1. Avian influenza
2. Coccidiosis
3. Newcastle disease
4. Fowl pox
5. Pullorum disease
6. Fowl cholera
7. Marek's disease
8. Colibacillosis
9. Infectious bursal disease
10. Infectious bronchitis
11. Infectious coryza
12. Blackhead
13. Dermatitis
14. Enteritis
15. Laryngotracheitis
16. Fowl typhoid

I. ***Answers to Evaluation***

1. f
2. d
3. h
4. g
5. j
6. e
7. b
8. c
9. a
10. l
11. d
12. c
13. c
14. b
15. d
16. a
17. Daily
18. *E. coli*
19. Drop in egg production and decreased egg shell quality

20. Answers may include any three of the following: listlessness, coughing, squinting, droopy combs, loss of plumage, ruffled plumage, bloody droppings, and diarrhea.

UNIT VI - ANIMAL HEALTH

Name _____

Lesson 9: Health Problems in Poultry

Date _____

EVALUATION

Match the name of the health problem with the description of symptoms on the left.

1. _____ White diarrhea and vent pasting
2. _____ Coughing, gasping, rattling, and extension of the neck
3. _____ Paralysis, a twisted neck, and respiratory problems
4. _____ Sleepiness, whitish watery diarrhea, and a humped posture
5. _____ Sulfur-colored droppings and a dark head
6. _____ Difficulty breathing, with gasping, coughing, rattling, and sneezing; retarded growth in younger birds
7. _____ Feather loss and sloughing off of the skin
8. _____ Sleepiness, an unsteady gait, and whitish diarrhea
9. _____ Nasal discharge, sneezing, and swelling of the face around the eyes
10. _____ Greenish-yellow droppings, darkening of the head, and sitting with the head turned back over the wings

a. Infectious coryza
b. Dermatitis
c. Gumboro
d. Laryngotracheitis
e. Infectious bronchitis
f. Pullorum
g. Enteritis
h. Newcastle disease
i. Fowl cholera
j. Blackhead

Circle the letter that corresponds to the best answer.

11. Blisters and yellow sores are a sign of:

    a. Avian influenza.
    b. Infectious bronchitis.
    c. Fowl cholera.
    d. Fowl pox.

12. If losses in a chicken flock exceed _____ during the first three weeks of production, a health problem likely exists.

    a. 1 percent
    b. 1.5 percent
    c. 2 percent
    d. 2.5 percent

13. _____ affects young chickens three to six weeks of age.

    a. Pullorum disease
    b. Avian influenza
    c. Infectious bursal disease
    d. Newcastle disease

14. After all birds are three weeks old, losses per month should not exceed _____ of the turkey or chicken flock.

    a. 0.5 percent
    b. 1 percent
    c. 1.5 percent
    d. 2 percent

15. Which of the following is the most costly disease affecting poultry?

    a. Fowl pox
    b. Infectious bronchitis
    c. Fowl cholera
    d. Coccidiosis

16. What is the chief symptom of Marek's disease?

    a. Paralysis of the legs
    b. Tumors
    c. Sores
    d. Poor quality eggs

Complete the following short answer questions.

17. How often should a flock be observed for signs of health problems?

18. What causes colibacillosis?

19. When observing egg production, what are two signs of health problems?

    a.

    b.

20. What are three general signs of health problems that can be observed when examining a bird's general appearance?

    a.

    b.

    c.

Lesson 9: Health Problems in Poultry Name _____

Evaluating Health Problem in the Poultry Flock

Objective: Determine the health problem of the poultry flock based on the symptoms.

Read the description of the symptoms affecting the flock and list the name of the disease in the blanks provided.

	Symptoms	Possible Disease
1.	The birds are coughing, wheezing, and gasping for air. They also have diarrhea and show a lack of coordination.	_____
2.	The birds are weak and droopy. They show signs of anemia, bloody droppings, and decreased egg production.	_____
3.	The birds experience a large decrease in egg production. They also have twisted necks and show signs of paralysis.	_____
4.	Young birds are smaller than expected for their age. They have yellow sores in their mouths as well as blisters on their combs.	_____
5.	Most of the young chicks are dying without any symptoms. The older ones have ruffled feathers and difficulty in breathing.	_____
6.	The birds are experiencing loss of appetite followed by rapid weight loss. Some have greenish-yellow droppings and sit with their heads under their wings.	_____
7.	The birds develop skin lesions and appear to be blind. Some appear to be paralyzed, and others have diarrhea.	_____
8.	The birds are fevered and have diarrhea. They are coughing and have difficulty breathing.	_____
9.	The birds appear to be sleepy. The ones that are moving have an unsteady gait. They have whitish diarrhea.	_____
10.	The young birds appear to have difficulty breathing; they are coughing, gasping, rattling, and sneezing. They also seem to be growing more slowly than normal.	_____
11.	The birds are experiencing nasal discharge, sneezing, and swelling of the face around the eyes.	_____

12. The birds are listless. They have drooping wings, unkempt feathers, and a dark head. Their droppings are the color of sulfur. _____

13. The birds appear lame and some are prostrate. They are losing their feathers and skin over the breast and thighs. _____

14. The birds seem sleepy and have little appetite. They have a humped posture and whitish watery diarrhea. _____

15. The birds are coughing, gasping, and rattling. They extend their necks as they breathe. Some have bloody mouths. _____

16. Young adult birds show signs of listlessness, loss of appetite, and increased thirst. They have green or yellow diarrhea and a pale, anemic look to their comb and wattles. _____

Unit VI - ANIMAL HEALTH

Lesson 10: Flock Health Management

Competency/Objective: Develop a health plan for poultry.

Study Questions

1. **What local, state, and federal regulations should be followed when buying and selling poultry?**

2. **What management practices should be followed when introducing new animals to the operation?**

3. **What are routine vaccination practices for flock health management?**

4. **How are internal and external parasites controlled?**

5. **What biosecurity measures can help control diseases and parasites?**

6. **What records should be kept?**

References

1. *Advanced Livestock Production and Management (Student Reference).* University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit VI.

2. Activity Sheet

   a) AS 10.1: Implementing Biosecurity

UNIT VI - ANIMAL HEALTH

Lesson 10: Flock Health Management

TEACHING PROCEDURES

A. ***Review***

In Lesson 9, various poultry diseases were described, and disease control through observation was stressed. To help prevent diseases, poultry managers should be sure that the birds they purchase are healthy. Poultry should also be vaccinated against diseases. While an investment of time, labor, and money is necessary to administer vaccinations, an outbreak of disease can be even more costly. It is also important to control internal and external parasites, which can cause decreases in production.

B. ***Motivation***

Ask students why it is important to have regulations governing the transportation of poultry that is bought and sold. What is the purpose of such regulations?

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Discuss the regulations that must be followed when poultry producers buy or sell birds.

   NOTE: Check for local regulations that may affect the purchase or sale of poultry.

   What local, state, and federal regulations should be followed when buying and selling poultry?

   a) The regulations affecting the sale of birds revolve around their transportation.
      1) Designed to prevent the spread of pullorum and fowl typhoid
      2) Set by the USDA; the Missouri Department of Agriculture generally follows their guidelines
      3) Established with the cooperation of the National Poultry Improvement Association (NPIA) and the Missouri Poultry Improvement Association (MPIA)
   b) All birds and hatching eggs entering the state of Missouri must possess either a Certificate of Veterinary Inspection or a VS Form 9-3
      1) Certificate - signed by an accredited veterinarian who has found no signs of fowl typhoid or pullorum in birds or no signs of pullorum in the flocks producing hatching eggs
      2) VS Form 9-3 - signed by the owner or the shipper of the flock, stating that the birds show no signs of illness
      3) Must have documentation showing that they have tested negative for pullorum and fowl typhoid within the last 90 days, unless they are a product of a flock that has been certified disease-free by state representatives of the National Poultry Improvement Plan (NPIP)
   c) All birds and hatching eggs entering Missouri must also have an entry permit certifying that they are free of disease.
      1) Issued to NPIP participants every year
      2) Must be requested for each shipment by other producers
   d) Official representatives of the NPIP must be provided with the Certificate of Veterinary Inspection or the VS Form 9-3 upon request.
      1) Permitted to conduct testing as they see fit

2) Quarantine unhealthy flocks, which are tested to find the source of disease
3) Disposed of in an approved manner if the birds are diseased

2. Ask students what health hazards are associated with relocating and introducing birds into a poultry operation. What measures can be used to guard against the spread of disease.

What management practices should be followed when introducing new animals to the operation?

a) Poultry scientists strongly discourage the introduction of new birds into an already existing flock because of the potential for introducing diseases.
b) New birds are brought in using an all-in, all-out system in which an entire group is introduced at once to a facility that was cleaned and sanitized after the removal of the previous flock.
c) If flocks of different ages are present, they should be housed separately in facilities that are at least 40 feet apart.

3. Ask students why it is important to carry out a routine sequence of vaccinations. Discuss common vaccination practices.

What are routine vaccination practices for flock health management?

a) Producers should develop a vaccination schedule designed to prevent diseases that are common in their area or follow the vaccination schedule and procedures outlined by the integrator.
b) Vaccination programs and schedules will vary widely from flock to flock.
    1) Broilers
        (a) Vaccinated for Marek's disease at one day of age
        (b) Vaccinated for Newcastle disease at one to two weeks of age
        (c) May also be vaccinated for infectious bronchitis at this time
        (d) Need to be revaccinated for both Marek's disease and Newcastle disease
        (e) Vaccinated for gumboro at any time before three weeks of age
        (f) Should be vaccinated for fowl pox with the timing of the vaccination depending on how frequently the disease occurs; may vary from one week of age where the disease is common up to sixteen weeks of age
    2) Replacement pullets for egg production or breeding flocks
        (a) Vaccinated for Marek's disease at the hatchery when they are a day old
        (b) If not vaccinated for Newcastle disease and infectious bronchitis at hatching, must be vaccinated at one to two weeks of age
        (c) Later revaccinated for Newcastle disease and infectious bronchitis
        (d) Should be vaccinated for fowl pox, but the timing of the vaccination will vary depending on the incidence of the disease in the area
        (e) Vaccinated for avian encephalomyelitis during the growing stage
        (f) Vaccinated for laryngotracheitis after four weeks of age depending on the incidence of the disease in the area
    3) Turkeys
        (a) May receive vaccinations for Newcastle disease, fowl pox, erysipelas, and fowl cholera
        (b) Vary in timing from one poultry operation to another
c) The birds should be healthy at the time the vaccine is administered.
d) Birds suffering from coccidiosis should not receive vaccinations.
e) Producers should not vaccinate pullets after 20 weeks of age because it will delay the production of eggs.
f) If layer hens are going to be kept for a second year, they will need to be vaccinated again for some diseases.
g) Vaccinations are more effective if birds are not under stress when the vaccine is administered.

1) Should not have undergone any stress-inducing management practices, such as moving or beak trimming
2) Ideally, should not receive more than one vaccination at a time

h) Many poultry producers prefer to give multiple vaccinations or vaccinate during the beak trimming process to save time and labor.

i) Producers must always follow all directions provided by the manufacturer precisely when administering any type of vaccine.

j) A new method of vaccination involving vaccinating the birds while they are still embryos has been introduced and implemented in some poultry production systems.

4. Have students list ways that internal and external parasites can be controlled.

How are internal and external parasites controlled?

a) Internal parasites, including roundworms, thread worms, tapeworms, cecal worms, and gapeworms
   1) The local county Extension agent, a veterinarian, or a poultry specialist should be contacted to help in diagnosis and provide recommendations for treatments.
   2) Various drugs and anthelmintics may be used to treat the different types of parasites.

b) External parasites, including lice, mites, and fowl ticks
   1) Insecticide sprays and dusts are used to get rid of these parasites.
   2) To control lice and mites, both the birds and the facilities are commonly sprayed with approved insecticides.
      (a) Enough spray administered to penetrate the feathers
      (b) Walls, ceilings, and floors sprayed thoroughly, paying attention to cracks and crevices
   3) To eliminate ticks, poultry houses and surrounding areas should be sprayed; the birds are not treated directly.
   4) Insecticidal dusts may be applied to either the birds or the facilities.
   5) Insecticides must always be used properly, according to manufacturer's directions.
   6) All insecticides should be kept away from water and feed sources.
   7) Some treatments require a specific time to pass after their application before the birds can be used for laying or slaughter.
   8) Contract producers should always follow the integrator's guidelines regarding insecticide use.

c) Darkling beetle
   1) Although it is not a parasite, the darkling beetle (litter beetle) has long been recognized as a nuisance pest in poultry operations.
   2) It causes damage by leaving the litter and crawling into the walls and insulation.
   3) Damaged insulation results in a loss of efficiency in heating and cooling and translates into a higher cost of production.
   4) The beetles are also know to transmit pathogens and poultry parasites, such as *Salmonella*, *E. coli*, poultry tapeworms, and coccidia.
   5) Prevention involves removing manure and feed spillage as often as possible.
   6) Walls should also be prepared properly.
      (a) Using aluminum foil backing on insulation
      (b) Taping the ends of the insulation with aluminum tape
      (c) Sealing cracks and crevices with caulk
      (d) Using aluminum sheeting along the barn walls and posts to a height of about one meter
   7) Barns should also be cleaned well and sprayed with a disinfectant between flocks.

5. Ask students to define biosecurity. Discuss the biosecurity measures that can be used to help prevent diseases and parasites in poultry. Have students complete AS 10.1.

What biosecurity measures can help control diseases and parasites?

a) Isolate flocks from other birds and animals.
   1) Poultry houses should have screens over all entrances to prevent the entry of wild birds and animals.
   2) Ideally, all the birds on a poultry farm should be the same age.
   3) Use an all-in, all-out system to introduce a new group of birds.
   4) If it is necessary to keep flocks of different ages, keep the flocks at least 40 feet apart.

b) Follow guidelines for visitors to the operation.
   1) Strictly limit the number of visitors to the poultry facilities.
   2) Have visitors shower in and out.
   3) Provide visitors with boots from the site.
   4) Visitors should scrub their own boots or shoes with disinfectant.
   5) Keep vehicular traffic to a minimum on the poultry operation.
   6) Delivery trucks should stay as far away from the flock as possible.
   7) Have employees of the operation unload supplies themselves.
   8) Do not allow the driver to step out of the truck.
   9) Disinfect the truck's tires before it enters the premises.

c) Keep facilities as clean as possible.
   1) Do not allow trash to accumulate near the poultry houses.
   2) Do not store feces or litter where it is accessible to wild birds.
   3) Thoroughly clean and disinfect poultry houses before bringing in a new flock.
   4) Keep equipment clean, dry, and disinfected.
   5) Clean feed and water receptacles regularly.
   6) Provide birds clean and fresh feed and water.
   7) Provide proper ventilation to discourage bacterial growth.

6. Ask students what records are important in poultry health programs. Why are these records important?

What records should be kept?

a) Vaccinations
   1) Date
   2) Method of administration
   3) Type of vaccine
   4) Vaccine lot number
   5) Source of the vaccine

b) Date and type of treatment for diseases

c) Date of application and type of drug or insecticide for internal and external parasites

F. ***Other Activities***

1. Have students investigate what poultry diseases are common to the local area. How are they treated and prevented?

2. Have a guest speaker who regularly administers vaccinations to chickens demonstrate their administration.

3. Review safety procedures for using insecticide sprays.

G. ***Summary***

In order to make a profit, poultry producers must keep their flocks free of disease. It is therefore important to follow regulations governing the purchase and sale of poultry and to keep birds of different ages separated. Producers should also follow a specific vaccination schedule that focuses on the diseases prevalent in their area. Maintaining clean facilities and equipment are effective strategies in

controlling internal and external parasites. Internal parasites can also be controlled by using drugs or wormers, while external parasites are controlled by insecticide sprays, dusts, or paints.

H. ***Answers to Activity Sheet***

General Measures	Details
Isolate flocks from other birds and animals.	Keep screens on entrances in good repair. Follow the all-in, all-out system, cleaning and sanitizing the facility before a new flock is brought in.
Follow guidelines for visitors.	Limit the number of visitors. Have visitors shower in and out. Provide them with boots, or have them scrub the soles of their own shoes with disinfectant. Keep vehicles to a minimum. Keep delivery trucks as far away from the flock as possible. Have employees of the operation unload supplies themselves. Do not allow the driver to step out of the truck. Disinfect the truck's tires before it enters the premises.
Keep facilities clean.	Do not allow trash to accumulate near the poultry houses. Do not store feces or litter where it is accessible to wild birds. Thoroughly clean and disinfect poultry houses before bringing in a new flock. Keep equipment clean, dry, and disinfected. Clean feed and water receptacles regularly. Provide birds clean and fresh feed and water. Provide proper ventilation to discourage bacterial growth.

I. ***Answers to Evaluation***

1. d
2. c
3. b
4. d
5. A Certificate of Veterinary Inspection or VS Form 9-3

6. Answers may include any three of the following: date, method of administration, type of vaccine, vaccine lot number, and source of the vaccine.

7. Because stress will reduce the effectiveness of the vaccine

8. Insecticidal sprays and dusts

9. An entire group of birds is introduced at once to a facilty that was cleaned and sanitized after the removal of the previous flock.

10. Answers may include any two of the following: Marek's disease, Newcastle disease, infectious bronchitis, gumboro, and fowl pox.

UNIT VI - ANIMAL HEALTH Name _____

Lesson 10: Flock Health Management Date _____

EVALUATION

Circle the letter that corresponds to the best answer.

1. If birds on the same site are of different ages, they should be kept at least _____ feet apart.

   a. 10
   b. 20
   c. 30
   d. 40

2. All birds entering the state of Missouri must have documentation that they have been tested negative for pullorum or fowl typhoid within the last _____, unless they are a product of an NPIP-approved flock.

   a. 70 days
   b. 80 days
   c. 90 days
   d. 100 days

3. Poultry houses have screens over all entrances to:

   a. Prevent the poultry from escaping.
   b. Prevent the entry of wild birds and animals carrying diseases.
   c. Keep the dust in the poultry house.
   d. Improve ventilation to prevent parasite infestations.

4. Pullets should not be vaccinated after _____ weeks of age, because it will delay egg production.

   a. 5
   b. 10
   c. 15
   d. 20

Complete the following short answer questions.

5. What forms may accompany a shipment of birds or hatching eggs entering the state?

6. What three pieces of information should be included in records about vaccinations?

   a.

   b.

   c.

7. Why should birds be under as little stress as possible when being vaccinated?

8. What are two products used to eliminate external parasites?

   a.

   b.

9. What is an all-in, all-out system?

10. What are two diseases for which broilers are commonly vaccinated?

    a.

    b.

Lesson 10: Flock Health Management Name _____

Implementing Biosecurity

Objective: Identify methods of disease and parasite prevention in poultry production systems.

You are an employee at a local broiler operation. Your employer has asked you to develop a list of the biosecurity measures that help prevent disease so that they can be passed out to new employees.

Fill out the table below, listing the measures that should be taken to help ensure flock health.

General Measures	Details
Isolate flocks from other birds and animals.	
Follow guidelines for visitors.	
Keep facilities clean.	

UNIT VII - FACILITIES AND EQUIPMENT

Lesson 1: Facilities and Equipment for Beef Cattle

Competency/Objective: Identify facility needs for beef cattle.

Study Questions

1. **What factors affect facility requirements for beef cattle?**
2. **What facilities may be used for beef cattle operations?**
3. **What facilities are used for cow-calf and backgrounding operations?**
4. **What facilities are used on feedlot operations?**
5. **What are the waste handling considerations for beef cattle operations?**
6. **What are the sanitation requirements in beef production?**
7. **What handling equipment is required for beef enterprises?**
8. **What other equipment is required for beef enterprises?**
9. **What records should be kept?**

References

1. *Advanced Livestock Production and Management (Student Reference).* University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit VI.
2. Transparency Masters
   a) TM 1.1: Sample Corral System
   b) TM 1.2: Pole Barn Shelter
   c) TM 1.3: Feedlot
   d) TM 1.4: Headgate and Squeeze Chute
3. Activity Sheet
   a) AS 1.1: Designing Beef Cattle Facilities

UNIT VII - FACILITIES AND EQUIPMENT

Lesson 1: Facilities and Equipment for Beef Cattle

TEACHING PROCEDURES

A. ***Introduction***

An important factor in the success of beef enterprises is the design of production facilities. Good facilities are needed to promote productivity. Manure handling and sanitation should be taken into account when designing facilities. In addition to facilities, beef enterprises need proper equipment.

B. ***Motivation***

Ask students to list the different types of beef cattle enterprises and then develop a list of the facilities and equipment that are necessary for each enterprise. Ask students to list some factors that will affect what facilities and equipment are designed or selected for a particular operation.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Discuss the importance of carefully planning for the facilities and equipment for each beef cattle operation. If possible, show students pictures of some different examples of facilities.

   What factors affect facility requirements for beef cattle?

   a) Three main factors
      1) Type of enterprise
         (a) Cow-calf enterprise - get by with limited facilities
         (b) Feedlot operation - complex facilities
      2) Number of animals serviced
      3) Herd management tasks necessary
   b) Other considerations when planning
      1) Location of the facilities on the farm
      2) Amount of land available
      3) Space required per animal
      4) Storage space needed for feed and supplies
      5) Handling methods employed
      6) Cost and labor associated with developing and using the facilities
      7) Opportunity for growth and expansion of the facilities
      8) Manure disposal
   c) Factors affecting design
      1) Year-round weather conditions
      2) Flexibility of the facility
      3) Ease of access to the facility
      4) Ventilation needs
      5) Electricity requirements
      6) Water needs
      7) Type of floors
      8) Bedding requirements
      9) Feed/bedding storage

2. Discuss the facilities that are likely to be present in every beef cattle operation. These facilities have a number of different functions. Ask students to list several tasks performed in cattle facilities. Describe the basic facilities. Show students a simple corral system and pole barn shelter using TMs 1.1 and 1.2.

What facilities may be used for beef cattle operations?

a) Conditions to be considered
   1) Design with as simple a layout as possible
   2) Gates near corners
   3) Short runway to prevent animals from turning around
   4) Open sorting pens and gates that present animals with a clear view
   5) Alleyways 15 to 22 inches wide, depending on age and size of animal
   6) Materials positioned so they do not scare animals and hinder sorting
   7) Latches easily operated by humans but not easily opened by livestock movement
   8) Sharp corners, drop-offs, and protruding structures avoided in the working facility
   9) Posts and other obstructions on the outside of facilities; smooth surface on the inside
   10) Good quality, sturdy materials
   11) Working chute included near loading facilities

b) Basic facilities that may be used for all beef enterprises
   1) Corrals and outside lots
      (a) Essential parts
         (1) Holding pen
         (2) Working chute
         (3) Headgate
         (4) Loading facilities
      (b) Constructed using high quality metal or wood materials
      (c) Set up to drain well and reduce handling stress
      (d) Designed to minimize the effort required to handle cattle
   2) Barns
      (a) Storage
         (1) Equipment
         (2) Feed
         (3) Hay
      (b) Barns open on one side
         (1) Store equipment, hay, and feeds unaffected by changes in temperature
         (2) Protect from precipitation and wind but not from temperature changes
      (c) Closed barn
         (1) Protect equipment and feed from temperatures
         (2) Can be insulated and heated or cooled
      (d) Can provide shelter
         (1) Calving
         (2) Recovering from illness
   3) Windbreaks and shelters
      (a) May be necessary if cold weather and harsh winters are present
      (b) Typical windbreaks
         (1) Line of trees
         (2) Stacked hay
         (3) Plywood wired to steel fence posts
         (4) Building of some sort
      (c) Shelters - should be built if heavy snow and rain is present to provide cattle with additional protection

3. Discuss the facilities that are used for cow-calf herds and stocker cattle.

What facilities are used for cow-calf and backgrounding operations?

a) Cow-calf operation
    1) Requires little in terms of facilities
        (a) Calve on pasture during the fall and spring
        (b) Can winter them outside with shelter provided by windbreaks or open shelters
    2) Barn - may be necessary for shelter during calving in some colder regions
b) Backgrounding operation
    1) Minimal facilities; pastured throughout the winter
    2) Windbreak or open pole barn shelter only in very cold or harsh winter situations

4. Ask students to list the various facility requirements for a feedlot operation. Point out that feedlot operations are more involved than other cattle enterprises. Use TM 1.3 to show students one type of feedlot. Hand out AS 1.1.

What facilities are used on feedlot operations?

a) Factors
    1) Location
        (a) Easily accessible
        (b) Allow for easy movement of livestock to pastures and other facilities
    2) Environmental issues
        (a) Wind direction because of odors and dust
        (b) Well-drained
        (c) Not located near lakes, streams, ponds, or ditches
    3) Soil type
        (a) Affects the types of structures that can be built
        (b) May limit the size of storage units
    4) Amount an operator can afford to spend - large automated systems more expensive
b) Feedlots
    1) Lots on the perimeter
    2) In the center of the feedlot
        (a) Office
        (b) Weigh scales
        (c) Enclosed veterinary hospital
        (d) Feed mill
        (e) Maintenance buildings
    3) Designed to provide an opportunity for expansion
c) Feed storage and handling
    1) On-site feed mill
    2) Systems for feeding - range from basic manual systems to complex automated systems

5. Ask students to list several manure handling situations. Discuss the role that proper disposal of fecal matter and dead carcasses plays in the overall productivity of an operation.

What are the waste handling considerations for beef cattle operations?

a) Removal of manure
    1) Pastured animals
        (a) Naturally decomposes
        (b) Must keep livestock out of water sources to avoid contamination
    2) Feedlot
        (a) Must implement a process to clean facilities and dispose of manure in a safe manner
        (b) Water pollution
            (1) Amount of clean water entering the lot reduced by placing the feedlot near the top of a slope and using diversion embankments

(2) Runoff control systems - runoff collected and directed away from areas where it could contaminate groundwater
(3) Storage facilities for collected runoff, including tanks, concrete pits, and lagoons

b) Disposal of animal carcasses
1) Can hire companies to dispose of dead animals by rendering or placing them in a landfill
(a) Pick up dead animals away from the facilities and other livestock by setting up a designated pick-up point
(b) Prevents the spread of diseases from other farms
2) Can bury dead animals
(a) Buried in a pit that is deep enough to cover the animal with four to six feet of soil
(b) Site
(1) Isolated
(2) Above the water table
(3) Away from water sources

6. Discuss the importance of proper sanitation. Have students give examples of sanitation needs when dealing with beef cattle enterprises.

What are the sanitation requirements in beef production?

a) Working facilities and handling equipment kept clean
b) Regular sweeping of barn floors
c) Dust control
1) Frequent sweeping
2) Water misters
d) Equipment sprayed or dipped into sanitizing solution
e) Feedlot operations
1) Veterinary section
(a) Healthy livestock do not pass through or near the facility.
(b) All feed, equipment, and medications are sterile before passing from the veterinary unit to the rest of the herd.
2) Ensure the sanitation of the feed mill to prevent diseases from being spread

7. Discuss the various types of handling equipment in a beef cattle operation. Describe the basic handling equipment. Show students TM 1.4.

What handling equipment is required for beef enterprises?

a) Headgate and squeeze chute
1) Form the central point where producers perform basic health care procedures and other management tasks
2) Designed to thoroughly restrain the animal during procedures
(a) Dehorning
(b) Branding
(c) Castrating
(d) Vaccinating
3) Headgate
(a) Can be a separate piece of equipment
(b) Permanent part of a facility or a portable unit for use in remote locations
b) Loading chute
1) Used to load cattle into a trailer
2) Sloping and stepped ramps used
3) Solid sides so animals cannot see out
4) Adjustable to allow cattle to be loaded onto trucks of different sizes

5) Walking path for handlers along the sides

c) Fencing panels
   1) Used to construct pens quickly
   2) Stored easily
   3) Maneuvered quickly to restructure pen
   4) Made from material that has enough strength to hold cattle

8. Have students list other equipment that might be used on a beef cattle operation. Discuss the requirements for the equipment.

What other equipment is required for beef enterprises?

a) Feeders
   1) Different kinds of feeders
      (a) Grain troughs
         (1) Located in a well-drained area or on concrete
         (2) Deep enough to keep grain from being spilled
      (b) Hay bunks - hold enough hay for several days
      (c) Self-feeders - easy to fill and large enough to hold 10 days to two weeks worth of feed
      (d) Fence line bunks - easily filled along fence line
   2) Needs of operation - dictate type of feeder used

b) Waterers
   1) Pipe water to a tank or trough if no access to pond or stream is available
   2) Adequate in size
   3) Keep animals from climbing into waterer
   4) Preferably located in a shady area during the summer
   5) Surrounded by concrete paving if the area around the waterer will become muddy
   6) Automatic waterers with heating elements for winter
   7) Easy to clean

c) Mineral feeders
   1) House mineral supplements during the winter
   2) Located near the water supply
   3) Should have a cover to provide protection from the weather

d) Livestock trailer
   1) Needed to move livestock from one facility to another
   2) Generally built by a trailer manufacturer
   3) Comes in a variety of sizes and styles depending on needs

e) Silos or feed bins
   1) May be needed to store feed
   2) Large, complex structures or relatively simple storage units

9. Have students identify the various types of records that should be kept on facilities and equipment.

What records should be kept?

a) Records for each major piece of equipment
   1) Depreciation to maintain accurate estimation of value
   2) Maintenance worksheet
      (a) Date purchased
      (b) Upgrades
      (c) Maintenance
      (d) Other pertinent information regarding upkeep

b) Annual inventory that lists all assets of the operation, including the value of buildings and equipment

F. ***Other Activities***

Take students on a field trip to a well-planned cattle operation to show them the facilities and equipment used.

G. ***Conclusion***

The facilities and equipment used in a beef cattle operation are very important to the overall success of the operation. A producer must plan the facilities based on the type of operation and a number of other factors. Facilities should be designed to meet current demands as well as future changes. A few facilities may be used for all types of beef cattle operations, including corrals and lots, shelters or windbreaks, and barns. Some equipment needs include a headgate, loading chute, and fencing panels. Other equipment might include feeders, waterers, and a livestock trailer. The specific facilities and equipment used will depend on the characteristics of a particular enterprise.

H. ***Answers to Activity Sheets***

Drawings will vary.

I. ***Answers to Evaluation***

1. b
2. b
3. c
4. d
5. Basic system of lots on the perimeter with an office, weigh scales, enclosed veterinary hospital, feed mill, and maintenance buildings in the center
6. Type of enterprise, number of animals serviced, and herd management tasks needed
7. To prevent the spread of diseases from other farms
8. Corrals and outside lots, barns, windbreaks and shelters
9. Answers may include either of the following: records for each major piece of equipment or an annual inventory that lists all assets, including the value of buildings and equipment.
10. They form the central point where producers perform basic health care procedures and other management tasks.

UNIT VII - FACILITIES AND EQUIPMENT Name_____

Lesson 1: Facilities and Equipment for Beef Cattle Date_____

EVALUATION

Circle the letter that corresponds with the best answer.

1. Which of the following is typically found on a cow-calf operation?

   a. Weigh scales
   b. Shelters
   c. On-site feed mill
   d. Veterinary hospital

2. What is one method of dust control on concrete barn floors?

   a. Spraying with a sanitizing solution
   b. Frequent sweeping
   c. Using ventilation to remove dust
   d. Putting down wood chips for bedding

3. Mineral feeders should be located near:

   a. The fence.
   b. Troughs.
   c. The water supply.
   d. Barn.

4. Why should the loading chute have solid sides?

   a. To keep cattle from getting out
   b. To prevent people from reaching in
   c. To protect the cattle from the weather
   d. To keep cattle from seeing out

Complete the following short answer questions.

5. What is the basic layout of facilities on a feedlot operation?

6. What are the three main factors that affect facility requirements for beef cattle enterprises?

   a.

   b.

   c.

7. Why should dead animals be picked up at a designated pick-up point?

8. What three basic facilities might be found on any type of beef cattle operation?

   a.

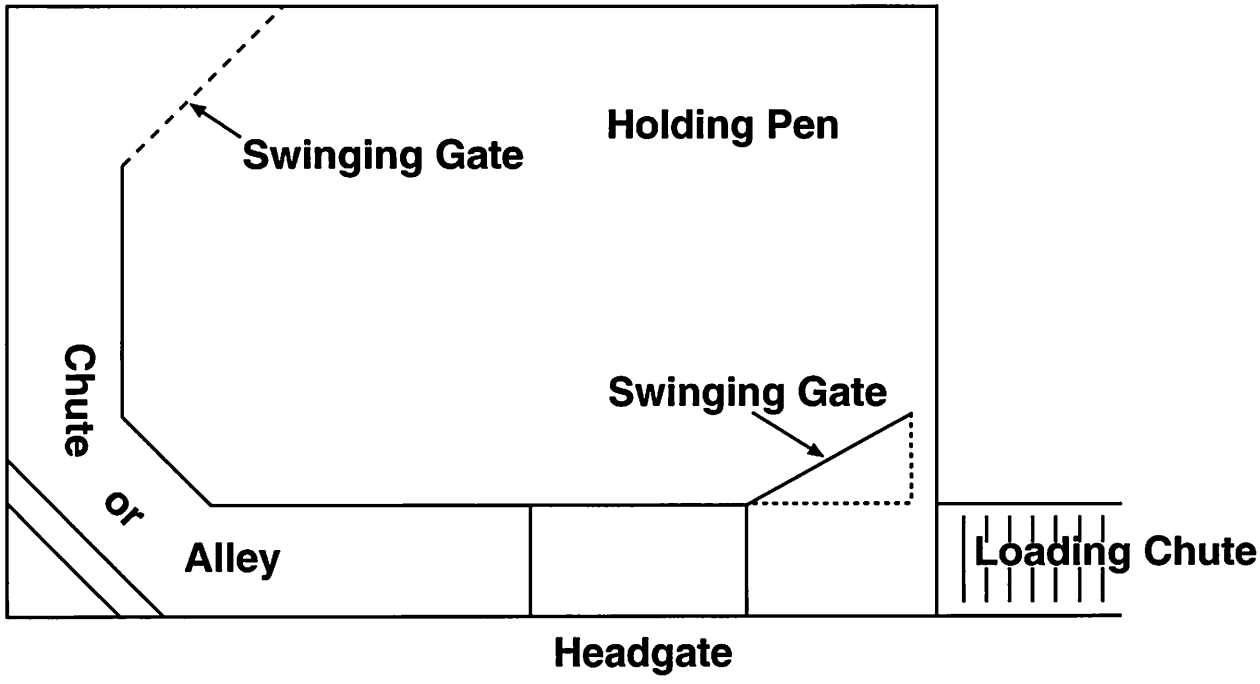
   b.

   c.

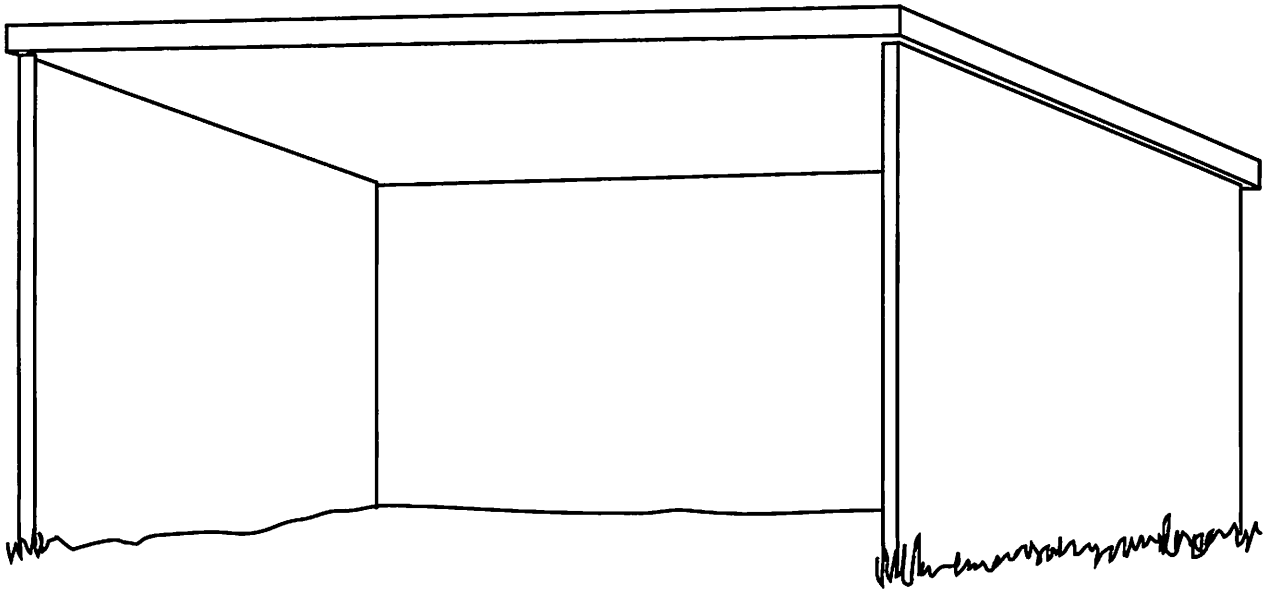
9. What is one type of record related to facilities and equipment that may be kept by a beef operation?

10. Why are a headgate and squeeze chute important?

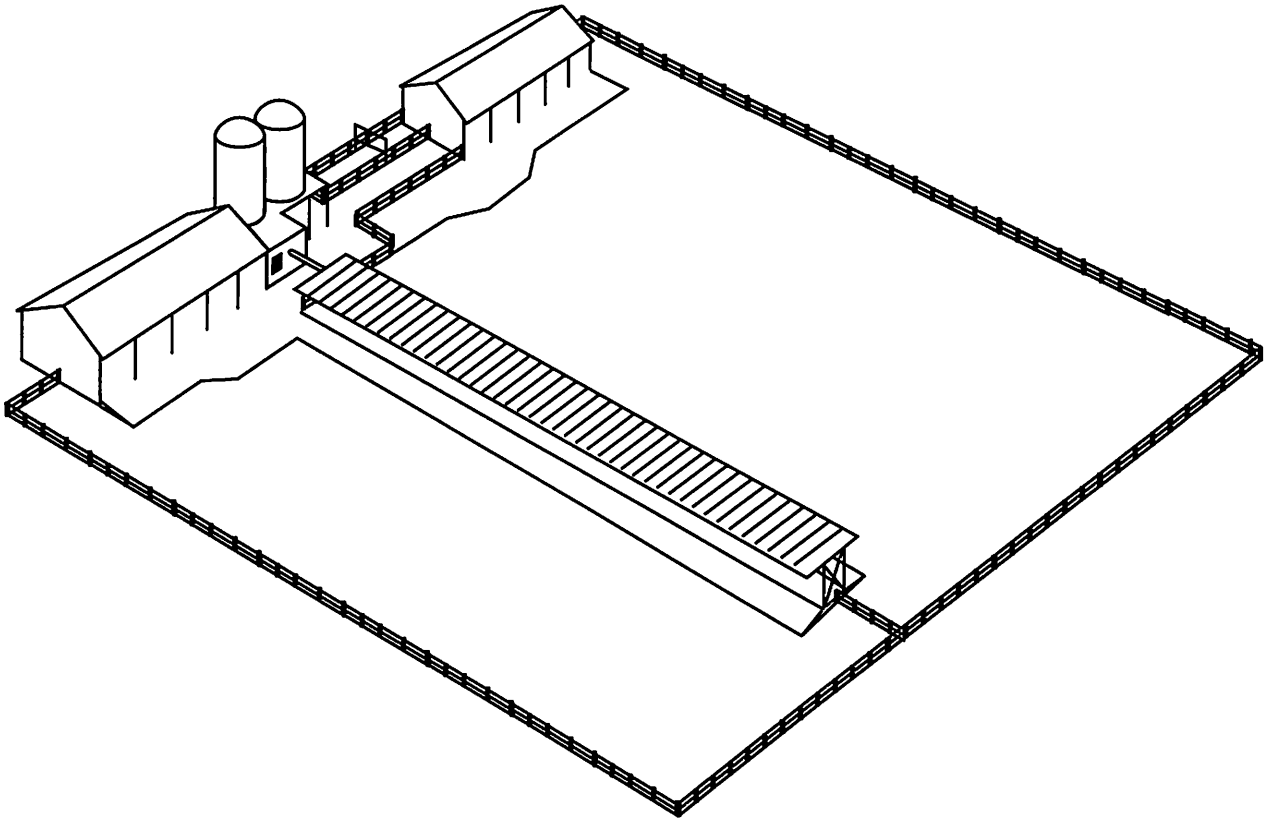
Sample Corral System



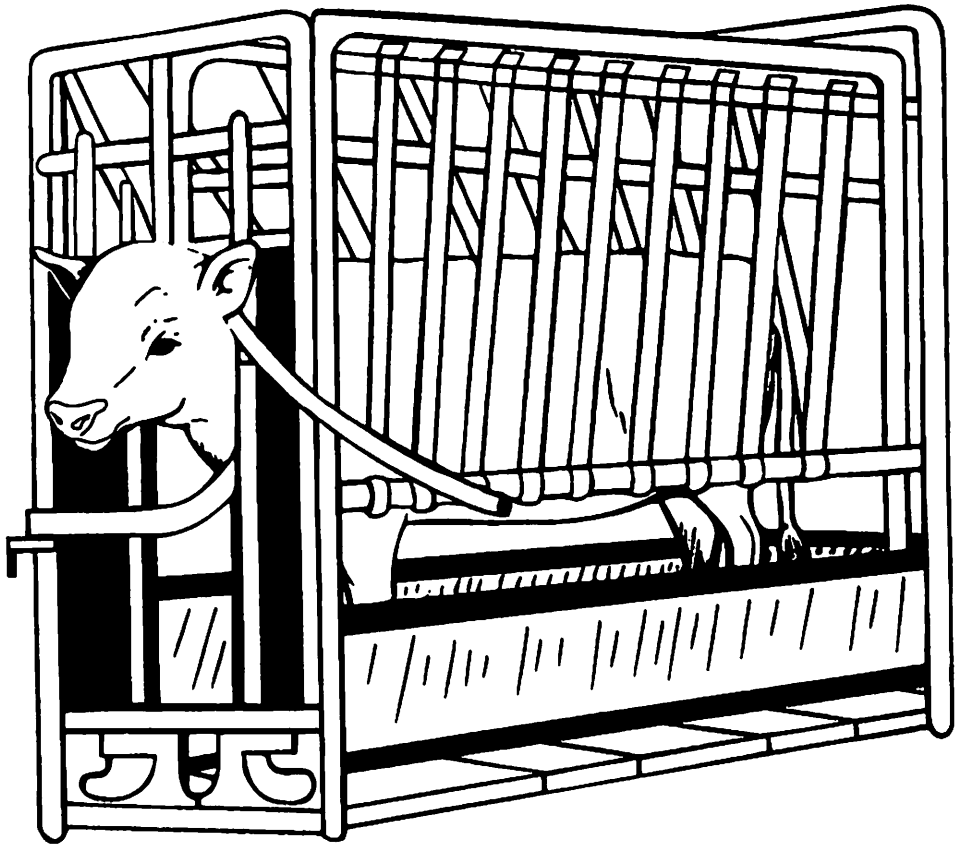
Pole Barn Shelter



Feedlot



Headgate and Squeeze Chute



Lesson 1: Facilities and Equipment for Beef Cattle Name_____

Designing Beef Cattle Facilities

Objective: Design a beef cattle facility

In the space below, sketch a drawing of a corral system or feedlot. Do not use the examples given in this lesson. Information for the design may be obtained from research on the Internet, from personal experience, or textbooks showing beef cattle facilities.

UNIT VII - FACILITIES AND EQUIPMENT

Lesson 2: Dairy Facilities and Equipment

Competency/Objective: Identify facility and equipment needs for dairy cattle.

Study Questions

1. **What factors affect facility requirements for dairy cattle?**
2. **What facilities are necessary for dairy cattle?**
3. **What are the waste handling considerations in managing dairy operations?**
4. **What are the sanitation requirements for milk production?**
5. **What equipment is required for dairy operations?**
6. **What records should be kept?**

References

1. Advanced Livestock Production and Management (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit VII.
2. Transparency Masters
   a) TM 2.1 Milking Parlor Designs

UNIT VII - FACILITIES AND EQUIPMENT

Lesson 2: Dairy Facilities and Equipment

TEACHING PROCEDURES

A. ***Review***

In the previous lesson, facility requirements for beef cattle were discussed. Dairy cattle require more elaborate facilities than beef cattle, especially for milking and other management chores. Good facilities allow a producer to carry out the management tasks of the operation with a reduced risk of injury while at the same time providing a less stressful and more productive working environment. Well-designed and useful facilities also increase the productivity and profits of the dairy operation.

B. ***Motivation***

Ask students to develop a list of possible facilities and equipment that are necessary in the operation of a dairy farm. Discuss how they compare to the facilities needed for beef cattle.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Discuss the importance of carefully planning the development of facilities and equipment for a dairy cattle operation. If possible, show students pictures of some different examples of facilities.

   What factors affect facility requirements for dairy cattle?

   a) Important considerations
      1) Management practices
         (a) Milking parlor required
         (b) More elaborate housing required than on beef cattle operations - more management required
      2) Size
         (a) Affects the type of housing used
         (b) Affects the design of the milking parlor
      3) Location of operation
         (a) Some form of heating
         (b) Fans in summer
      4) Location of facilities
         (a) Well-drained location
         (b) Easy access for vehicles hauling feed, milk, manure, and livestock
         (c) Prevailing wind directions - dairy housing and milking parlor downwind of farmhouse and neighbors
      5) Electrical requirements
         (a) Continuous supply of electricity necessary
            (1) Milking equipment
            (2) Milk storage equipment
            (3) Automated feeding systems
         (b) Standby generator in case of power failure
   b) Other factors
      1) Amount of money available for construction
      2) Regulations and laws for the construction of dairy facilities
      3) Manure handling systems

4) Feeding systems
5) Type of milking system
6) Housing requirements
7) Ventilation needs
8) Water needs
9) Feed/bedding storage
10) Future expansion needs

2. Discuss facility and equipment options in every dairy enterprise. These facilities must be planned for a variety of tasks. Ask the students to list several tasks performed in dairy cattle facilities. TM 2.1 illustrates the different milking parlor designs.

What facilities are necessary for dairy cattle?

a) Free-stall barn - most common in Missouri
   (a) Freely enter and leave the stalls from an alley
   (b) Stalls not wide enough to turn around - prevent cows from contaminating front part of the stall
   (c) Mingle in the alleys or lie down in the stall to rest
   (d) Fed in the housing area or in an attached feeding area
   (e) Moved to milking parlors for milking
   (f) Curtain sidewalls - opened in summer
   (g) Manure
      (1) Scrap and haul
      (2) Flush to lagoon
   (h) Advantages
      (1) Easier use of mechanized feeding
      (2) Better cow disposition due to freedom of movement
b) Housing for calves and replacement animals
   1) Dry, clean, and well-ventilated housing important
   2) Young calves
      (a) Portable calf hutches
         (1) Typically 4 feet by 8 feet
         (2) Easily made
         (3) Can purchase plastic types
         (4) Fenced area in front for exercise
      (b) Confinement calf barn
         (1) Heated or unheated depending on the climate
         (2) Cows housed in separate pens until after calving
         (3) Calves in individual pens until weaning, then grouped together in larger pens
         (4) May be mechanized for feeding and manure removal
   3) Heifers
      (a) Pasture
      (b) Basic open sheds
c) Milking parlors
   1) Quick and efficient way to milk cows
   2) Can easily accommodate large herds
   3) Factors to consider for design
      (a) Number of cows milked
      (b) Milking frequency and total hours of use
      (c) Number of operators
      (d) Plans for expansion
      (e) Personal preferences
   4) Five types
      (a) Herringbone
         (1) Most common type

(2) Enter in groups
(3) Stand at an angle to the operator pit
(4) Stand in elevated stalls to provide easy access to the udder
(5) On either one or both sides of the operator
(6) Cows finished at approximately the same time and released together

(b) Polygon milking parlors
(1) Use herringbone stalls in a four-sides structure around the operator pit
(2) Most efficient with large numbers of cows
(3) Generally set up in a diamond shape

(c) Side-opening parlor
(1) Positions the cows parallel to the operator
(2) Enter and leave individually
(3) Keep slow-milking cows from holding up the movement of a group
(4) Disadvantage - slightly more time is needed to milk the entire herd
(5) Efficient routine necessary to wash, milk, and release the cows as quickly as possible

(d) Parallel
(1) Cows lined up at a 90-degree angle to the pit.
(2) Cows milked from between the hind legs instead of from the side.
(3) Shield keeps equipment from being contaminated by manure.
(4) Provides increased safety for the operator and reduced kicking off of the milking unit.

(e) Rotary or carousel
(1) Allow a large number of cows to be milked in a limited amount of space
(2) Enter one at a time onto a slowly rotating platform.
(3) Milked as the platform rotates
(4) Remain in parlor for another rotation if not milked out completely
(5) Slightly more expensive to operate

d) Feed storage
1) Silos
(a) Tower silos
(1) More expensive
(2) Provide good protection for the silage
(3) Easy feeding using automated systems

(b) Trench, or above ground bunker silos
(1) Reduce investment in facilities
(2) Expand easily to store greater amounts of feed
(3) Greater spoilage
(4) No automated feeding
(5) Preferred for large number of cows

2) Hay and grain storage facilities
(a) Hay - stored in barn
(b) Grain storage - round, steel bin set on a concrete foundation

3) Commodity storage building
(a) 3 to 7 bays
(b) Store by-product feedstuffs

3. Discuss the need to appropriately remove manure from dairy facilities. Have students list several ways of handling manure on a dairy operation.

What are the waste handling considerations in managing dairy operations?

a) Manure
1) Flushing
(a) Solid floors with drains or alleyways
(b) Manure flushed to lagoon - using recycled lagoon water
(c) Solids separated - spread on land

(d) Wastewater irrigated or applied with traveling gun
(e) Cost and labor efficient
(f) Permit necessary from Department of National Resources (DNR) to construct lagoon

2) Solid floors
(a) Manure scraped out daily
(1) Automatic scrapers
(2) Small tractors with blades (skid-steer loader)
(b) Manure stored until spread on a field for fertilizer
(c) Sawdust, wood chips, loose bedding mixed with manure

b) Disposal of dead animals
1) Disposed of by renderers or in a sanitary landfill
(a) Arrangements made to have carcass picked up away from other animals
(b) Take away within 24 hours of death if possible
2) Burial
(a) Buried in a pit deep enough to cover a carcass with at least 4 feet of soil
(b) Pit located in an isolated area that will prevent groundwater contamination
3) Composting alternative
4) Rubber gloves and protective clothing
(a) Worn when handling dead animals
(b) Reduce contact with disease-causing agents

4. Sanitation is a major factor to consider on a dairy operation. Consumers expect the milk they buy at the store to be safe to drink. Have students list ways that the milking parlor and facilities can be contaminated. Then discuss how an operation can be managed safely, keeping everything sanitary. Point out to students the importance of sanitation in meeting governmental regulations.

What are the sanitation requirements for milk production?

a) Sanitation program
1) Necessary to reduce microorganisms that could contaminate milk
2) Permit through Missouri State Milk Board to market Grade A milk
3) Local University Extension agents or Health Department - sanitation ordinances or standards in county or area
4) Milking parlor and all equipment used in the milking process
(a) Thoroughly cleaned after each milking
(b) Ensure sanitary conditions

b) Cleaning milking equipment
1) Automatic clean-in-place (CIP) washing systems
(a) Allow equipment to be cleaned without taking it apart
(b) Circulate water and cleaning agents through the system
2) Pipeline milker
(a) Rinsed with lukewarm water at 110°F to remove milk residue
(b) Washed using hot water at 165°F with chlorinated detergent or alkali cleaner
(c) Rinsed with lukewarm water at 110°F with organic acid to remove mineral deposits
3) Bulk tanks - cleaned using same cycle as milking system

5. Ask students to list types of equipment necessary for a dairy operation. Discuss the various types of equipment.

What equipment is required for dairy operations?

a) Handling equipment
1) Headgate
2) Squeeze chute

3) Loading chute
b) Trailer
c) Feeder
d) Waterer
e) Milking equipment
1) Pipeline milker
(a) Most common type of milker in use today
(b) Milking unit attached to the cow's teats and pulsating vacuum system removes milk from udder
(c) Milk flows
(1) Through cluster, or claw, through pipeline to receiver
(2) Receiver pumps to bulk tank
(d) Reduced amount of labor necessary during the milking process
2) Bulk tank
(a) Refrigerated, stainless steel tank for storing milk
(b) Milk rapidly cooled to 38° to 40°F to prevent bacterial growth
(c) Must be large enough to store milk until a truck from the processor comes

6. Have students list different types of records that might be important for a dairy producer. Discuss the importance of keeping accurate records.

What records should be kept?

a) Facilities and equipment
1) Date purchased
2) Upgrades
3) Maintenance work on the equipment
4) Depreciation cost associated with each piece of equipment to provide an accurate record of its value
5) Accurate, updated inventory showing all of the operation's assets, including the value of all buildings and equipment
b) Milk production
c) Breeding, herd health, and sires used

F. ***Other Activities***

Conduct a field trip to a local dairy operation. The field trip should include a tour of the barn and the milking parlor. Ask the students what kind of manure handling system was used on the farm.

G. ***Conclusion***

The facilities and equipment used in a dairy operation are crucial to the overall success of the operation. to meet current demands as well as future plans. Facilities for dairy cattle include barns and milking parlors. Manure disposal should be carefully planned because milk production takes place within facilities that must be sanitary. Good sanitation is a vital part of the success of the dairy farm. Equipment for a dairy operation includes a milking machine and bulk tank.

H. ***Answers to Evaluation***

1. c
2. c
3. a
4. d
5. b

6. Answers may include any two of the following: management practices, size, location, location of facilities on the operation, waste disposal, and electrical requirements.

7. Clean-in-place; automatic clean-in-place systems allow milking equipment to be cleaned without taking it apart by circulating water and cleaning agents through the system.

8. Pipeline milker and bulk tank

9. Depreciation cost

10. Recycled lagoon water

UNIT VII - FACILITIES AND EQUIPMENT Name_____

Lesson 2: Dairy Facilities and Equipment Date_____

EVALUATION

Circle the letter that corresponds with the best answer.

1. Which of the following types of milking parlors are cows lined up at a 90-degree angle to the pit for milking?

   a. Herringbone
   b. Rotary
   c. Parallel
   d. Polygon

2. How should a producer dispose of a dead cow?

   a. Put the carcass in a remote part of the pasture
   b. Throw the carcass in a ditch
   c. Arrange with a disposal service to pick up the carcass
   d. Drop the carcass in an abandoned well

3. What is the most common type of milking parlor?

   a. Herringbone
   b. Polygon
   c. Side-opening
   d. Parallel

4. An advantage of a free stall barn is:

   a. Ease of handling each animal.
   b. More individual attention to each animal.
   c. Securing animal with metal stanchions.
   d. Better cow disposition.

5. How often should milking equipment and facilities be cleaned?

   a. Before each milking
   b. After each milking
   c. Daily
   d. Weekly

Complete the following short answer questions.

6. What are two important considerations that affect facility requirements for dairy cattle?

   a.

   b.

7. What does CIP stand for, and how is it related to sanitation?

8. What are two pieces of equipment used in a milking parlor?

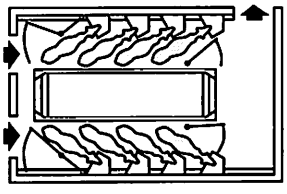
   a.

   b.

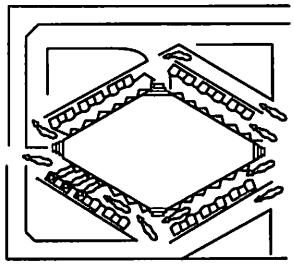
9. What information should be kept in the records for a piece of equipment to provide an accurate record of its value?

10. What type of water is used to flush manure from drains or alleyways?

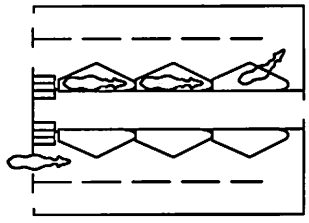
Milking Parlor Designs



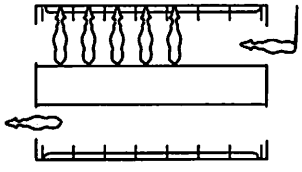
Double Herringbone



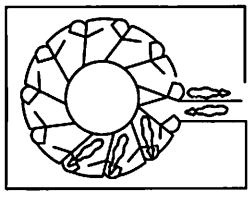
Polygon Herringbone



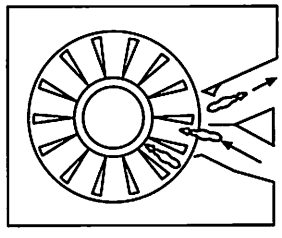
Double Side Opening



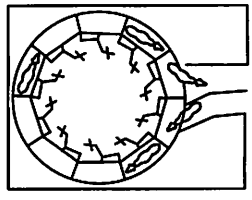
Parallel



Rotary Herringbone



Turnstyle



Rotary Tandem

UNIT VII - FACILITIES AND EQUIPMENT

Lesson 3: Facilities and Equipment for Swine

Competency/Objective: Identify facility and equipment needs for swine operations.

Study Questions

1. **What factors affect facility requirements for swine?**
2. **What are facility options from farrowing to finishing?**
3. **What are waste handling considerations in swine operations?**
4. **What are sanitation requirements for swine production?**
5. **What handling equipment is required for swine enterprises?**
6. **What other equipment is required for swine operations?**
7. **What records should be kept?**

References

1. *Advanced Livestock Production and Management (Student Reference).* University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit VII.
2. Transparency Masters
   a) TM 3.1: Farrowing Crate
   b) TM 3.2: Modified Open-Front Building
   c) TM 3.3: Slotted Floor Swine Housing
3. Activity Sheet
   a) AS 3.1 Swine Facilities and Equipment Collage

UNIT VII - FACILITIES AND EQUIPMENT

Lesson 3: Facilities and Equipment for Swine

TEACHING PROCEDURES

A. ***Review***

In the previous lesson, Lesson 3, the facility requirements for dairy cattle were discussed. The typical dairy facility is very advanced in regard to design and equipment. Swine operations have traditionally been less progressive, with production taking place in pastures or simple pens. However, in recent years, the trend in pork production has been toward more sophisticated confinement systems. Today, more hogs are generally raised on a single farm in large, automated facilities.

B. ***Motivation***

Ask students to list the different types of swine operations. Develop a list of the facilities and equipment necessary for the operation of each type of enterprise. Discuss the importance of having good facilities and equipment.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Discuss the importance of carefully planning the facilities for a particular swine operation. If possible, show students some pictures or slides with examples of facilities.

   What factors affect facility requirements for swine?

   a) Type of operation
   b) Location of facilities on the farm
   c) Amount of land available
   d) Size of the operation
   e) Space required per head
   f) Storage requirements for feed and supplies
   g) Handling methods
   h) Cost and labor associated with facility development and use
   i) Expansion opportunities
   j) Waste disposal requirements
   k) Factors when designing a particular building
      1) Year-round weather conditions
      2) Ease of access to the facility
      3) Ventilation needs
      4) Electricity requirements
      5) Water needs
      6) Type of floor
      7) Bedding requirements
      8) Feed/bedding storage

2. Discuss the fact that there are different facility options for each swine enterprise. Have students list the facility needs for farrow-to-finish enterprises and discuss how they differ from feeder pig or feeder pig finishing enterprises. Discuss the design of different facilities. TMs 3.1, 3.2, and 3.3 can be used to illustrate the discussion.

What are facility options from farrowing to finishing?

a) Facilities for the breeding herd
   1) Boars housed in individual crates or pens
   2) Sows and gilts
      (a) Crates
      (b) Crate/pen systems
      (c) Group pens
   3) Should provide adequate space for each animal

b) Confinement facility for farrowing purposes
   1) Must provide adequate ventilation
   2) Partially or totally slotted floors
   3) Warm, dry, and free from drafts
   4) Farrowing in pens or in crates
      (a) Pens
         (1) Provide more space for the movement of the sow
         (2) Require more intensive management
         (3) More time spent cleaning pens and managing the sow during the farrowing process to ensure the safety of the piglets
         (4) Guard rails used to keep the sow from laying on the pigs
      (b) Crates
         (1) Narrow and only provide enough room for the sow to stand or lie down
         (2) Separate area where the pigs sleep when they are not nursing
         (3) Sow less likely to kill her pigs by laying on them
         (4) Less labor required to manage the farrowing process
   5) Generally use automatic feeding and watering systems
   6) Usually have facilities for the storage of feeds as well as medical supplies; feed stored in bins next to the facility
   7) May also have a washing unit designed to cleanse the sows before they are put in the farrowing crate

c) Nursery
   1) Separated from the farrowing house to aid in disease prevention
   2) Designed to raise hogs from weaning to about 35 pounds
   3) Moved from the farrowing crate or pen to the nursery at five to eight weeks after farrowing
   4) Pig brooder often provided with a heat lamp or some other type of heating in the brooder area to keep the pigs warm
   5) Generally use slotted floors for removal of fecal matter
   6) Mechanized equipment for feeding and watering

d) Three basic styles of confinement facilities for finishing swine
   1) Should be aware of the temperature and humidity levels in each type of facility
   2) Carefully manage the number of head per pen to decrease the chances of problems such as tail-biting, slow rates of gain, and cannibalism
   3) Recommended that pigs be sorted by sex and placed in pens with no more than 25 to 30 animals per pen
   4) Should remove pigs exhibiting gaining problems, injuries, or cannibalism and place them in separate pens for treatment or special feeding and handling
   5) Open front buildings
      (a) Have about half of the pen extending out from the front of the building
      (b) Animals - enter and leave freely
      (c) Designed to protect the animals from wind and inclement weather during the winter and provide ventilation during the summer
      (d) Usually use slotted floors or solid inclined floors
      (e) Feeders and waterers included in each pen; may be automated, depending on the size of the operation
      (f) Covered section usually divided by solid partitions to reduce winter drafts
   6) Modified open front building

(a) Pens covered completely by the roof
(b) One open side
(c) Generally has the same requirements as the open-front facility

7) Totally enclosed housing
(a) No large openings to the outside
(b) Typically require heating in the winter and cooling in the summer
(c) Interior divided into several pens separated by a central service alley
(d) Average of 25 pigs in each pen
(e) Manure generally stored in pits under slotted floors; may be partially or totally slotted
(f) Provide adequate ventilation at all times in this system
(g) Must carefully control the moisture and temperature levels to avoid diseases and respiratory problems
(h) Moisture levels controlled by using fans to provide ventilation and reduce the humidity
(i) Temperature controlled by adding a heating system if the facility is located in a cold climate
(j) In warmer climates, heat supplied by the animals' bodies and controlled by raising or lowering exterior wall panels
(k) Some facilities computer controlled and automatically provide proper heating, cooling, and ventilation to maintain a set temperature and humidity level
(l) Automated feeding and watering systems frequently used in totally enclosed buildings

8) Wean-to-finish facilities
(a) New trend in pork production
(b) Can be used for finishing the hogs
(c) Pigs placed in the building at weaning and remain there until slaughter
(d) Designed to meet the needs of both young pigs and older animals.
(e) Provide ventilation and heating suitable for weaned pigs provided, along with enough space to accommodate the pigs as they grow
(f) Feeders and waterers usable at all ages
(g) Slotted floors generally used

3. Discuss the role proper disposal of manure and carcasses play in the overall productivity of an operation.

What are waste handling considerations in swine operations?

a) Removal of manure
1) Slotted floors
(a) Allow for easy removal of manure
(b) Movement of the animals - works the manure through the slats into a pit placed below the floor
(c) Manure held in the pit until it is removed by a flushing system and transferred to a holding lagoon
(d) Pit system in an enclosed barn - must maintain adequate ventilation for odor control and to avoid the build up of dangerous gases
(e) More expensive than solid floors

2) Solid floors
(a) Scrapers or small tractors with blades used to remove the manure and bedding
(b) Manure scraped out of the building and piled up for removal to a field for use as fertilizer
(c) Inclined solid floors used with power washing equipment and flush gutters in some facilities to remove manure

b) Disposal of animal carcasses
1) Facilities designed to allow dead animals to be removed easily

2) Can hire companies to transport dead animals to a landfill or rendering plant
3) Should be picked up away from buildings or live animals housed on the operation to keep the truck from contaminating the operation with other diseases
4) Other options for disposal
   (a) Burial in pits
   (b) Composting
      (1) Involves placing dead animals in bins on a pile of sawdust and covering them with more sawdust
      (2) Break down into compost
      (3) Takes about six months
      (4) Compost spread as fertilizer

4. Discuss the importance of proper sanitation with the students. Have the students give examples of sanitation needs when dealing with swine enterprises.

What are sanitation requirements for swine production?

a) Provide showers and dressing areas for employees and guests entering the operation on totally enclosed confinement operations.
b) Keep all facilities and equipment clean and sanitized to decrease the chances for illness and disease in the herd.
   1) Sweeping barn floors
   2) Controlling dust with a misting system
   3) Sterilizing equipment
c) Make certain that all dead or sick animals are removed from or contained within the facility immediately to prevent the spread of disease.

5. Have students list different types of handling equipment used for swine operations. Discuss the various types of handling equipment.

What handling equipment is required for swine enterprises?

a) Holding and crowding pens for moving and sorting hogs
b) Cutting gates - allow producers to direct pigs into a particular pen
c) Blocking gates - keep other hogs from moving through an alley
d) Portable or stationary loading chutes
e) Transfer or moving crates that attach to the back of a tractor
f) Trailers

6. Have students list other equipment that might be used in a swine operation.

What other equipment is required for swine operations?

a) Feeders
b) Waterers
c) Weigh scales
d) Ear notchers
e) Castration knives
f) Syringes
g) Needle teeth clippers

7. Have students identify the various types of records that should be kept for facilities and equipment.

What records should be kept?

a) Accurate, updated inventory of all equipment and buildings listing their value

b) Equipment records for large and expensive pieces of equipment
   1) Depreciation cost associated with each piece of equipment
   2) Maintenance worksheet
      (a) Date purchased
      (b) Upgrades
      (c) Maintenance
      (d) Other pertinent information regarding upkeep

F. ***Other Activities***

If possible, have students visit a swine operation and tour the facilities. If a tour is not possible, the instructor may obtain permission to tour an operation and take pictures of the facilities and equipment. These pictures can be processed into slides to show to the class.

G. ***Conclusion***

The facilities and equipment used in a swine operation are very important to the overall success of the operation. A producer must plan the facilities taking into account the needs of the type of operation. Necessary facilities and equipment include housing for the animals and handling equipment. Other required equipment includes feeders and waterers. It is also important to plan for sanitation and waste disposal on the operation.

H. ***Answers to Activity Sheets***

Results will vary.

I. ***Answers to Evaluation***

1. a
2. c
3. b
4. b

5. Answers may incude any three of the following: type of operation, location of the facilities on the farm, the amount of land available, the size of the operation, the space required per head, storage requirements for feed and supplies, the handling methods employed by the producer, the cost and labor associated with developing and using the facilities, the opportunity for growth and expansion, year-round weather conditions, ease of access to the facility, ventilation needs, electricity requirements, water needs, the type of floor, bedding requirements, and feed/bedding storage space.

6. Answers may include any three of the following: holding and crowding pens, cutting gates, blocking gates, portable or stationary loading chutes, transportation or moving crates, and trailers.

7. Depreciation costs and maintenance worksheet

8. Answers may include any two of the following: feeders, waterers, weigh scales, ear notchers, castration knives, syringes, and needle teeth clippers.

9. Burial and composting

10. A narrow crate that only provides enough room for a sow to stand or lie down. The crate has a separate area where the pigs sleep when they are not nursing.

UNIT VII - FACILITIES AND EQUIPMENT Name _____

Lesson 3: Facilities and Equipment for Swine Date _____

EVALUATION

Circle the letter that corresponds with the best answer.

1. When visitors or workers arrive at a confinement facility, _____ to ensure sanitation.

   a. Shower and change clothes in a dressing area.
   b. Sign a waiver or clearance sheet.
   c. Wash their hands before entering the facility.
   d. Wipe their shoes before entering the facility.

2. Nurseries are designed to raise hogs from:

   a. 5 to 8 weeks of age
   b. 12 to 14 weeks of age
   c. Weaning to 35 pounds
   d. 35 pounds to 100 pounds

3. How is manure generally removed when using slotted floors?

   a. By scraping
   b. Through the movement of the pigs
   c. By scrubbing the floor with brooms
   d. Through the alley

4. How many pigs are generally placed in one pen in a finishing barn?

   a. No more than 10 to 15
   b. No more than 25 to 30
   c. No more than 45 to 50
   d. No more than 60 to 65

Complete the following short answer questions.

5. What are three factors to consider when planning a swine facility?

   a.

   b.

   c.

6. What are three pieces of handling equipment used on swine enterprises?

   a.

   b.

   c.

7. What two components should be included in equipment records for large, expensive pieces of equipment?

   a.

   b.

8. What are two examples of equipment, other than handling equipment, that may be used on swine operations?

   a.

   b.

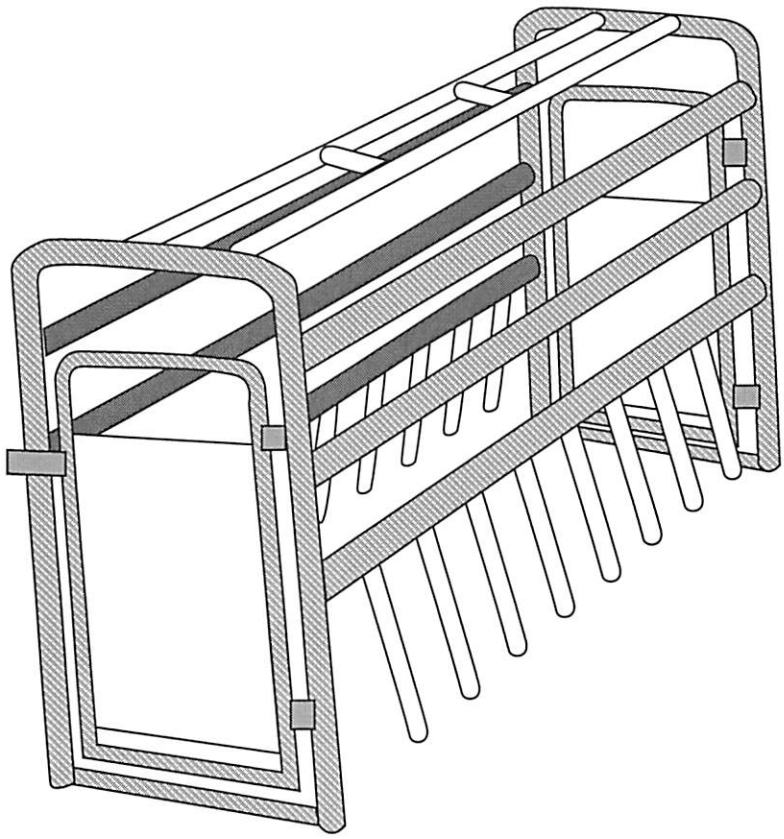
9. Other than hiring a company to pick up the dead animal, what are two ways of disposing of a carcass?

   a.

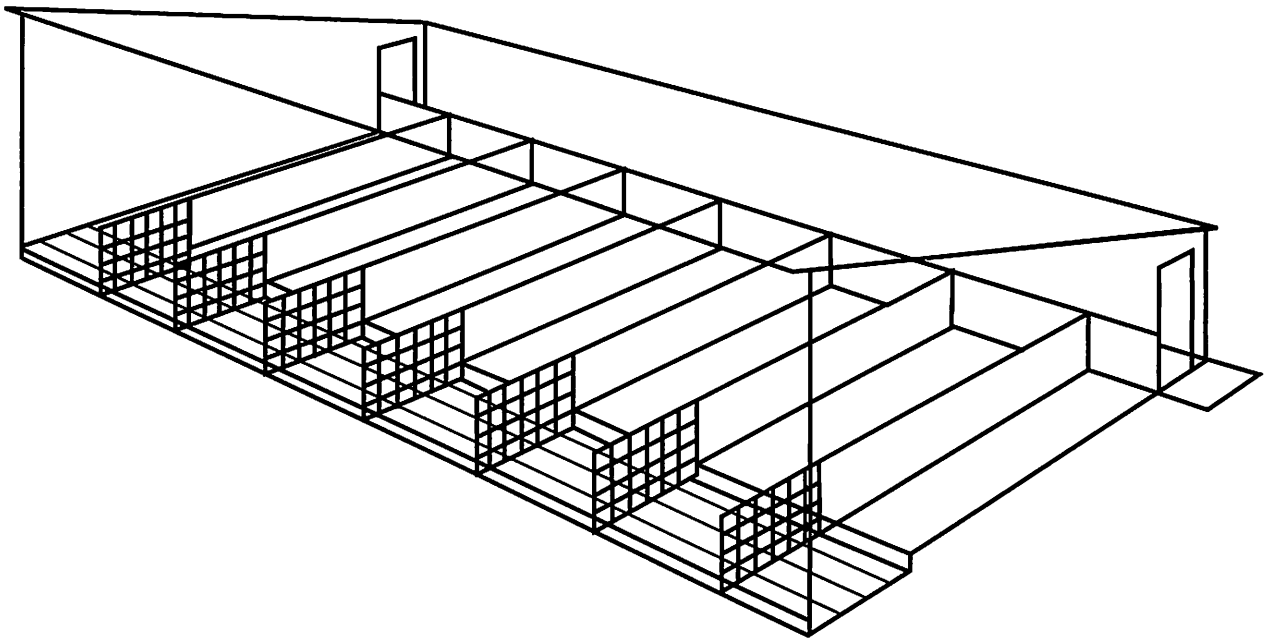
   b.

10. What is a farrowing crate?

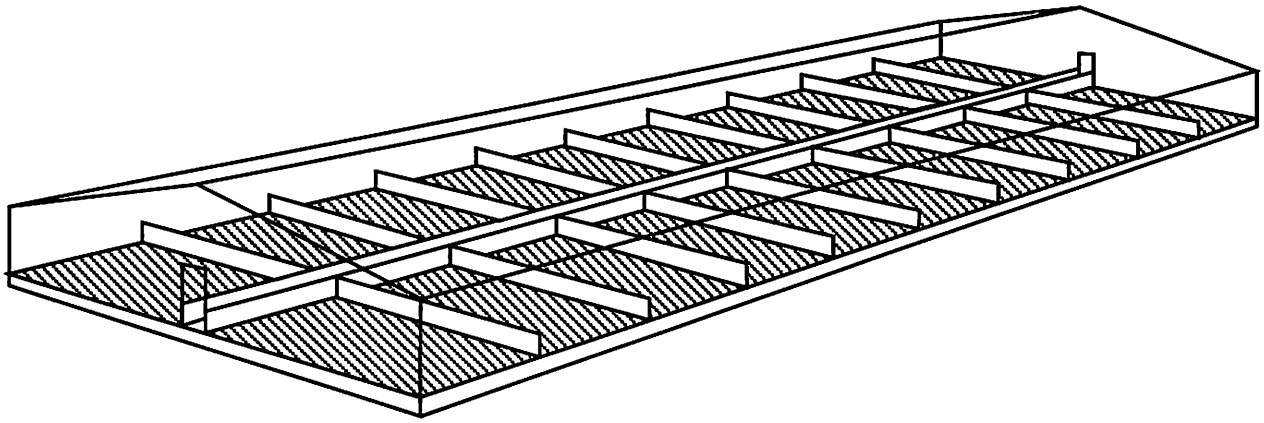
Farrowing Crate



Modified Open-Front Building



Slotted Floor Swine Housing



Lesson 3: Facilities and Equipment for Swine Name _____

Swine Facilities and Equipment Collage

Objective: Identify a variety of facilities and equipment that may be used in swine production.

Obtain pictures and drawings of several different types of swine facilities and equipment. The pictures should include the items listed below. Pictures may be found in agriculture publications, swine equipment and facility handbooks, and on the Internet. Cut out the pictures and paste them to a standard piece of white poster paper to form a collage.

- Feeders
- Waterers
- Farrowing crates
- Buildings
- Handling equipment

UNIT VII - FACILITIES AND EQUIPMENT

Lesson 4: Facilities and Equipment for Sheep

Competency/Objective: Identify facility and equipment needs for sheep.

Study Questions

1. **What factors affect facility requirements for sheep?**
2. **What facilities are used for sheep enterprises?**
3. **What are waste handling considerations for sheep enterprises?**
4. **What are the sanitation requirements in sheep production?**
5. **What handling equipment is required for sheep enterprises?**
6. **What other equipment is required for sheep operations?**
7. **What records should be kept?**

References

1. *Advanced Livestock Production and Management (Student Reference).* University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit VII.
2. Transparency Masters
   a) TM 4.1: Sample Corral for Small Flocks
   b) TM 4.2: Flight Zone of Sheep
   c) TM 4.3: Sample Sheep Barn
3. Activity Sheet
   a) AS 4.1: Dogs as Sheep Equipment

UNIT VII - FACILITIES AND EQUIPMENT

Lesson 4: Facilities and Equipment for Sheep

TEACHING PROCEDURES

A. ***Review***

Lesson 3 discussed the facility requirements for swine. Swine require much more intensive care than sheep. Sheep generally have facility needs similar to those for beef cattle. It is important for sheep producers to recognize that well-designed facilities and proper equipment reduce the workload and overall labor necessary to maintain a flock. Good facilities and equipment will therefore increase the productivity and profit of the sheep operation.

B. ***Motivation***

Ask students to list the different types of sheep operations. Develop a list of facilities and equipment that are necessary for each type of enterprise. Discuss the similarities and differences when compared to other species of livestock.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Discuss the importance of carefully planning the facilities for a sheep operation. If possible, show students pictures or diagrams of some different examples of facilities.

   What factors affect facility requirements for sheep?

   a) Type of operation
   b) Size of the operation
   c) Location of the operation
   d) Number of sheep to be handled at one time
   e) Number of head to be housed
   f) Location of the facilities on the operation
   g) Amount of land available
   h) Storage requirements for feed and supplies
   i) Handling methods employed
   j) Year-round weather conditions
   k) Flexibility of the facility
   l) Ease of access to the facility
   m) Ventilation needs
   n) Electricity requirements
   o) Water needs
   p) Type of floors
   q) Bedding requirements and storage
   r) Cost and labor associated with developing and using the facilities
   s) Opportunity for growth and expansion of the facilities
   t) Waste disposal requirements

2. Ask the students to list several tasks performed in sheep facilities. Point out that facility options will vary depending on the tasks performed on a particular sheep enterprise. Use TMs 4.1, 4.2, and 4.3 to illustrate the layout of a simple corral, the visual field and flight zone of sheep, and a simple barn.

What facilities are used for sheep enterprises?

a) Windbreaks and shelters
   1) May provide shelters to supply sheep with protection from the elements during cold, harsh winters when pastured outside
   2) Examples
      (a) Pile of stacked hay
      (b) Plywood wired to steel fence posts
      (c) Inexpensive open front shed

b) Corrals
   1) Constructed using high quality metal or wood fences
   2) Set up to drain moisture after a rain and reduce the handling stress of the livestock
   3) Designed to minimize the effort required to handle sheep
   4) Handling facilities like sorting pens and chutes
      (a) May be built into the corral system
      (b) Planned with activities in mind
         (1) Gathering
         (2) Sorting
         (3) Weighing
         (4) Tagging
         (5) Shearing
         (6) Trimming
         (7) Vaccinating
         (8) Worming
         (9) Castrating
         (10) Docking
         (11) Treating health problems
         (12) Monitoring ewes and rams during the breeding season
      (c) Should be centrally located near a barn or office where all equipment and necessary medications are easily accessible
      (d) Constructed to allow for sheep behavior
         (1) Have the ability to see behind themselves without turning, with a visual field of 270 to 320 degrees
         (2) Have a flight zone that affects their movement; moves if a person steps into the circle that forms the edge of the flight zone where the sheep can see him or her
         (3) Move toward freedom or an open space
         (4) Move toward a light or lit area
         (5) Move away from buildings and structures
         (6) Move uphill rather than downhill
         (7) Follow the animals in front of it
         (8) Move toward other sheep
         (9) Move more easily around curves or slight corners
         (10) Move at their own speed

c) Barns
   1) May be constructed inexpensively
   2) May serve more than one purpose
      (a) Shelter
      (b) Lambing
      (c) Shearing
      (d) Addition for storing feed and bedding
      (e) Office for record keeping activities and storing medications

3. The management of animal waste, whether it be manure or carcasses, is an important component of facility design. It should be considered when planning facilities. Discuss waste handling considerations.

What are waste handling considerations for sheep enterprises?

a) Producers do not have to deal with handling manure if sheep are pastured because it will naturally break down, although sheep should be kept out of water sources to avoid contamination.
b) If a producer has a barn for housing sheep, she or he must consider how waste will be handled.
    1) Some operations may consider using a slotted floor above pits that hold manure and other waste.
    2) The expense of including this type of floor is not justified for most operations.
    3) They generally use solid floors and manually clean the facility.
    4) A tractor and blade may be used to move the manure to a chosen location for storage until it can be spread as fertilizer.
c) Producers also need to plan for the disposal of carcasses by rendering, placing them in a sanitary landfill, incineration, or burial.

4. The importance of sanitation can sometimes be overlooked by producers in the livestock industry. Not paying attention to sanitation could cause economic losses from diseases or lowered productivity. Describe sanitation requirements for sheep operations.

What are the sanitation requirements in sheep production?

a) If a producer hires someone to come onto the operation and shear the flock, then he or she must ensure that all the items being brought onto the operation are sanitized properly.
    1) Shearing equipment
    2) Portable facilities brought onto the farm by the shearing crew
b) Producers should also keep all other working facilities and handling equipment clean and sanitary.
    1) Sweeping barn floors
    2) Controlling dust
    3) Sterilizing equipment

5. Discuss the various types of handling equipment used in a sheep cattle operation. Describe the basic handling equipment. If possible, show them examples of equipment designed for use with sheep. Have students complete AS 4.1.

What handling equipment is required for sheep enterprises?

a) Portable and stationary loading chutes
b) Trailers are used when transporting sheep
c) Fencing panels
    1) Used to construct pens and handling areas
    2) Easily stored
    3) Can be quickly realigned once they are set in place to change the layout of a pen.
d) Trained dogs
e) Handling for management activities
    1) Chute and headgate
    2) Sheep chair
        (a) Useful for smaller flocks
        (b) Holds the sheep on its rump, the same position used for shearing
        (c) Sheep backed into the webbing that forms the seat and then tipped backward
        (d) Used for a number of tasks
            (1) Treatment for health problems
            (2) Pregnancy tests
            (3) Vaccinations
            (4) Ear-tagging or tattooing

3) Tilt table and turning cradle
   (a) Used for larger flocks with over 100 ewes
   (b) Tilt table - turns the sheep on its side
   (c) Turning cradle - turns the sheep upside down

6. In addition to handling equipment, other pieces of equipment are necessary for a sheep enterprise. Discuss the other equipment needed.

What are other equipment requirements for sheep operations?

a) Feeders
   1) May utilize grain troughs, hay bunks, self-feeders, and fence line bunks
   2) Should be large enough to hold an adequate amount of feed to meet the needs of the animals
b) Waterers
   1) Can use a tank, trough, or automatic drinking cup
   2) Automatic waterers with heating elements - viable alternative for watering in the winter
   3) Placed in the shade during the summer
   4) Should consider the safety of the livestock; all sheep should be able to climb out if they fall into the waterer
c) Mineral and salt feeders
   1) Should have a cover to protect the minerals from severe weather
   2) Placed near a water source because animals will be more likely to consume adequate amounts of minerals if fresh water is readily available
d) Weigh scale or weigh crate
e) Dipping tank
f) Foot bath
g) Showers or sprayers

7. One of the most important aspects of a livestock enterprise is keeping accurate and complete records. These records are useful at the end of the year when it is time to figure profit or loss. Discuss the records relating to facilities and equipment.

What records should be kept?

a) Accurate, updated inventory of all the facilities and equipment on the farm
b) Equipment records, especially for large, expensive pieces of equipment
   1) Depreciation cost for the equipment
   2) Maintenance worksheet
      (a) Date the piece of equipment was purchased
      (b) Upgrades
      (c) Maintenance
      (d) Other pertinent information regarding its upkeep

F. ***Other Activities***

1. If a local producer is about to shear his or her sheep, arrange a field trip to the operation. Have students note the facilities and equipment used on the operation.

2. If a local producer has a sheep dog, ask the producer to demonstrate the function and value of the dog.

G. ***Conclusion***

The facilities and equipment used in a sheep operation are crucial to the overall success of the operation. A producer must plan the facilities based on the needs of the operation, as well as a number

of other factors that affect facility requirements. Waste disposal and sanitation, for example, should be considered when designing any facility. Good equipment is also important to the success of the operation.

H. ***Answers to Activity Sheets***

Answers will vary.

I. ***Answers to Evaluation***

1. c
2. b
3. d
4. d

5. Answers may include any two of the following: feeders, waterers, mineral and salt feeders, weigh scale or weigh crate, dipping tank, foot bath, and showers or sprayers.

6. To reduce contamination

7. Answers may include any three of the following: gathering, sorting, weighing, tagging, shearing, trimming, vaccinating, worming, castrating, docking, treating health problems, and monitoring ewes and rams during the breeding season.

8. Inventory of all the facilities and equipment and equipment records

9. The sheep will move if a person steps into the circle that forms the edge of the flight zone within the sheep's visual field.

10. Answers may include any two of the following: type of operation, size of the operation, location of the operation, number of sheep to be handled at one time, number of head to be housed, location of the facilities on the operation, amount of land available, storage requirements for feed and supplies, handling methods, year-round weather conditions, flexibility of the facility, ease of access to the facility, ventilation needs, electricity requirements, water needs, type of floors, bedding requirements and storage, cost and labor associated with developing and using the facilities, and opportunity for growth and expansion of the facilities.

UNIT VII - FACILITIES AND EQUIPMENT Name _____

Lesson 4: Facilities and Equipment for Sheep Date _____

EVALUATION

Circle the letter that corresponds to the best answer.

1. What type of floor is generally used in sheep facilities?

   a. Slotted
   b. Slatted
   c. Solid
   d. Grated

2. A sheep chair holds the sheep on its:

   a. Head.
   b. Rump.
   c. Back.
   d. Side.

3. Sheep have a visual field of:

   a. 170 to 220 degrees.
   b. 200 to 250 degrees.
   c. 220 to 270 degrees.
   d. 270 to 320 degrees.

4. If a shearing crew comes onto the sheep operation, what should producers do to ensure sanitation?

   a. Have the crew sweep the barn floor.
   b. Have the crew transport manure away from the facility.
   c. Have the crew clean the operation's fencing panels.
   d. Have the crew sanitize their shearing equipment.

Complete the following short answer questions.

5. In addition to handling equipment, sheep enterprises require other types of equipment. What are two other pieces of equipment that an operation might need?

   a.

   b.

6. Why should sheep be kept out of water sources?

7. What are three activities that are normally completed in the handling facilities of a sheep corral?

   a.

   b.

   c.

8. What are two types of records related to equipment and facilities that should be kept for a sheep operation?

   a.

   b.

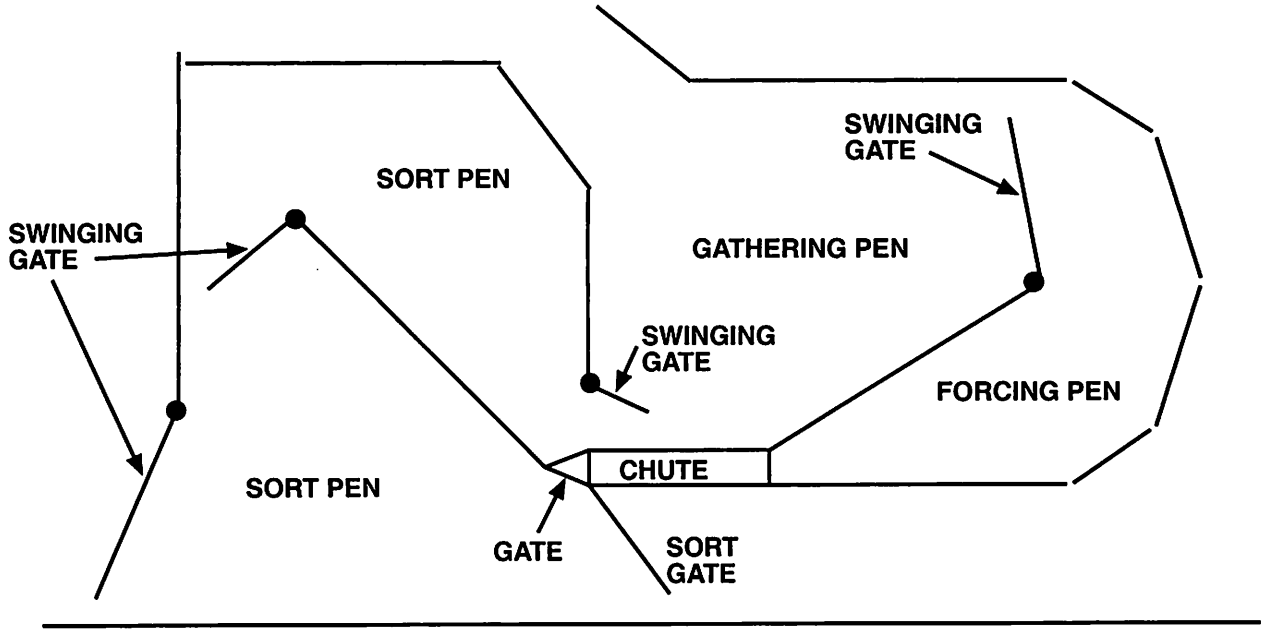
9. How does the flight zone affect the movement of a sheep?

10. What are two factors that affect facility requirements for sheep?

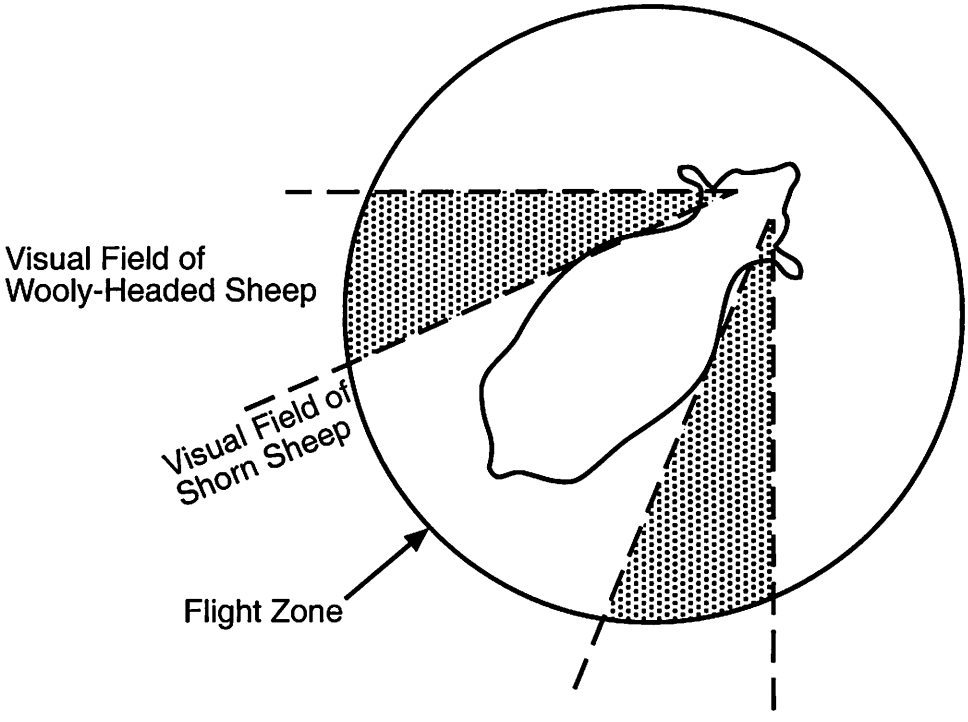
    a.

    b.

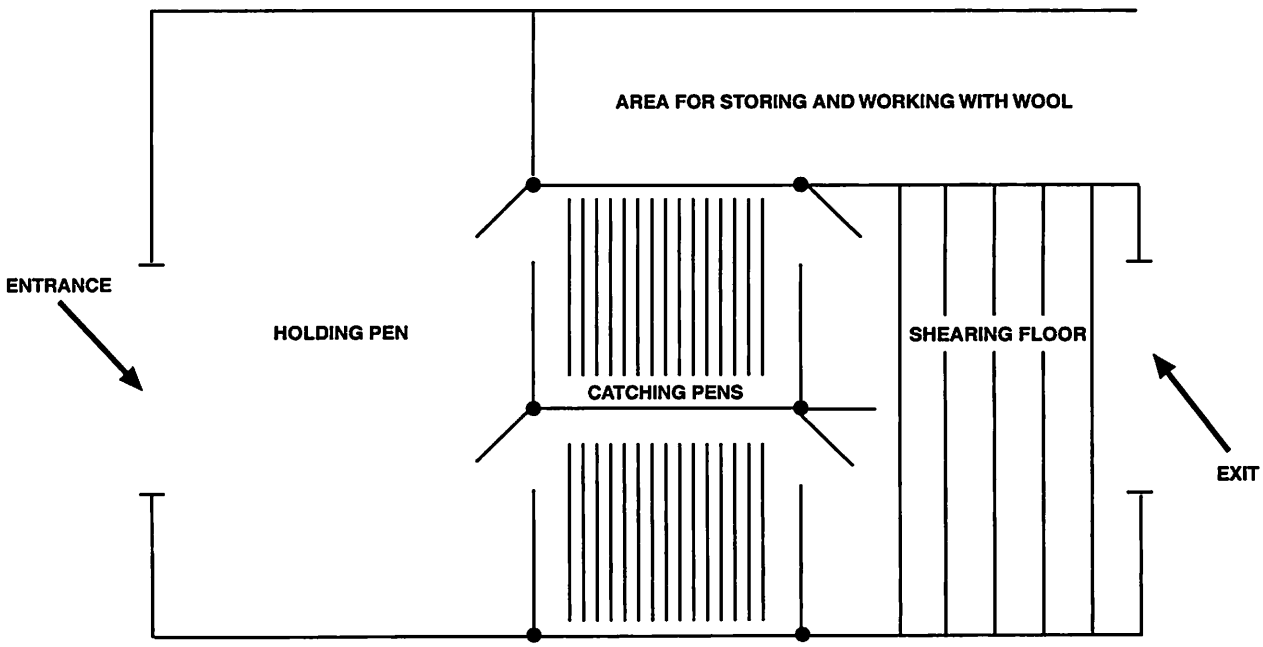
Sample Corral for Small Flocks



Flight Zone of Sheep



Sample Sheep Barn



Lesson 4: Facilities and Equipment for Sheep Name _____

Dogs as Sheep Equipment

Objective: Describe the value of using a dog when handling sheep.

Select a dog breed that is commonly used for handling sheep. Research the breed using the library, the Internet, or encyclopedias. Prepare a report that includes (but is not limited to) the items listed below. Include a picture of the dog breed selected.

Name of the breed, description and characteristics, value to sheep producers or why and how they are used, where they may be purchased, basic training of the dog, number of sheep they may control, and where a producer may find information on sheep dogs.

UNIT VII - FACILITIES AND EQUIPMENT

Lesson 5: Facilities and Equipment for Horses

Competency/Objective: Identify facility and equipment needs for horses.

Study Questions

1. **What factors affect facility requirements for horses?**
2. **What facilities are used for horse enterprises?**
3. **What are waste handling considerations for horse operations?**
4. **What are sanitation requirements in horse production?**
5. **What handling equipment is required for horse enterprises?**
6. **What other equipment is required for horse enterprises?**
7. **What records should be kept?**

References

1. *Advanced Livestock Production and Management (Student Reference).* University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit VII.
2. Transparency Masters
   a) TM 5.1: Horse Barn
   b) TM 5.2: English and Western Saddles
   c) TM 5.3: Common Bridles
3. Activity Sheet
   a) AS 5.1: Saddles, Bits, and Bridles

UNIT VII - FACILITIES AND EQUIPMENT

Lesson 5: Facilities and Equipment for Horses

TEACHING PROCEDURES

A. ***Review***

Lesson 4 described the facility and equipment requirements for sheep. Sheep and horses are similar in that they do not require expensive facilities for survival. Horses basically need some shelter to protect them from extreme weather conditions and ordinary feeding and watering equipment. However, many horse enterprises have much more elaborate facilities. Producers must plan carefully when designing facilities for a horse operation to ensure that the facilities are safe and effective. They should also select the proper equipment for the operation.

B. ***Motivation***

Ask students to list the types of facilities and equipment that might be used on a typical day on a horse operation.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Discuss the importance of carefully planning the development of facilities and equipment for each horse enterprise. Describe the factors that may affect facility requirements for horses.

   What factors affect facility requirements for horses?

   a) Type of operation, which affects the purpose of the facility
   b) Amount of capital available
   c) Size of the operation
   d) Ventilation to supply fresh air to the animals and to the handler working with the animals
      1) Reduces dust and odor buildup within the building
      2) Reduces the humidity level
      3) Helps prevent respiratory problems
   e) Space
      1) Require more space than other common farm animals
      2) Must provide plenty of space, or horses may develop bad habits because they are bored
   f) Safety of horses and handlers
   g) Efficient use of labor
   h) Attractiveness

2. Ask students to list several tasks performed in horse facilities. Discuss the characteristics of these facilities. If possible, show students some different examples of horse facilities. TM 5.1 shows an example of a horse barn.

   What facilities are used for horse enterprises?

   a) Shelters
      1) Protects the horses from the weather
      2) May be included in a pasture
      3) May be enclosed on three sides to provide protection from the wind

4) May consist of a roof to produce shade for the horses

b) Corrals or turnout lots
   1) Necessary for horse operations because horses are generally much healthier when kept outside
   2) Fences
      (a) Constructed using wood boards, barbless wire, woven or high tensile wire, metal pipe, or polyvinyl chloride (PVC) boards or pipe
      (b) Should never use barbed wire because it may injure the horses
      (c) More sturdy fences required for large breeds of horses, young horses, and stallions
   3) Pens set up to drain well and reduce the handling stress of the horses

c) Barns
   1) Should be located in an area with good drainage so that manure and urine can be washed away
   2) Should have interior surfaces that are easily cleaned and sanitized
   3) Must have good ventilation without drafts
   4) Should be well lit
   5) Should include a storage area for feed, bedding, tack, and other necessary equipment
   6) Flooring
      (a) Generally made of clay or wood
      (b) Concrete floors - hard on horses' feet and legs and tend to get slippery when wet
      (c) Easier to provide straw or some other bedding material on a clay or wood floor
      (d) Straw or wood shavings - good bedding for horses
      (e) Top foot of clay removed and replaced yearly to decrease the incidence of disease and parasites
   7) Specialized types of barns
      (a) Used for a particular purpose
      (b) Vary somewhat in design and layout
      (c) Specialized structures
         (1) Stallion barn
         (2) Breeding shed
         (3) Broodmare/foaling barn
         (4) Boarding stable
         (5) Training stable

d) Indoor training area
   1) May be a part of the main barn or a separate building
   2) Used for exercising, training, or riding
   3) Width and height designed taking into account the activity for which it will be used

3. Ask students what role the proper disposal of manure and dead animals plays in the overall productivity of an operation. Discuss waste handling considerations.

What are waste handling considerations for horse operations?

a) Most horse facilities are built with wooden or clay floors, which will need to be taken into consideration when planning the method of waste removal.

b) The facility should be designed for easy removal of animal waste from horse stalls.
   1) Could load a small trailer with bedding and manure removed from each stall by hand
   2) Could build the facility so a tractor and blade can be used to drag waste from each stall
   3) Most producers with small horse enterprises - manure removed by hand
   4) Stalls often cleaned daily

c) Dead animals should be removed from the barn as soon as possible after they are found to help limit the spread of diseases.

d) Carcasses can be disposed of by rendering, placing it in a landfill, or burial.
   1) If a dead animal truck is coming to pick up a carcass, ensure that the dead animal truck does not come near the other horses or farm buildings
   2) If the horse is buried in a pit
      (a) Should be deep enough to cover the carcass with at least four feet of soil.
      (b) Should be in an isolated area where the burial will not contaminate groundwater

4. Discuss the need for proper sanitation in horse production. Ask students what measures should be taken to ensure good sanitation.

What are sanitation requirements in horse production?

a) Stalls should have absorbent bedding to help drain off urine and moisture from manure.
b) The frequent removal of manure and urine-soaked bedding is necessary to keep horse barns sanitary and control flies.
c) Manure should be spread frequently to prevent fly larvae from developing.
d) Sweeping barn floors, cleaning interior surfaces, controlling dust, and sterilizing equipment used to treat animals should be done on a regular basis.
e) Water and feed troughs should also be cleaned out to remove moldy hay and control diseases and parasitic activity.

5. The horse enterprise requires more handling equipment than is generally necessary for other farm animals. Discuss the equipment with the class. Show students TMs 5.2 and 5.3 to illustrate some basic types of equipment. Have students complete AS 5.1.

What handling equipment is required for horse enterprises?

a) Horse trailer
   1) Two important considerations
      (a) Safety
      (b) Protection of the horse
   2) Should be equipped with brakes
   3) Safety chain - should be attached to the hitch
   4) Padded chest bar - helps prevent injury to the horse
   5) Rough or uneven floor surface - better footing for the horse
   6) Enclosed trailer - protects the horse from drafts
   7) Small door in the front of the trailer - allows a handler to leave the trailer after leading a horse inside
b) Tack
   1) Necessary for riding and showing horses
   2) Basic tack
      (a) Saddle
      (b) Saddle pad or blanket
      (c) Bridle
      (d) Halter
      (e) Lead rope
   3) Should be made of good quality materials
   4) Must fit the horse properly
   5) Saddles
      (a) Two most common types of saddles
         (1) Western - more durable utility saddles that provide more security for the rider
         (2) English - allows the rider to communicate with the horse using her or his legs, which is important in jumping or showing horses
      (b) Type of saddle used - depends on the style of riding
      (c) Important to check the fit by looking at the horse's body

(1) Length of the horse's back
(2) Shape and size of its withers
(3) Muscling and slope of its shoulders
(4) Girth of the ribs

6) Bit and bridle
   (a) Bit - controls the horse's movements, appropriate for the style of bridle chosen
   (b) Bridle - holds the bit in the horse's mouth
   (c) Type of bit and bridle - depends on the riding style
7) Halters
   (a) Used for tying and leading the horse
   (b) Made of nylon, leather, or rope
8) Expensive and should be given proper care
   (a) Leather
      (1) Kept clean and oiled
      (2) Saddle soap used to clean the leather
      (3) Should select an oil that does not rub off on clothing and keeps the leather soft and pliable
   (b) Must replace worn or broken parts of the tack

6. Discuss other types of equipment used on horse operations.

What other equipment is required for horse enterprises?

a) Feeders
   1) May include hayracks, mangers, and grain feeders
   2) Hay racks and mangers - may be built into stalls
   3) Grain feeders - should be removable for cleaning
   4) Concrete apron placed under the feeder if horses are fed outside
      (a) Prevents horses from standing in mud
      (b) Prevents horses from possibly eating dirt if feed should fall on the ground
b) Salt and mineral feeders - kept separate by feeding them in different feeders or in one feeder with different compartments
c) Waterers
   1) Should provide plenty of clean, fresh water
   2) Supply water using a hose or an automatic watering system
   3) Water tank, trough, or automatic waterer provided to hold the water
   4) Must be prevented from freezing in cold weather
d) Grooming supplies
   1) Daily grooming required to keep horses healthy and improve their appearance
   2) Grooming equipment
      (a) Currycombs
      (b) Mane and tail comb
      (c) Grooming cloth
      (d) Brushes
      (e) Ear clippers
      (f) Mane clippers
e) Hoof care supplies
   1) Regular foot care necessary to prevent damage to hooves
   2) Equipment for hoof care
      (a) Wire hoof brush
      (b) Hoof pick
      (c) May also have shoeing equipment if producers do not have a professional farrier (horse shoer)

7. Have students describe the types of records that should be kept for facilities and equipment.

What records should be kept?

a) Updated inventory of all the facilities and equipment
b) Equipment records, especially for large, expensive pieces of equipment
    1) Depreciation cost for the equipment
    2) Maintenance worksheet
        (a) Date the piece of equipment was purchased
        (b) Upgrades
        (c) Maintenance
        (d) Other pertinent information regarding its upkeep

F. ***Other Activities***

1. Have a producer demonstrate the proper methods for grooming and caring for a horse's hooves.

2. Several different types of knots (cinch knot, bowline, honda knot, and manger tie) are used for the ropes and leather strapping involved in handling horses. Have students research these knots and explain how they are used.

G. ***Conclusion***

The facilities and equipment used in a horse operation are vital to the overall success of the operation. Although horses basically only need shelter from the weather to survive, facilities on horse operations can be elaborate, including specialized features such as indoor training areas. The equipment needed for horse operations may be extensive, including tack, grooming supplies, and hoof care equipment. Horse production requires good facilities and equipment for an operation to be successful.

H. ***Answers to Activity Sheets***

Answers will vary.

I. ***Answers to Evaluation***

1. a
2. b
3. c
4. a

5. Answers may include any three of the following: type of operation, amount of capital available, size of the operation, ventilation, space, safety of horses and handlers, efficient use of labor, attractiveness.

6. Because barbed wire may injure the horses

7. Answers may include any two of the following: feeders, salt and mineral feeders, waterers, grooming supplies, and hoof care supplies.

8. English and Western

9. To control the horse's movements

10. Answers may include any two of the following: rendering, placing it in a landfill, or burial.

11. So that manure and urine can be washed away

12. Depreciation cost for the equipment and a maintenance worksheet

UNIT VII - FACILITIES AND EQUIPMENT Name _____

Lesson 5: Facilities and Equipment for Horses Date _____

EVALUATION

Circle the letter that corresponds with the best answer.

1. Why should manure be removed and spread frequently?

   a. To control flies
   b. To satisfy the horses
   c. To remove moldy hay
   d. To control dust

2. Which of the types of flooring listed below is recommended for horse barns?

   a. Concrete
   b. Clay
   c. Mud
   d. Tile

3. How do most producers with small horse enterprises remove manure?

   a. Through a slotted floor
   b. With a scraper
   c. By hand
   d. With a tractor and blade

4. Good ventilation in facilities:

   a. Helps prevent respiratory problems.
   b. Keeps horses warm.
   c. Dries out the manure.
   d. Is not necessary.

Complete the short answer questions below.

5. What are three factors that affect facility requirements on a horse operation?

   a.

   b.

   c.

6. Why should corrals and fences be made of wood or round pipe instead of barbed wire?

7. What are two types of equipment, other than handling equipment, that are used on horse operations?

   a.

   b.

8. What are the two common types of saddles?

   a.

   b.

9. What is the purpose of the bit in a bridle?

10. What are two methods for disposing of dead horses?

    a.

    b.

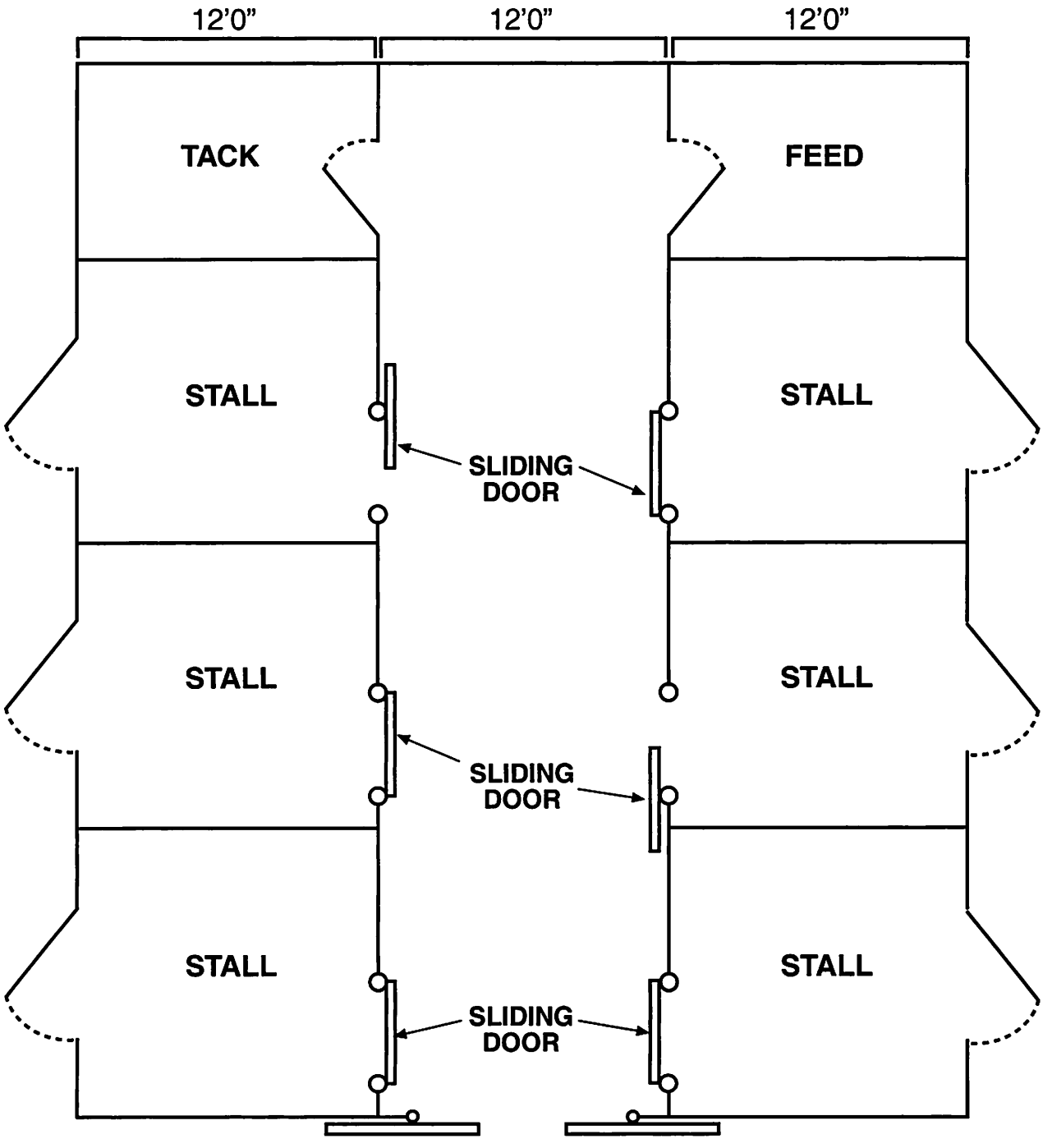
11. Why should barns be located in an area with good drainage?

12. What are two items of information that should be included in equipment records?

    a.

    b.

Horse Barn


12'0"
12'0"
12'0"
TACK
FEED
STALL
STALL
SLIDING DOOR
STALL
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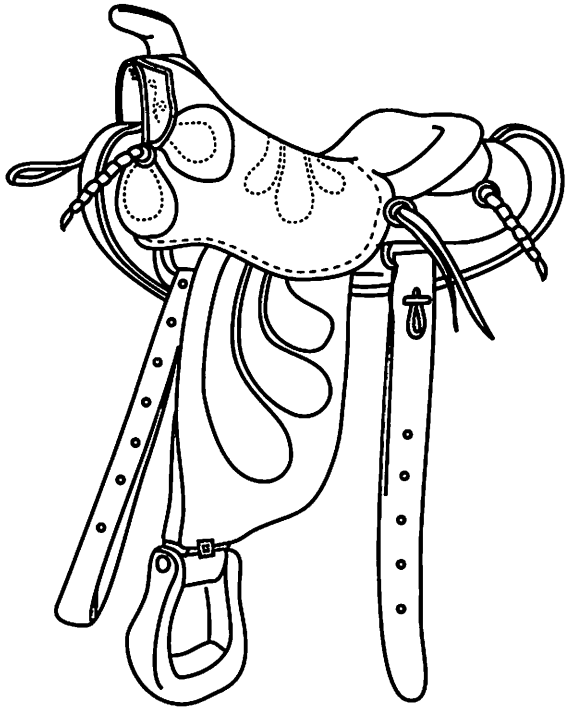
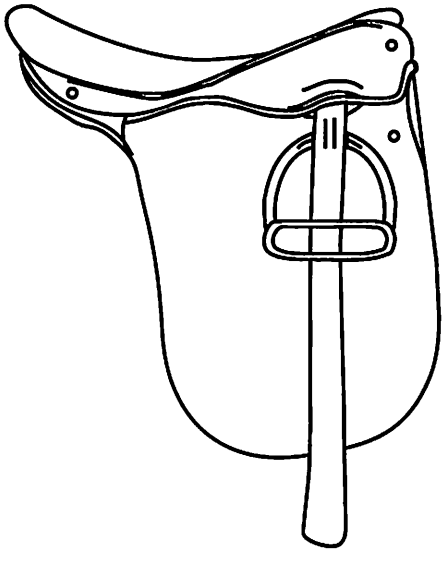
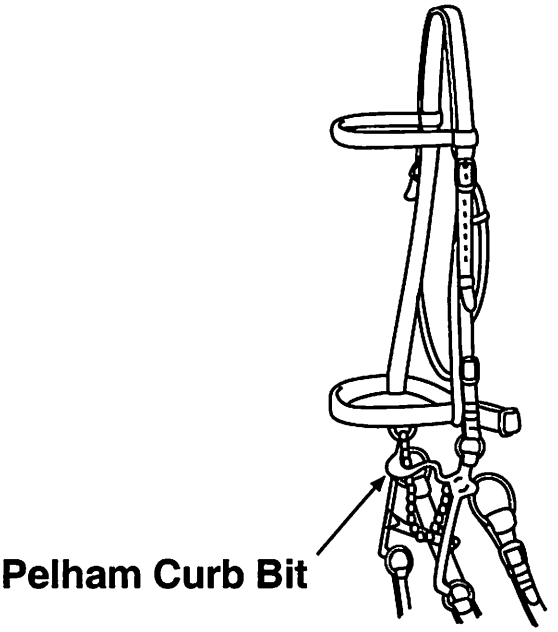
STALL
SLIDING DOOR
ENTRANCE

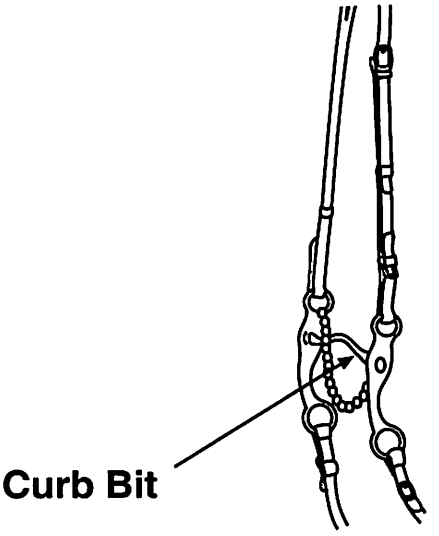
English and Western Saddles





Common Bridles





Lesson 5: Facilities and Equipment for Horses Name _____

Saddles, Bits, and Bridles

Objective: Demonstrate a knowledge of the tack used when handling horses.

Obtain pictures of different types of saddles, bits, and bridles from textbooks, horse supply catalogs, or the Internet. The pictures should include (but are not limited to) the tack listed below. Paste the pictures on pieces of paper. Next to each picture, write the name of the particular piece of tack and an explanation of its uses.

- Saddles - Western (stock), English (hunt-jumping), Lane Fox, dressage
- Bridles - Weymouth, Pelham, split ear
- Bits - Curb, snaffle, Dee race, hackamore, roper curbed-cheek, spade mouth

UNIT VII - FACILITIES AND EQUIPMENT

Lesson 6: Poultry Facilities and Equipment

Competency/Objective: Identify facility and equipment needs for poultry.

Study Questions

1. **What factors affect facility requirements for poultry?**
2. **What facilities are needed for commercial egg layers?**
3. **What facilities are needed for broiler and turkey production?**
4. **What facilities are needed for broiler and turkey breeders?**
5. **What facilities are needed for replacement pullets?**
6. **What are the waste handling considerations in managing poultry operations?**
7. **What are the sanitation requirements for poultry production?**
8. **What handling equipment is required for poultry enterprises?**
9. **What other equipment is required for poultry operations?**
10. **What records should be kept?**

References

1. *Advanced Livestock Production and Management (Student Reference).* University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit VII.
2. Activity Sheet
   a) AS 6.1: Designing a Poultry Production Facility

UNIT VII - FACILITIES AND EQUIPMENT

Lesson 6: Poultry Facilities and Equipment

TEACHING PROCEDURES

A. ***Review***

Lesson 5 described the facilities and equipment required for horses. As long as certain standards are met, horse owners have a wide range of options in terms of facilities. Poultry facilities, on the other hand, are generally fairly standard in design. The aim of such housing is to raise birds in an environment that is as stress-free as possible. The birds will then be healthy and vigorous, producing a high quality product consisting of either meat or eggs.

B. ***Motivation***

Have students break into groups and blindly point to a spot on a map of United States. They should then make a list of the factors they would need to take into account if they were to build a poultry production facility on this site.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Ask students how facility needs may change if a poultry producer raises his or her birds at the Equator or in Canada. Discuss the factors that affect facility designs for poultry.

   What factors affect facility requirements for poultry?

   a) Temperature
      1) Poultry species perform acceptably in temperatures ranging from 35 to 85 degrees Fahrenheit.
         (a) Optimum - 55 to 70 degrees Fahrenheit for layers
         (b) Optimum - 75 degrees Fahrenheit for broilers
      2) A poultry house should be designed to protect the birds from rapid changes in temperature.
      3) Feathers provide some protection from cold temperatures, but egg and meat production are reduced.
      4) Poultry have little protection from hot temperatures because they do not have sweat glands.
      5) Proper insulation can help poultry houses regulate temperature.
      6) Ventilation systems can also help to keep birds cool in the summer.
   b) Moisture
      1) Relative humidity in poultry houses should be between 50 and 75 percent.
      2) Excessive moisture leads to bacterial growth and an uncomfortable environment for the birds.
      3) Moisture comes from vapor given off by the birds, waterers, droppings, and wet litter.
      4) Moisture can be controlled by increasing air flow through ventilation systems.
   c) Ventilation
      1) Proper ventilation helps to expel moisture and stale air from the building and to regulate temperatures.
      2) Considerations in the design of ventilation systems include avoiding drafts and the entrance of cold air.

3) In most poultry houses, electric fans move fresh air through the building, which has inlets to let in fresh air and outlets for the removal of moist, stale air.
4) Natural ventilation from windows may be used, but it is only acceptable for relatively small houses and smaller flocks.

d) Lighting
1) Lighting systems are crucial to laying house operations because light is used to stimulate hens to lay eggs.
2) Proper lighting is also important for broilers and turkeys, both of which should receive a certain amount of light for optimum growth.
3) The lighting systems are automated to switch on and off at specified times.
4) Poultry houses should be equipped with a back-up generator.

2. Discuss the facilities needed for commercial laying operations, describing their design.

What facilities are needed for commercial egg layers?

a) Generally housed in environmentally controlled laying houses
b) May be housed on a slat or wire floor or on litter-covered solid floor
c) Majority kept in cages
1) Contain 2 to 25 birds
2) Should allow each bird at least 54 to 64 square inches of floor space
3) Usually placed in a stair-step arrangement of three to five rows
4) Droppings
(a) Fall through the cage floor into pits or onto dropping boards placed on top of the bottom cages
(b) Must scrape off dropping boards periodically
d) Must have a building for handling and storing eggs
1) Clean
2) Kept at the optimum temperature and humidity
3) Air-tight fumigation cabinet - standard if the producers fumigate the eggs

3. Describe the facilities needed for broilers and market turkeys.

What facilities are needed for broiler and turkey production?

a) Broilers
1) Generally raised in large, one-room, environmentally controlled poultry houses; may also use open houses with windows
2) Dimensions - from 24 to 40 feet wide and 200 to 600 feet long; generally holds between 7,200 to 20,000 broilers
3) May all be kept in one large pen, but producers may also divide the room into smaller units with wire fencing
4) Provide .8 to 1 square foot of floor space per bird
5) Generally use solid concrete flooring covered in litter
6) Commonly raise broilers from brooding to market under the same roof, with equipment such as portable feeders, waterers, a heat source, and brooding rings added during the first few weeks
b) Turkeys
1) Confinement housing consists of pole-type housing with natural ventilation or more structurally sophisticated, environmentally controlled poultry houses with concrete foundations
2) Require 3 to 5 square feet of space per bird depending on their size and sex

4. Discuss the differences in facilities for market and breeder broilers and turkeys.

What facilities are needed for broiler and turkey breeders?

a) Broiler breeders
   1) Usually kept in confinement housing
   2) Generally housed on a floor that has wooden or metal slats over two-thirds of the floor; the rest of the floor consists of an earthen floor covered with litter
   3) Flooring system - promotes fertility and clean eggs
   4) Should have approximately 2 feet of space per bird
   5) May need divided pens depending on the mating system used
b) Turkey breeders
   1) Confinement housing
      (a) Held in buildings covered with wire on all sides; producers commonly cover three sides with plastic during the winter months to protect the birds
      (b) May use portable fencing or dividers for breeding purposes
      (c) Provide 3 to 5½ square feet of space for each bird
c) Egg storage facilities for both turkey and broiler breeders

5. Discuss the facilities needed for replacement pullets.

What facilities are needed for replacement pullets?

a) Separate housing required
b) Generally the same as those used for brooding or for a laying flock of hens
c) Replacement pullets
   1) May be started on the floor in a brooder house during the brooding phase
   2) Then moved to a layer house
   3) Also often grown in cages from the time of hatching

6. Ask students what considerations are important in waste management in poultry production. What hazards are associated with dead animal disposal? How can dead animals be disposed of to avoid such problems?

What are waste handling considerations in managing poultry operations?

a) Manure handling in facility design
   1) Confinement housing on solid floors
      (a) Clean litter is periodically spread over soiled litter.
      (b) When the birds are sent to market, the manure-laden litter is scraped away with a front-end loader on a tractor or skid-steer loader.
   2) Slat floors
      (a) Manure falls into a pit for storage.
      (b) It may later be removed using a tractor or special mechanical equipment.
   3) Cage system - Special mechanical equipment may be used to remove manure from pits.
b) Handling of manure
   1) Lagoons for storing manure as it breaks down
   2) Pits for storing manure until it can be spread on fields as a wet or dry fertilizer
   3) Converting manure into animal feed
c) Handling the carcasses of dead birds
   1) Incineration
      (a) Incinerator - built on site or purchased
      (b) Eliminates foul odors, fly problems, and water pollution problems if done correctly
   2) Disposal pits
      (a) Airtight underground pits that are 7 feet deep and equipped with a tight lid
      (b) Should not be used where ground water may become contaminated
   3) Composting
      (a) Turned into compost using specially designed composters
      (b) Used for fertilizer

7. Ask students why it is so important that poultry facilities and equipment be kept sanitary. How can producers discourage the growth of bacteria and disease-causing microorganisms on the premises?

What are the sanitation requirements for poultry production?

a) Proper sanitation is accomplished by cleaning and disinfecting the facilities.
   1) Spray lightly with disinfectant to settle lingering dust.
   2) Remove all litter and droppings and scrub the walls, floor, and equipment with hot soapy water.
   3) Rinse the soap away.
   4) Apply disinfectant spray according to the manufacturer's directions.

b) Measures to prevent outside contaminants from entering the facilities are also used by commercial poultry producers.
   1) When entering or leaving the poultry facility, visitors and employees must shower, so showers must be provided.
   2) Boots are disinfected by stepping into a disinfectant solution placed by the door when moving between buildings.
   3) Visitors must sanitize their boots or shoes.
   4) When entering the poultry operation, trucks must pass through disinfectant receptacles.

8. Ask students what equipment is needed for handling poultry.

What handling equipment is required for poultry enterprises?

a) Long sticks to round-up turkeys
b) Catching chutes used to capture birds and load them onto trucks

9. Have students list other types of equipment used in poultry production.

What other equipment is required for poultry operations?

a) Waterers
   1) Provided in troughs, bell-type waterers, nipple waterers, or cup containers
   2) Nipple and cup waterers - frequently used in the cages of layers to minimize cleaning
   3) Designed so the water cannot be contaminated with litter and droppings
   4) Should minimize spillage as much as possible to prevent excess moisture in the poultry house

b) Feeders
   1) Should be easy to clean and set high enough to avoid contamination from droppings
   2) Cage system - troughs in front of the hens' cages, often using a mechanized feeder
   3) Broiler and turkey operations - troughs or hanging circle-type feeders that may be automated to deliver feed continuously

c) Nests for commercial layers in cage systems
   1) Nesting system with a sloped bottom so that when the egg is laid it will gently roll into an egg tray or an automatic egg collector
   2) Nest that holds the egg until it is picked up manually; requires some sort of absorbent nesting material

d) Nests
   1) Nesting boxes of sufficient size provided
   2) Easy to clean
   3) Bedding of nesting materials

e) Roosts
   1) Provide a comfortable perch for the birds away from the main flock

2) Turkeys - Not necessary in confinement

f) Emergency warning system
   1) Useful for poultry houses and egg storage facilities
   2) Designed to sound when it detects fire, abnormal temperatures, and power failures

10. Discuss the records that should be kept relating to poultry facilities and equipment.

What records should be kept?

a) Annual inventory showing the type of equipment and buildings owned by the operation and their value
b) Information on depreciation
c) Copies of insurance policies
d) Records of equipment failures and any maintenance performed on the equipment

F. ***Other Activities***

1. Have students research the prices and warranties of different types and models of poultry equipment. Have them do a presentation discussing their findings.

2. Take a tour of a poultry production facility and observe how different facilities and equipment work or are used.

3. Have students talk to poultry producers and ask them to describe what they consider to be the best type of facility or equipment.

G. ***Conclusion***

Different types of poultry operations require a variety of different facilities. However, certain factors--temperature, moisture, ventilation, and light--affect all the buildings used to house poultry. Waste removal and sanitation are also important for all poultry facilities. Poultry facilities require limited handling equipment because of the small size of the birds; other types of equipment that may be needed include feeders, waterers, nests, and roosts. Appropriate records should be kept for equipment and facilities.

H. ***Answers to Activity Sheet***

Answers may vary. However, each bird should have .8 sq. ft. to 1.0 sq. ft. of room. The student should draw a building with approximately 20,000 square feet of space. The building should be a rectangle; one possible answer is a facility measuring 40 ft. by 500 ft.

I. ***Answers to Evaluation***

1. d
2. a
3. b
4. c
5. d
6. b
7. a
8. Temperature, moisture, ventilation, and lighting

9. Answers may include any of the following: annual inventory showing the type of equipment and buildings owned by the operation and their value, information on depreciation, copies of insurance policies, and records of equipment failures and any maintenance performed on the equipment.

10. They are generally the same as those used for brooding or for a laying flock of hens. Replacement pullets may be started on the floor in a brooder house during the brooding phase and then moved to a layer house. They are also often grown in cages from the time of hatching.

11. Incineration, disposal pits, and composting

12. Egg storage facilities

13. Chutes used to capture birds and load them onto trucks

14. Because visitors and employees must shower when entering or leaving the poultry facility

UNIT VII - FACILITIES AND EQUIPMENT Name _____

Lesson 6: Poultry Facilities and Equipment Date _____

EVALUATION

Circle the letter that corresponds to the best answer.

1. Optimum temperature for production for broilers is _____ degrees Fahrenheit.

   a. 60
   b. 65
   c. 70
   d. 75

2. Generally _____ flooring is used in broiler production.

   a. Solid
   b. Slatted
   c. Wire
   d. Cage

3. Broiler breeders are generally housed on what type of flooring?

   a. Solid
   b. Solid and slat
   c. Wire and slat
   d. Slat

4. How much space should be provided for market turkeys in confinement?

   a. 1 to 3 feet per bird
   b. 2 to 4 feet per bird
   c. 3 to 5 feet per bird
   d. 4 to 6 feet per bird

5. How many layers are typically kept in a single cage?

   a. 1 to 10
   b. 1 to 20
   c. 2 to 15
   d. 2 to 25

6. Which of the following waterers are frequently used in layer cages?

   a. Troughs and cup containers
   b. Cup and nipple waterers
   c. Nipple waterers and troughs
   d. Bell-type and nipple waterers

7. Relative humidity in poultry houses should be between:

   a. 50 and 75 percent.
   b. 55 and 75 percent.
   c. 50 and 85 percent.
   d. 55 and 85 percent.

Complete the following short answer questions.

8. What are four factors that affect facility requirements for poultry?

   a.

   b.

   c.

   d.

9. What is one type of record related to facilities or equipment that should be kept?

10. What are the facility requirements for replacement pullets?

11. What are three methods of disposing of carcasses?

    a.

    b.

    c.

12. In addition to facilities for housing birds, what other type of building is necessary for laying operations and breeding operations?

13. What are catching chutes?

14. Why are showers provided in poultry facilities?

Lesson 6: Poultry Facilities and Equipment Name_____

Designing a Poultry Production Facility

Objective: Design a poultry production facility.

In the space provided, draw a poultry facility with an appropriate length and width for housing 20,000 broilers.

UNIT VIII - ANIMAL FEEDING

Lesson 1: Providing Feedstuffs for Livestock

Competency/Objective: Develop a feeding program for livestock.

Study Questions

1. **Where can information about requirements for animal nutrition be found?**
2. **What are the feed harvesting options?**
3. **What is the effect of storage and handling practices on the quality of feedstuffs?**
4. **How may forage quality be enhanced through treatment practices?**
5. **What are the feed processing options?**
6. **What are some alternative feedstuffs and their storage requirements?**
7. **What factors influence the selection of quality feedstuffs?**

Reference

1. *Advanced Livestock Production and Management (Student Reference).* University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit VIII.
2. Activity Sheet
   a) AS 1.1: Selecting High Quality Roughage

UNIT VIII - ANIMAL FEEDING

Lesson 1: Providing Feedstuffs for Livestock

TEACHING PROCEDURES

A. ***Introduction***

Proper nutrition affects animals at every stage of growth and production. The feeds provided to animals supply them with the nutrients needed for maintenance and production. Selecting feeds and methods of feeding are among the most important activities facing producers. The first step in creating a quality feeding program is to locate sources of current information on nutrition and feeds. This information is used in choosing harvesting and feed processing options.

B. ***Motivation***

Have students list the feeds most often used in the local area for different types of livestock. Discuss why these feeds are common.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Ask students where they could obtain information about feeding animals. Discuss reputable sources of information.

   Where can information about requirements for animal nutrition be found?

   a) National Research Council (NRC)
      1) The NRC publishes information on the nutrient requirements of a variety of species as well as other information affecting animal nutrition.
      2) The NRC also makes information available over the Internet.
   b) University Extension services
      1) Agricultural Extension specialists summarize in various publications the sometimes complex results of research into nutrition.
      2) The University of Missouri has published numerous guidesheets that deal with animal nutrition, feed requirements, and feeding guidelines.
      3) This information can be obtained from local Extension agents and over the Internet.
   c) Livestock feed companies

2. Ask students to list the ways in which forages may be harvested. Discuss their effect on the feed. Have students complete AS 1.1. For the activity, obtain a flake of alfalfa hay from the approximate center of four different hay bales that are as different from each other in quality as possible. Place the samples in cardboard flats and number them before displaying them to the students.

   What are the feed harvesting options?

   a) Mechanical harvesting
      1) Hay
         (a) Should be cut from the pre-bloom to the early bloom stage to produce high quality hay with the maximum amount of total digestible nutrients

(b) Needs to have a low water content, with 15 to 18 percent moisture; if the water content is initially high, it will decrease in storage, causing fluctuations in the nutrient content
(c) Reductions in quality
(1) Shattering the hay because the leaves contain most of the nutrients
(2) Loss of nutrients from bleaching the hay too long in the sunlight
(3) Leaching during curing if it rains, which causes water-soluble nutrients to leach out
(4) Foreign matter

2) Soilage (green chop)
(a) More available nutrients utilized by livestock than with other mechanical harvesting options or grazing
(b) Disadvantage - daily harvest required for feeding

3) Silage
(a) Should have a moisture level of 45 to 70 percent when stored
(1) Too high - will be sour and contain fewer nutrients
(2) Too dry - will likely become moldy
(b) Temperature during fermentation
(1) Best between 80 and 100 degrees Fahrenheit
(2) Lower temperatures - break down the proteins in the silage and increase the amount of spoilage
(3) Higher temperatures - loss of dry matter and crude protein
(c) Most effective method of utilizing feed resources
(1) Preserves high moisture crops when curing is not a option
(2) Preserves crops when the crop used would be greatly reduced in quality by drying
(d) Does not improve the nutrient content of the crop but does reduce the amounts of other compounds that can be toxic
(e) Very palatable

4) Haylage
(a) Form of silage in which forages such as alfalfa, clovers, and sudan grasses are harvested at 40 to 45 percent moisture and placed in a silo
(b) Silo - either an above-ground type or an in-ground bunker
(c) Advantages
(1) Decreases harvesting losses when compared to traditional haying methods
(2) Reduces waste at feeding time
(3) Increases the nutritional value of the feed

5) Baleage
(a) Forages baled as large round bales and then immediately wrapped while fresh
(b) Same equipment used in the baling process with the addition of a piece of wrapping equipment to seal the hay bale
(c) Either wrapped individually or pushed into a long plastic bag that can contain several bales
(d) Advantage - higher nutrient content due to an increase in moisture and better retention of the leaves, which are not as easily lost to shattering
(e) Disadvantages
(1) Problem of disposing of the plastic wrap after feeding
(2) Difficulty of moving the wrapped bales without damaging the plastic covering

b) Grazing systems
1) Continuous grazing
(a) Allows livestock to harvest forages in a specific pasture without interruption throughout the year
(b) Livestock preferences - dictate which plants are left untouched and which are overgrazed

(c) Results in a pasture with some areas abundant in unpalatable and difficult to digest forages and other areas where nutritious plants are overgrazed
(1) If overused, results in the disappearance of the most beneficial plants because the majority of beneficial grasses and legumes cannot withstand rapid defoliation
(2) Results in nutritious low-growing plants in undergrazed areas being crowded out by taller and less palatable plants

2) Intensive grazing
(a) Involves dividing a pasture into smaller pastures and stocking them with animals at a high density
(1) Rapidly graze a sward to a height of 4 to 12 inches, depending on the species
(2) Move to another pasture while the plants in the previously grazed pasture have a chance to grow and establish strong root systems
(b) Benefits for feeding
(1) More easily digested plants because they remain at a younger stage of growth
(2) Favors the growth and survival of valuable plants
(3) More efficient use of less palatable plants because the livestock will be less selective
(4) Eliminates the overgrazing and undergrazing of certain plants because livestock preferences do not dictate which plants will be eaten

3. Ask students if they can give some examples of improper feed handling and storage practices. Discuss how feed should be handled and stored.

What is the effect of storage and handling practices on the quality of feedstuffs?

a) Dry hay
1) Important to mow and dry the hay in the field to a moisture level that allows stable storage
(a) Conditioning
(1) Forage treatment that allows the moisture content to be quickly reduced, saving time in the haying process
(2) Usually means using a machine with rubber and steel rollers that smash or break the plant stems, allowing moisture to evaporate more easily from these broken areas
(3) Skill of the machine operator - determines the amount of forage loss
(4) Typical losses with well-adjusted mower-conditioners - between 1 and 5 percent of dry matter
(b) Chemical conditioning
(1) Chemical drying agent sprayed on the crop at the time of mowing
(2) Affects the waxy surface of the plant to allow easier moisture removal
(3) Potassium and sodium carbonates - most commonly used chemicals
(c) Effectiveness of either mechanical or chemical conditioning determined by the drying conditions
(d) Better drying obtained on sunny warm days using a thin, wide swath of hay
2) Baling and handling accomplished using several methods
(a) Stored as small rectangular bales or large round bales
(b) Large, high density bales - becoming more popular because they are more efficient to transport and less labor is required
(c) Handling and storage of bales
(1) Plays a large role in the amount and quality of the dry matter and nutrients retained
(2) Typical losses of dry matter - from 2 to 5 percent of the yield
(3) Skill of the baler operator - can greatly affect nutrient loss because poor baling techniques can lead to shattering

(4) Time of baling - less baling loss with hay baled with a higher moisture content, but moist hay deteriorates more rapidly in storage

(d) Either stored inside a shelter or outside with varying amounts of protection from the weather

(1) When protected well, relatively stable during storage with only minor respiration by microorganisms

(2) Respiration - reduces forage quality by removing some of the digestible nutrients

(3) Hay stored outside - 10 to 15 percent more loss of nutrients than hay stored inside

(4) Storing hay outside - reduced investment in storage structures

(5) Improved preservation of the bottom of the bale by setting bales on crushed gravel, old tires, or other material to eliminate contact with the soil

(6) Further protection provided by plastic wrap around the circumference of the bale

b) Silage

1) Placed in vertical silos, bunker or horizontal silos, or silage bags

2) Most important management practice to ensure good quality forage - make sure the forage is sealed to limit the entry of oxygen when it is stored

3) Oxygen infiltration - affects the fermentation and respiration of the forage

4) Bunker silo

(a) Sealed by packing the silage with a heavy piece of equipment, such as a large tractor

(b) Top layer - spoils and seals the forage underneath

(c) Important to fill the bunker as completely and quickly as possible to prevent several "top" layers from developing

5) Easier to preserve a seal with a sealed upright silo or silage bags

4. Ask students if they have seen or read about the use of forage treatments to improve the quality of feed. Discuss different types of treatments.

How may forage quality be enhanced through treatment practices?

a) Anhydrous ammonia

1) Substance for preserving high moisture hay and silage

2) Use of anhydrous ammonia combined with plastic wrapping - most popular method of hay preservation

(a) Prevents heating from aerobic microbial activity by limiting the growth of microbes

(b) Reduces mold growth

(c) Adds non-protein nitrogen, which may be beneficial to livestock

3) Use of ammonia on silage

(a) Can kill aerobic microorganisms, decreasing storage losses

(b) Can also increase crude protein content

(c) May improve digestibility

4) Safety concerns

(a) Severe burns, blindness, and death from direct exposure to anhydrous ammonia

(b) Higher than recommended application rates - toxic to animals

b) Organic acids

1) Used as preservatives for both hay and silage

2) Propionic acid - most commonly used

3) Inhibits the growth of aerobic microbes in moist hay to prevent spoilage

4) Reduces surface molding and decreases aerobic spoilage in silage

5) Disadvantages

(a) Requires special equipment to spray the acid on the forage

(b) Corrosive to machinery
(c) Can cause injuries to producers

6) Buffered propionic acids - not as corrosive but more expensive

c) Enzymes
1) Contain a mixture of cellulases, hemicellulases, amylases, and pectinases that are sprayed on silage
2) Break down the fiber in forages
(a) Reducing the fiber concentration
(b) Providing additional sugars to aid in fermentation
3) Dry matter loss also reduced

d) Bacterial inoculants
1) Consist of dried or inactive bacteria that grow and reproduce when sprayed on forage
2) Provide a supplement for the natural lactic acid bacteria found on the forage crop
3) Improve fermentation by increasing the production of lactic acid
4) Reduce dry matter loss in silage
5) More effective on grass and legume silage than on silage from corn or sorghum
6) Safety issue
(a) Carbon dioxide produced after the silo is filled
(b) Can replace the oxygen in the silo
(c) Carbon dioxide combined with nitrogen dioxide - can cause suffocation and death
(d) Should not enter the silo for a couple of weeks after filling; then it should only be entered with a forage blower operating for twenty minutes before entry

5. Describe the different ways feeds may be processed.

What are the feed processing options?

a) Pelleting
1) Consists of heating the feed material with high moisture and then forcing it through holes in a die
2) Advantages
(a) Increased consumption because of increases in palatability
(b) More easily digested than other feeds
(c) Reduces unhealthy and wasteful dust
(d) Reduces selectivity, so less of the feed is wasted
(e) Less storage space necessary
(f) Easy to use with bulk and automated feeders
(g) Useful on the range as they do not blow away as easily as other feeds
3) Disadvantages
(a) Costly
(b) Variable in quality
(c) Difficult to pellet rations that have a higher fat content
4) Crumbles
(a) Form of pelleted feed common in poultry diets
(b) Made by breaking or cutting pellets to a specific size

b) Cubing
1) Made by forcing dried hay through holes in a die
2) Less nutrient loss than baled hay
3) Efficient when mechanized feeders are used or when the feed is spread on the ground
4) Less storage space necessary

c) Grinding
1) Simplest, most common, and least costly method of feed processing
2) Involves reducing the size of the feed by compressing it in a hammer mill or burr mill to produce fine particles

3) Frequently used for corn, milo, wheat, barley, and oats
4) Proper management necessary to avoid grinding the feed too finely, which may result in a texture that is less palatable and digestible

d) Rolling
1) Crack concentrates in roller mills, which compresses grain between two rollers set a desired distance apart to produce a flake
2) Preferred by cattle, which may gain better on it than if they are fed ground grain
3) Crimping - feed processing method similar to rolling, involving corrugated rollers

e) Heat treatments
1) Several methods
(a) Steam rolling - exposing air-dried grain to steam for several minutes to increase the moisture content and then rolling the grain
(b) Steam flaking - similar to steam rolling, except the air-dried grain is exposed to steam for a longer period
(c) Roasting - heating air-dried grain at about 300 degrees Fahrenheit for a specific time period to produce a puffed product
(d) Popping - heating air-dried grain at high temperatures for 15 to 30 seconds
(e) Extruding - pushing heated feed through a die or small holes in a screen to achieve a desired shape
(f) Micronizing - heating air-dried grain at temperatures up to 300 degrees Fahrenheit with an infrared generator and then rolling it
2) Can improve palatability
3) Can also improve digestibility by affecting the starch in the grain
4) Enhance the absorption of protein from the feed
5) More costly than other types of feed processing

6. Ask students what alternative feedstuffs are. Discuss examples of alternative feedstuffs and storage requirements for the feeds. Why would producers choose to use non-traditional feeds?

What are some alternative feedstuffs and their storage requirements?

a) Alternative feedstuffs
1) Distillers' grain
(a) By-product of the distilling industry
(b) Spent grain left over after fermenting into alcohol
(c) Dried and sold for feeding
(d) Include corn, milo, wheat, or rye
2) Brewers' grain
(a) By-product of the beer malting industry
(b) Usually barley, although it may have some corn or rice
(c) Both dried and wet forms available for feeding
3) Soy hulls
(a) Removed from the soybean as it is being rolled or flaked during processing
(b) Usually toasted and finely ground
(c) Contain about 67 percent fiber and 12 percent protein
(d) Good source of energy
4) Wheat midds
(a) Fine particles of the grain left over from commercial wheat milling
(b) Consist of wheat germ, wheat bran, and some fibrous material
(c) Good source of protein and energy
5) Corn gluten
(a) By-product of the wet corn milling industry, which produces high fructose corn syrup
(b) Obtained in dry or wet form
(c) Relatively high in protein and fiber but low in starch
6) Whole cotton seed
(a) Left over after the lint has been removed for the garment industry

(b) High in energy, protein, and fiber
(c) Also high in fat

7) Rice bran
(a) Consists of the hulls that are left after the grain has been removed for human consumption
(b) Blended with some of the germ
(c) Usually finely ground

8) Hominy
(a) By-product of the dry milling industry involved in making grits or corn meal
(b) Contains some corn bran, germ, and part of the starchy portion of white or yellow corn kernels

b) Storage
1) Most commodity storage buildings - metal-roofed buildings with concrete retaining walls that are 5 to 6 feet in height and open sides
2) Designed to allow large trucks to dump a load of feed on a concrete apron
3) Front bucket loaders - may be used to push the feedstuff into the facility
4) Other feeds - moved into a storage facility using an auger
5) Characteristics of the feedstuff - determine the type of equipment needed

7. Have students list factors that might influence the selection of feedstuffs. Discuss these factors.

What factors influence the selection of quality feedstuffs?

a) Stage of growth of an animal and its use
b) Palatability
c) Climate
d) Facilities
e) Equipment
f) Amount of land
g) Cost
h) Availability
i) Toxic plants
j) Mycotoxins
1) Group of fungi, such as molds, mildews, rusts, and smuts, that may be present in plants or feeds
2) Lower resistance to diseases and adversely affect immunization

F. ***Other Activities***

1. Have students work in groups to prepare reports on the nutritional requirements of the livestock and poultry species raised in the local area.

2. Obtain a sample of feed or forage using appropriate sampling techniques.

3. Have students send feed or forage samples to Extension services for laboratory analysis to determine their quality. The instructor may try to send off a sample one or two weeks earlier to show the students the results of testing.

4. Have the students work with interactive CDS about animal nutrition.

G. ***Conclusion***

Information published by the National Research Council and University Extension on nutritional requirements for animals is helpful when selecting feeds for livestock and poultry feeding programs. Their publications can help producers select between the different harvesting and feed processing options. A variety of factors influence the choice of feedstuffs for livestock and poultry.

H. ***Answers to Activity Sheet***

I. ***Answers to Evaluation***

1. b
2. d
3. a
4. e
5. c
6. c
7. b
8. a
9. d

10. Conditioning allows the moisture content to be quickly reduced, saving time in the haying process.

11. Answers may include any three of the following: stage of growth of an animal and its use; palatability; climate; facilities; equipment; amount of land; cost; availability; toxic plants; and mycotoxins.

12. They are more costly than other feed processing options.

13. Because they remain at a younger stage of growth

14. Answers may include any two of the following: distillers' grain, brewers' grain, soy hulls, wheat midds, corn gluten, whole cotton seed, rice bran, and hominy.

15. Bacterial inoculants

UNIT VIII - ANIMAL FEEDING Name _____

Lesson 1: Providing Feedstuffs for Livestock Date _____

EVALUATION

Match the term on the right with the description on the left.

1. _____	Forcing mixed feed through a die	a. Crumbles
2. _____	Compressing grain to produce a flake	b. Pelleting
3. _____	Breaking or cutting pellets	c. Grinding
4. _____	Forcing dried hay through holes in a die	d. Rolling
5. _____	Reducing the size of the feed by compressing it in a hammer mill or burr mill	e. Cubing

Circle the letter that corresponds to the best answer.

6. What national organization publishes information on the nutrient requirements of livestock and poultry?

   a. USDA
   b. STP
   c. NRC
   d. PETA

7. Which of the following harvesting options results in more of the available nutrients being utilized?

   a. Hay
   b. Soilage
   c. Silage
   d. Continuous grazing

8. Feeds processed using heat treatments are:

   a. More palatable.
   b. Less digestible.
   c. Variable in quality.
   d. Cheap.

9. If temperatures are too high during fermentation, silage will:

   a. Be sour.
   b. Become moldy.
   c. Shatter.
   d. Lose crude protein.

Complete the following short answer questions.

10. What is the purpose of conditioning hay?

11. What are three factors that influence the selection of feeds for any livestock or poultry operation?

    a.

    b.

    c.

12. What is a disadvantage of the various heat treatments used to process feeds?

13. Why are plants more easily digested when using intensive grazing systems?

14. What are two alternative feedstuffs?

    a.

    b.

15. Which treatment practice improves the quality of silage by increasing the production of lactic acid?

Lesson 1: Providing Feedstuffs for Livestock Name _____

Selecting High Quality Roughage

Objective: Select the roughage with the highest feeding value.

Follow the directions below to choose the highest quality alfalfa hay.

1. Examine the four samples of alfalfa hay placed on display by your instructor.
2. Do not touch the sample to avoid disturbing it or changing its appearance for the other students in the class.
3. Evaluate the four samples for the three criteria listed below, ranking them on a scale from 1 to 4 for each characteristic.
4. Assign an overall ranking on a scale from 1 to 4 indicating which sample would have the highest feeding value.

Characteristic	Sample 1	Sample 2	Sample 3	Sample 4
Color				
Leafiness				
Foreign material				
Final ranking				

UNIT VIII - ANIMAL FEEDING

Lesson 2: Feeding Livestock and Poultry

Competency/Objective: Identify feeding options for livestock and poultry.

Study Questions

1. **What are the general guidelines for feeding livestock?**
2. **What are feed additives?**
3. **What are the feeding options for beef cattle?**
4. **What are the feeding options for dairy cattle?**
5. **What are the feeding options for swine?**
6. **What are the feeding options for sheep?**
7. **What are the feeding options for horses?**
8. **What are the feeding options for poultry?**
9. **What are the water quality and quantity requirements for livestock and poultry species?**
10. **What records should be kept?**

References

1. *Advanced Livestock Production and Management (Student Reference).* University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit VIII.
2. Activity Sheet
   a) AS 2.1: Determining the Moisture Content of Hay

UNIT VIII - ANIMAL FEEDING

Lesson 2: Feeding Livestock and Poultry

TEACHING PROCEDURES

A. ***Review***

Lesson 1 described the different feed harvesting and processing options and factors affecting the selection of feedstuffs. Livestock and poultry producers should also learn the general guidelines for feeding livestock. This information is necessary when selecting feeding options for their stock.

B. ***Motivation***

Bring in two or three samples of grain from different sources. Ask the class if all grain is the same as far as feeding values, even if they were grown in different fields by different people. Have students explain how the samples might differ.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Ask students why they have to eat, and what would happen if they did not. Discuss how food provides nutrients for the maintenance and growth of animals. Hand out AS 2.1.

   What are the general guidelines for feeding livestock?

   a) Nutrients
      1) Carbohydrate - provides energy
      2) Fat or lipid - provides energy
      3) Protein - supplies building blocks for growth; excess protein goes toward the production of energy
      4) Vitamin - needed in trace amounts for function of body systems
      5) Mineral - needed in trace amounts for function of body systems
      6) Water - required for bodily processes

   b) Measures of energy content
      1) Total digestible nutrients (TDN)
         (a) Includes digestible protein, digestible crude fiber, and digestible fat
         (b) Used in determining the energy requirements for ruminants
         (c) Available information on TDN ratios for several thousand different feedstuffs
      2) Digestible energy (DE)
         (a) Equal to the amount of energy lost through feces subtracted from the feed's gross energy
         (b) Energy requirements for horses published by NRC in terms of DE values
      3) Metabolizable energy (ME)
         (a) Value equal to the energy lost from urine and gasses subtracted from DE
         (b) Often used in determining feed rations for swine
      4) Net energy (NE)
         (a) Amount of energy needed by an animal for maintenance and production
         (b) Calculated by subtracting the amount of energy lost through heat production as nutrients are metabolized from ME

   c) Amount of moisture in a feed
      1) Influences the percentage of nutrients it contains
      2) Measured on either an as-fed or dry matter basis

(a) As-fed - the nutrient content of feeds with the moisture they normally have when fed
(b) Dry matter
(1) Used for the material that is left when all the moisture is removed
(2) Indicate the exact amount of nutrients available without being thrown off by water weight
(3) Used to figure the nutrient content of feeds that have a variable moisture content; dry matter figures are converted to an as-fed weight based on the dry matter content

d) Concentrates and roughages
1) Concentrates
(a) Feeds like grains, soybean meal, and by-products that are low in fiber content and high in total digestible nutrients
(b) Provide fats, carbohydrates, and sometimes protein
(c) Reliable source of energy
2) Roughages
(a) Include hay, pasture, and silage
(b) High in fiber and low in total digestible nutrients
(c) Provide some energy for gain
(d) Regulate the pH and moisture balance in the animal's body
(e) Satisfy the appetite

e) Types of feeding
1) Full feeding - feeding animals as much as they will eat
2) Free-choice feeding - providing animals with a constant, unlimited supply of feed and allowing them to regulate their own intake
3) Limited feeding - providing a specific amount of feed on a specific schedule to maintain weight or growth rather than fattening the animal or increasing production

2. Ask student to explain what feed additives are. Have them list examples of additives. Discuss their use.

What are feed additives?

a) Feed additives are used to promote feed efficiency and gains by affecting the health or growth of the animal.
b) The Food and Drug Administration has strict regulations governing the use of feed additives.
1) May be used only within specified levels
2) Must be withdrawn within a specified times of the marketing of the animal
c) Antibiotics and antibacterials are organic in nature and slow or stop the growth of disease-causing organisms
1) Sometimes combined to combat a problem that is not susceptible to either one on an individual basis
2) More antibiotics fed to swine than any other species of livestock
3) Fed to cattle on a regional basis, with little use in arid regions such as the southwestern United States
4) Growth of the practice of confinement production of livestock - increased the use of antibiotics
d) Hormones are substances that are secreted by the endocrine glands into the body fluids and transported to another location in the animal's body where they have specific affects on cell activity.
1) Primarily used when feeding beef cattle
2) Common simulated hormone products
(a) Ralgro
(b) Rumensin
(c) Synoves S and H
3) Used as implants or given in the feed

4) Not recommended for swine, poultry, and horses

e) Anthelmintics are compounds to control stomach and intestinal worms.
   1) May be administered in the water or feed
   2) Should only be used if the presence of worms is suspected

f) Other miscellaneous additives are used for a variety of purposes
   1) Coccidiostats to prevent disease in poultry
   2) Sodium bicarbonate to affect pH levels in the digestive tract
   3) Poloxaline to prevent bloat
   4) Tranquilizers to reduce stress in the feedlot
   5) Sodium bentonite as a pellet binder for pelleted feeds

3. Ask students what feeds beef cattle need to maintain themselves, grow, and reproduce. Discuss the feeding options for beef cattle.

What are the feeding options for beef cattle?

a) Do not need large quantities of concentrates if provided an adequate amount of quality pasture
b) Free-choice feeding of salt and mineral licks
c) Cow-calf operations
   1) Graze their livestock on pasture
   2) Supplemented with silage or hay in winter
   3) Supply concentrates for extra energy for flushing or lactation
   4) Creep-feeding
      (a) Provides extra feed for young calves
      (b) Consists of a commercial feed mix, grain, or chopped roughages
      (c) Placed in a feeder in an area where the cows cannot reach it
      (d) Used
         (1) If cows do not supply enough milk
         (2) If calves are to be weaned early or sold at weaning
         (3) If they are born in the fall
         (4) If it is economical
      (e) Not used
         (1) If the cows are heavy milkers
         (2) If the calves receive enough nutrients from good pasture or roughages in winter
d) Stocker cattle operations
   1) Pasture in the summer months and hay in the winter
   2) May provide concentrates using limited feeding beginning in late summer to supplement roughages
e) Feeder cattle operations
   1) Feedlot
      (a) Full fed with feed that has a high grain content as well as roughages
      (b) May add a protein supplement
   2) Pasture - may feed concentrates using either limited or full feeding to supplement the roughages

4. Discuss the differences in feeding beef and dairy cattle. What feeding options are available for dairy cows? How are dairy calves fed?

What are the feeding options for dairy cattle?

a) Dairy cows
   1) Traditional method
      (a) Fed roughages free choice in a barn
      (b) Fed grain and protein concentrates individually, either in the barn or in the milking parlor; amount based on the level of milk production

2) Challenge or lead feeding
   (a) Involves feeding higher levels of concentrate early in the lactation period to challenge the cow to reach her maximum potential for milk production
   (b) Decreased amount of concentrate fed when the level of production drops
3) Complete ration, also called total mixed ration - feeding cows grouped by production level, fed a ration that combines roughages and concentrates to meet all nutritional needs
4) Pasture
   (a) Used to supplement the roughages supplied in the barn when using traditional feeding or challenge feeding
   (b) Rotational grazing preferred

b) Dairy calves
1) Receive colostrum for the first three days after calving
2) Fed milk replacer once or twice a day until complete weaning
3) Fed a calf starter containing grains free choice for the first three or four months
4) Fed forages free choice beginning at eight to ten weeks of age

c) Replacement heifers
1) Fed free choice on pastures
2) May need grain and stored forages to supplement the nutrients provided by the pasture to achieve the desired rate of gain of 1.7 pounds per day

5. Ask students how feeding swine is different than feeding cattle. How does their diet differ?

What are the feeding options for swine?

a) Tend to use automated feeding systems
b) Market hogs and pregnant sows kept in confinement - fed a concentrate-rich feed twice a day
c) Lactating sows - fed concentrates using automated feeders or hand-feeding a few times a day
d) Baby pigs
1) May be nursed until weaning with no other feed supplements
2) May supplement the sow's milk by placing pans of creep feed in the pen
   (a) Commercial prestarter for pigs not receiving enough milk or early weaned pigs
   (b) Starter feed for pigs weaned after three weeks of age

6. Discuss the options available for feeding sheep.

What are the feeding options for sheep?

a) Sheep
1) Fed on quality pasture with a mineral supplement and salt lick fed free-choice
2) May use management intensive grazing
3) May provide supplemental roughages or concentrates in troughs on the pasture

b) Lambs
1) May creep-feed while nursing to help stimulate rumen development
2) Begin to eat coarsely ground or crushed grain from a trough as early as ten days of age
3) Creep-feeding necessary with an early weaning program

c) Market lambs
1) Fed out in a dry lot or on a pasture
2) Feedlot - fed using either self-feeding or hand-feeding
3) Pasture - receive supplemental feed for finishing

7. Point out that a horse's digestive system differs from other monogastric animals because of an enlarged cecum that allows them to digest roughages. Discuss the feeding options for horses.

What are the feeding options for horses?

a) Need a large amount of pasture, typically a minimum of two acres of quality legume-grass pasture for each animal
b) Can increase the carrying capacity using rotational grazing
c) Should provide calcium and phosphorous mineral supplements and salt free-choice
d) Mature and less active horses - may need only the amount of energy provided by pasture or hay
e) Other animals
    1) Need supplemental concentrates
    2) Should not be fed free-choice because horses will overeat
    3) Fed by hand using a limited feeding system
    4) Better to feed them regularly several times a day rather than only once
f) Foals
    1) Begin to eat feeds at ten days to three weeks of age
    2) Can get all their nutrients from roughages on high quality pastures
    3) Otherwise, should begin creep-feeding concentrates at four to six weeks of age

8. Ask students how commercial poultry producers can feed such a large number of birds. Describe the feeding options used by poultry producers.

What are the feeding options for poultry?

a) Automated feeders and waterers standard
b) Hand-feeding
    1) Inefficient, except when brood rings do not permit the use of automatic feeding systems
    2) Young birds - hand fed, with extra care necessary to be sure that they have a constant feed supply
c) Generally full fed a complete feed; whole grains should never be added to a complete ration
d) Commercial egg-production systems
    1) All-mash system - mixture of a nutritionally complete ground feed that works well with automated feeders
    2) Mash and grain system - provide grain and a mash mixture separately
    3) Cafeteria system
        (a) Allows the birds to mix their own ration; a quarter of the feeders hold a 26 to 32 percent protein supplement, and the others contain grain
        (b) Not typically used in commercial operations
e) Broilers - fed complete mixed feeds in the form of crumbles or pellets

9. Ask students why it would be important for animals to receive a sufficient quantity of high-quality water. Discuss water quantity and quality requirements for different species of livestock and poultry.

What are the water quality and quantity requirements for livestock and poultry species?

a) Quantity
    1) Fluctuate with changes in the body due to the stage and level of production
    2) Increase with increasing temperatures, high-protein diets, and high salt intake
    3) Average intake
        (a) Beef animal - 8 to 12 gallons per day
        (b) Dairy cow
            (1) Lactating - 35 to 45 gallons per day
            (2) Dry - 20 to 30 gallons per day
        (c) Swine

(1) Finishing - 3 to 5 gallons per day
(2) Nursery - 1 gallon per day
(3) Sow and litter - 8 gallons per day
(4) Gestating sow - 6 gallons per day

(d) Sheep - 2 gallons per day
(e) Horse - 10 to 12 gallons per day
(f) Chickens
(1) Layers/breeding hens - 50 gallons per day per 1000 birds
(2) Broilers (at 28 weeks) - 100 gallons per day per 1000 birds
(3) Pullets (at 20 weeks) - 46 gallons per day per 1000 birds

(g) Turkeys (at 28 weeks) - 200 gallons per day per 1000 birds

b) Quality
1) Tend to consume less water if the quality is undesirable
2) Contains less than 2,500 mg/l of dissolved solids, such as salts, nitrates, fluorine and other heavy metals
3) Free of pathogenic microorganisms, algae, protozoa, hydrocarbons, pesticides, industrial chemicals, and other hazardous materials

10. Ask students what records are associated with feeding.

What records should be kept?

a) Feed intake records
b) Feed conversion records
c) Records of any medication or supplements added to feed

F. ***Other Activities***

1. Have students divide into groups and research a specific type of production in the area. Have them report on the feeding options used by several different operations.

2. Give students examples of different types and production classes of livestock. Have students analyze nutrient requirement tables to determine the nutrient levels required for the examples provided.

G. ***Conclusion***

Feeds should meet the nutritional requirements of the animal for maintenance and production. Producers must determine whether feeds meet the nutrient requirements of their animals, which can be done by looking at measures such as TDN, DE, ME, and NE. A number of feeding options may be used to supply nutrients to the different species of livestock and poultry. Animals must receive an adequate quantity of high-quality water. Records for feeding should include feed intake and medications and supplements provided in feeds.

H. ***Answers to Activity Sheet***

Answers will vary.

I. ***Answers to Evaluation***

1. b
2. d
3. b
4. c
5. a
6. b
7. a

8. c

9. They are fed a concentrate-rich feed twice a day.
10. Feed intake records and records of any medication or supplements added to feed
11. Self-feeding and hand-feeding
12. Full feeding a concentrate mix
13. Because animals tend to consume less if the quality is undesirable
14. To stimulate rumen development
15. Market cattle are full fed with a feed that has a high grain content as well as roughages; it may also have a protein supplement.

UNIT VIII - ANIMAL FEEDING Name _____

Lesson 2: Feeding Livestock and Poultry Date _____

EVALUATION

Circle the letter that corresponds to the best answer.

1. Which of the following is a concentrate?

   a. Hay
   b. Grain
   c. Pasture
   d. Silage

2. What does TDN measure?

   a. The amount of NE in a feed
   b. The number of calories in a feed
   c. The quantity of fat in a feed
   d. The amount of energy in a feed

3. The feeding program for dairy cattle that involves feeding higher levels of concentrates early in the lactation period is:

   a. Traditional feeding.
   b. Challenge feeding.
   c. Feeding complete rations.
   d. Rotational grazing.

4. When is creep-feeding used for beef calves?

   a. If the calf is born in the spring
   b. If the cow is a heavy milker
   c. If the calf is to be weaned early
   d. If the calf is on good quality pasture

5. How much pasture is required for horses on quality legume-grass pasture?

   a. A minimum of 2 acres
   b. A minimum of 3 acres
   c. A minimum of 4 acres
   d. A minimum of 5 acres

6. How much water is needed for a beef animal?

   a. 3 to 5 gallons per day
   b. 8 to 12 gallons per day
   c. 20 to 30 gallons per day
   d. 35 to 45 gallons per day

7. Feeding animals as much as they will eat is:

   a. Full feeding.
   b. Free-choice feeding.
   c. Limited feeding.
   d. Hand-feeding.

8. Antibiotics are fed more often to _____ than any other type of livestock, while hormones are given most often to _____.

   a. Swine, horses
   b. Beef cattle, swine
   c. Swine, beef cattle
   d. Beef cattle, chickens

Complete the following short answer questions.

9. How are market hogs fed?

10. What records should be kept in relation to feeding?

    a.

    b.

11. What are the two ways market lambs may be fed out in a feedlot?

    a.

    b.

12. What type of feeding is generally used in poultry production?

13. Why is good quality water necessary?

14. Why would a producer creep-feed lambs while they are nursing?

15. How are feeder cattle fed on the feedlot?

Lesson 2: Feeding Livestock and Poultry Name_____

Determining the Moisture Content of Hay

Objective: Determine the moisture content of hay samples.

Materials and Equipment:

Microwave oven
Digital scales accurate to 1/10 of a gram
Large paper plate
8 oz. of water in a glass
Hay sample weighing at least 100 grams

Procedure:

1. Place the plate on the scales and tare to 0.0.
2. Weigh out exactly 100 grams of hay onto the plate.
3. Spread the hay evenly on the plate.
4. Place the glass of water in the microwave to protect the oven and keep the sample from charring.
5. Allow the sample to dry in the microwave on high for 5 minutes.
6. Weigh the sample and record the weight.
7. Continue drying for two-minute intervals until the weight changes less than 1 gram between weighings.
8. If the sample chars, discard it and repeat the above procedure.
9. Calculate the percent moisture using the following formula.

$$\% \ moisture = \frac{Wet\ weight - Dry\ weight}{Wet\ weight} \times 100$$

10. Record your findings.

    Wet weight _____

    Dry weight _____

    Percent moisture _____

UNIT IX - HERD/FLOCK MANAGEMENT

Lesson 1: Beef Cattle Management from Birth to Market

Competency/Objective: Develop and implement management factors for beef cattle from birth to market.

Study Questions

1. **What management practices should be performed on calves?**

2. **What options must be considered when determining weaning age in calves?**

3. **What types of feeding programs are appropriate for market cattle?**

4. **What records should be kept?**

References

1. *Advanced Livestock Production and Management (Student Reference).* University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit IX.

2. Transparency Masters

   a) TM 1.1: Tattoo and Ear Tag Identification
   b) TM 1.2: Castration Equipment
   c) TM 1.3: Dehorning Tools

3. Activity Sheet

   a) AS 1.1: Designing and Registering Brands

UNIT IX - HERD/FLOCK MANAGEMENT

Lesson 1: Beef Cattle Management from Birth to Market

TEACHING PROCEDURES

A. ***Introduction***

This unit will discuss some basic management considerations when raising livestock. Beef cattle, like all types of livestock, need proper management from birth to market to achieve optimum productivity. Management practices performed on beef calves, weaning, and feeding programs appropriate for market cattle will all have an impact on productivity. Production levels and profit can be tracked by keeping the appropriate records.

B. ***Motivation***

Discuss the importance of having a management plan in place to effectively maintain a quality beef cattle operation. Have students give suggestions for developing a beef cattle management plan. List several management tasks that are performed on calves. Discuss weaning management and managing feeding for production.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Certain management practices should be performed on calves. List the management practices. Have students that are familiar with beef cattle explain why each of these practices are necessary and discuss them with the class. Display TMs 1.1, 1.2, and 1.3 during the discussion, or show the class actual tools for identification, dehorning, and castrating. Have students complete AS 1.1.

   What management practices should be performed on calves?

   a) Make certain the calf is warm, clean, and dry.
      1) May aid the cow by drying the calf with a cloth
      2) Warm environment supplied until the calf is on its feet
         (a) Cows - seek shelter if they are in a range or pasture setting
         (b) Should provide shelter if calving takes place during the winter
            (1) Using large hay bales to form a windbreak
            (2) Moving the cow into a barn for calving
   b) Treat the navel cord.
      1) Done as soon after birth as possible to prevent infections
      2) Should be dipped or sprayed with a 2 percent iodine solution
   c) The calf will need to nurse shortly after birth to receive colostrum.
      1) Contains antibodies and nutrients like vitamin A and E that the calf requires
      2) Weak calf
         (a) May have problems with the nursing process
         (b) Producer - physically put calf's head up to the udder of the mother
         (c) Can use nippled bottle to feed frozen colostrum that has been thawed and warmed
         (d) Can feed colostrum through a stomach tube inserted down the esophagus
   d) Separate the cows with calves from pregnant cows
      1) Cows and calves put in another area where ample supplies of water and feed are available

2) Plenty of feed available for a new mother because she requires more feed to produce milk for the calf

e) The calf is generally identified with an ear tag or tattoo applied at birth or a brand applied just before weaning.
   1) Ear tags made of flexible plastic with the numbers already printed on them
      (a) Special set of pliers used to attach the tags
      (b) Best to put the tag toward the end of the ear between the ribs, which allows it to be flexible and makes it easier to read
   2) May choose to use tattoos for identification because tags may sometimes be torn from the ears and lost
      (a) Sometimes put a tag in each ear so that the animal may still be identified if a tag is lost
      (b) Tattooing a calf
         (1) First make sure the ear is clean by removing any dirt or wax
         (2) Advisable to check the marking on a piece of cardboard after choosing the tattoo number desired
         (3) Placed so the tattoo is near the center of the inside ear, avoiding the ribs and blood vessels
         (4) After removing the pliers, rub the tattoo ink into the puncture holes until the bleeding stops
         (5) May choose to ensure identification by tattooing both ears
         (6) Should clean and disinfect the pliers before tattooing the next calf
   3) Branding
      (a) Applied just before weaning
      (b) Brands recorded by county or state governments
      (c) May be registered with the Missouri Department of Agriculture
      (d) Two major methods
         (1) Hot iron
         (2) Freeze branding

f) Male calves are generally castrated.
   1) May choose to castrate a young male calf following birth
   2) Calves going into a feedlot - castrated at any time between birth and four months of age
   3) Typically castrate, dehorn, and brand the animals about three months after birth
   4) Castration
      (a) May be accomplished by a surgical method using a knife or scalpel or by applying pressure using a burdizzo (clamp) or elastrator (rubber band)
      (b) Most common method of castration - use of a knife or scalpel
      (c) Disinfectants used after the procedure to reduce the possibility of fly or screw worm infestation
      (d) Proper restraint important
      (e) When mechanical handling facilities are available, calf secured on a tilting or working table in a squeeze chute
      (f) More producers choosing not to castrate male beef animals

g) Normally dehorning will take place at the same time as castration.
   1) Should be dehorned when they are young because handling the calf is easier and it experiences less stress
   2) Four main reasons
      (a) Horned cattle - often bring less money when sold
      (b) Less space needed in feedlots and trucks
      (c) Cattle less likely to bruise one another, causing economic loss to the carcass.
      (d) Cause less damage to facilities
   3) Methods
      (a) Chemical methods used on calves that are less than two weeks of age
         (1) Caustic stick - substance applied to the horn that acts like an acid and eventually eliminates the horn

(2) Care taken to prevent the substance from touching the skin by applying petroleum jelly around the horn
(3) Should be dry before the calf returns to the mother
(4) Calf should be kept out of the rain for several days after applying the chemical

(b) Spoon, gouge, or mechanical dehorning tube used when horns are past the button stage but the calf is still less than 60 days of age
(c) Hot irons used for calves that are 4 to 5 months old
(d) Clippers or saws used for older cattle

2. Discuss the importance of weaning livestock and the stress it places on calves. Discuss the appropriate weaning age for calves.

What options must be considered when determining weaning age in calves?

a) While a number of calves are born in the 40- to 60-day calving period from the first calf to the last calf born, calves are generally weaned at the same time.
b) Younger calves will not be at the same growth level as animals born at the beginning of the calving period.
c) Calves born early in the cycle will therefore wean at a heavier weight than later calves.
d) Producers will usually wean all of the calves once the youngest animals reach 205 days.
e) The weaning age will depend on market conditions and the growth of the animals during the early phases.
f) Several factors affect the weaning weight of calves.
   1) Amount of forage available to the calf and the cow
   2) Weather conditions
   3) Supplemental feeds
   4) Disease resistance

3. Discuss the feeding options for cattle from birth to market.

What types of feeding programs are appropriate for market cattle?

a) Cow-calf
   1) Lactating cow
      (a) Will need about 50 percent more roughage than when dry
      (b) Must approximately double the amount of protein fed daily
   2) Calves
      (a) Can begin creep feeding grain when calves are about four weeks old
      (b) Creep feeder
         (1) Placed in the shade, if possible
         (2) Near where the cows rest
         (3) Should also be close to waterers
      (c) Creep feed
         (1) Purchased from a commercial manufacturer or blended by the producer
         (2) Should be high in protein and energy and fortified with vitamins and minerals
         (3) Molasses added to increase the palatability of the feed
b) Stocker or yearling
   1) Feeding period for backgrounding generally from 120 to 150 days in length, with the calves gaining about 1.5 to 2.0 pounds per day
   2) Primarily fed roughages such as grass pasture or hay
   3) Supplemental grain
      (a) Provides proteins, minerals, and vitamins
      (b) Increases the rate of gain
   4) Calves that have been backgrounded, or pre-conditioned

(a) More suited to enter the feedlot than those that have not been fed in this manner
(b) Feeding program - should prepare the cattle to make maximum use of the ration received during finishing

c) Feedlot
1) High-energy ration used to finish the cattle to a desirable slaughter weight
2) Typically fed high levels of grains and alternative feedstuffs and low levels of roughages
3) Amount of roughage fed varies throughout the finishing period; beginning finishing rations have higher levels of roughages than the ration fed at the end of the finishing period
4) Corn and grain sorghums - most commonly used grains
5) Roughages - generally consist of hay or silage
6) Rations - protein supplements, vitamin A, vitamin E, and minerals, including sodium, phosphorus, and calcium
7) Generally reach slaughter weight at 15 to 24 months of age
8) May receive hormones during the feeding process
(a) Growth implants placed under the skin in the ear
(b) Tends to increase gain by approximately 8 to 12 percent

4. Have students identify the various types of production records that should be kept on a beef cattle operation.

What records should be kept?

a) Percent calf crop dropped
b) Percent calf crop weaned
c) Weaning weights (205-day weights)
d) Amount and analysis of feed given to the animals during the growth stage
e) Age in days and weight at marketing
f) Pounds of feed to produce a pound of beef
g) Death rates

F. ***Other Activities***

1. Take a field trip to allow students to observe a producer performing one of the management tasks discussed in this lesson (castration, dehorning, identification).

2. A producer may be invited to class as a guest speaker to discuss how he or she manages the feeding of the beef herd to promote productivity.

G. ***Conclusion***

A successful beef cattle producer knows and understands the management procedures and practices that are necessary for the beef cattle enterprise. Producers involved in raising calves need to be able to properly take care of the calves from calving to weaning. Weaning occurs when the calves are approximately 205 days of age. Cattle must be fed appropriately from this point through the final feeding stage to be productive. Keeping good records will help producers track productivity.

H. ***Answers to Activity Sheet***

Answers will vary.

I. ***Answers to Evaluation***

1. c
2. d

3. a
4. c
5. a
6. b
7. b

8. Answers may include any two of the following: percent calf crop dropped, percent calf crop weaned, weaning weights, the amount and analysis of feed given to the animals during the growth stage, age in days and weight at marketing, pounds of feed to produce a pound of beef, and death rates.

9. Answers may include any two of the following: amount of forage available to the calf and the cow, weather conditions, supplemental feeds, and disease resistance.

10. Knife or scalpel, burdizzo, and elastrator

UNIT IX - HERD/FLOCK MANAGEMENT Name_____

Lesson 1: Beef Cattle Management from Birth to Market Date_____

EVALUATION

Circle the letter that corresponds with the best answer.

1. What nutrients are present in the colostrum of the beef cow?

   a. Vitamin A and B
   b. Vitamin D and C
   c. Vitamin A and E
   d. Vitamin D and B

2. Where should ear tags be placed in the ear?

   a. As close to the head as possible
   b. Anywhere that is convenient
   c. In the lower part of the ear near the edge.
   d. Toward the end of the ear between the ribs

3. Feedlot cattle are generally fed high levels of _____ and low levels of _____.

   a. Grain, roughages
   b. Roughages, grain
   c. Protein, grain
   d. Roughages, protein

4. How old are calves generally when they are weaned?

   a. 5 days of age
   b. 105 days of age
   c. 205 days of age
   d. 305 days of age

5. When is caustic paste most appropriately used in removing horns in beef animals?

   a. When calves are 2 weeks old or younger
   b. At about 4 to 5 months of age
   c. After the horn is fully matured
   d. At any age

6. How much improvement in gain can be made by the use of growth implants?

   a. 3 to 6 percent
   b. 8 to 12 percent
   c. 14 to 22 percent
   d. 23 to 30 percent

7. Creep feed should be high in:

   a. Roughages.
   b. Protein.
   c. Vitamin C.
   d. Fiber.

Complete the following short answer questions.

8. What are two types of records that should be kept by beef producers?

   a.

   b.

9. What are two factors that may affect the weaning weight of calves?

   a.

   b.

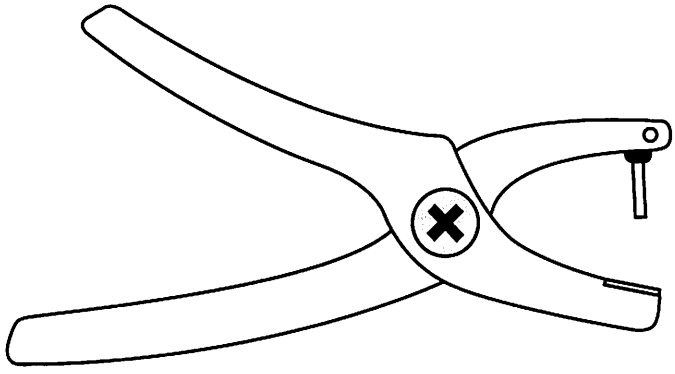
10. What are three tools for castration used in beef cattle enterprises?

    a.

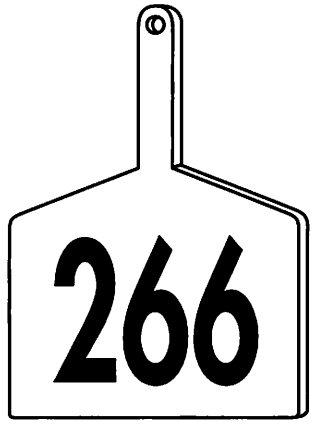
    b.

    c.

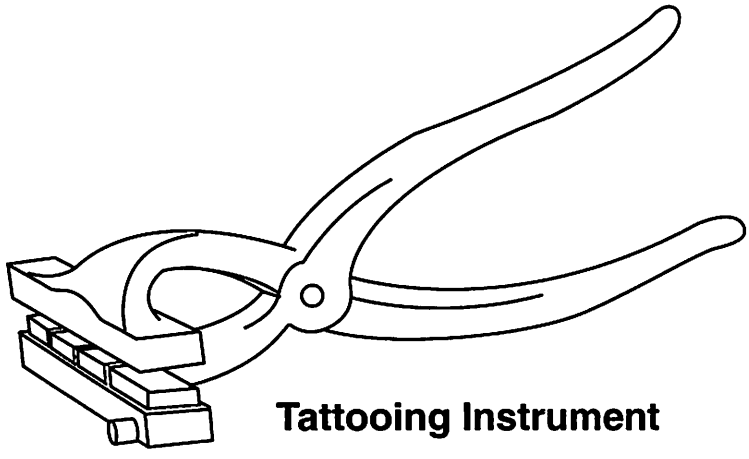
Tattoo and Ear Tag Identification



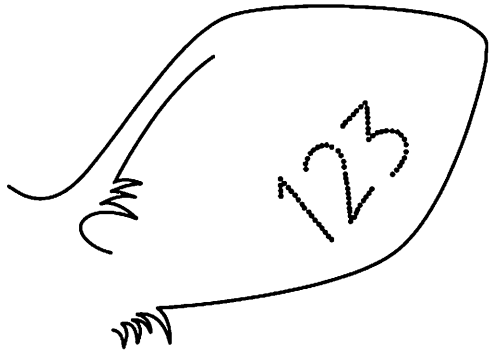
Tag Applicator



Prenumbered Ear Tag

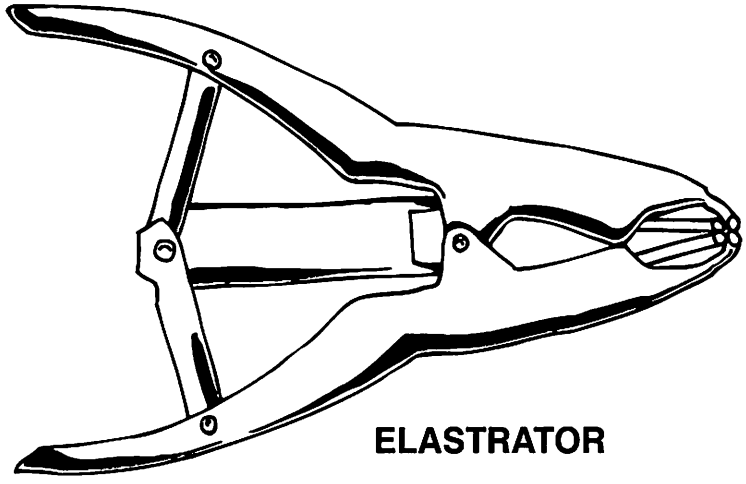


Tattooing Instrument

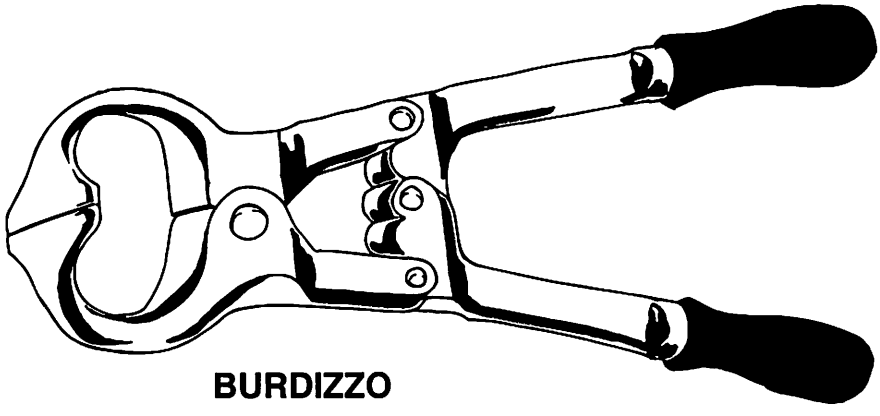


Tattoo

Castration Equipment

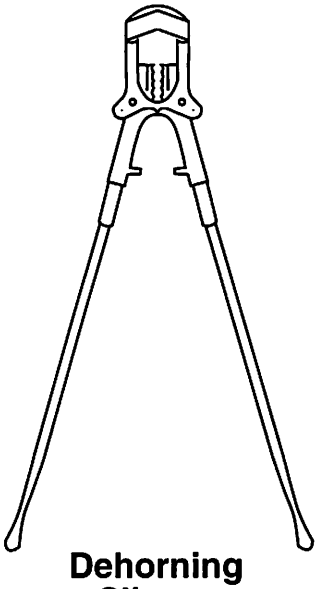


ELASTRATOR

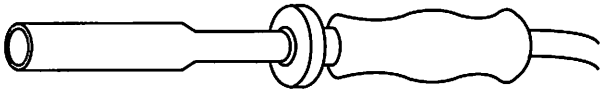


BURDIZZO

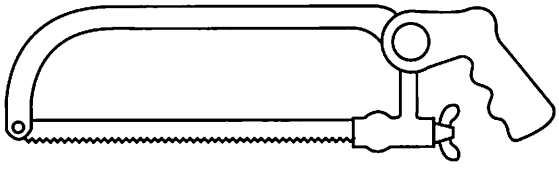
Dehorning Tools



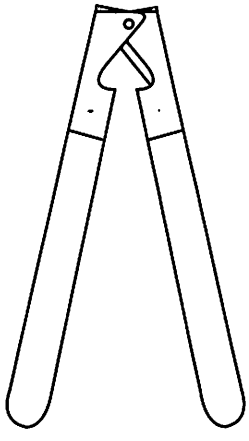
Dehorning Clipper



Dehorning Iron



Hand Saw



Mechanical Dehorner (Barnes type)

Lesson 1: Beef Cattle Management from Birth to Market Name_____

Designing and Registering Brands

Objective: Determine the process for designing and registering brands for beef cattle.

A brand is a permanent mark applied to livestock for identification purposes. The holder of any properly registered brand that is applied to an animal is protected against losses that may occur when livestock stray onto property owned by someone else. A brand that is registered with the Missouri Department of Agriculture, Animal Health Division, and appears on livestock, is evidence of ownership.

Design your own brand. There are certain rules of a good brand design. The basic design for most brands will consist of a combination of characters (letters and numbers) and symbols. Research the appropriate specifications and determine the policies to register your brand.

UNIT IX - HERD/FLOCK MANAGEMENT

Lesson 2: Management of Beef Replacement Stock

Competency/Objective: Develop and implement management factors for beef replacement stock.

Study Questions

1. **What management practices are implemented for replacement heifers?**
2. **What management practices are implemented for replacement bulls?**
3. **What types of feeding programs are appropriate for replacement stock?**
4. **What records should be kept?**

References

1. *Advanced Livestock Production and Management (Student Reference).* University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit IX.
2. Activity Sheet
   a) AS 2.1: Planning for Replacement Stock

UNIT IX - HERD/FLOCK MANAGEMENT

Lesson 2: Management of Beef Replacement Stock

TEACHING PROCEDURES

A. ***Review***

Lesson 1 discussed management practices for beef animals raised for slaughter. This lesson will focus on the management of replacement beef animals. Beef heifers and bulls raised to go back into the breeding herd are fed and managed differently from market animals after weaning.

B. ***Motivation***

Discuss the importance of having a management plan in place to effectively maintain a replacement program for a beef cattle operation. Have students give suggestions for developing a replacement beef cattle management plan.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Discuss the importance of replacement females in a beef herd. Ask students how they would select heifers for a herd. Discuss management practices for raising replacement heifers.

   What management practices are implemented for replacement heifers?

   a) Calved and managed in the same way as the calves raised for market until weaning
   b) Objective when selecting replacement females - to identify heifers that have certain characteristics
      1) Conceive early in the breeding season
      2) Calve easily
      3) Give a flow of milk consistent with the feed supply
      4) Wean a heavy calf
      5) Make a desirable genetic contribution to the calf's postweaning growth and carcass merit
   c) About 15 to 20 percent of the cows from a breeding herd removed from the herd each year
      1) Death
      2) Breeding failure
      3) Aging
   d) About 30 to 40 percent of the heifers saved each year to replace those cows
   e) More heifers saved than needed to allow for death losses and later culling
   f) May evaluate the chosen heifers as weanlings and as yearlings to determine whether they should be added to the herd
      1) Best way to decide which heifers to keep
         (a) Expected Progeny Differences (EPD) of the sires and dams
         (b) Performance records of the heifers
         (c) Pelvic area measurement of heifers
      2) Only consider heifers in the top 50 percent in weaning weight
      3) Consider age and weight at maturity
         (a) Reach sexual maturity at about twelve to fourteen months of age, when they have attained about 65 percent of their mature weight
         (b) Heifers of the English breeds - 550 to 625 pounds
         (c) Larger breeds and crossbred heifers of large breeds - 675 to 750 pounds

g) Often select the most productive heifers after the first pregnancy check
h) Make sure bull calves are removed from the herd prior to sexual maturity to avoid early mating; heifers bred too early may have their growth retarded and their productive life shortened
i) Breeding
    1) May take place shortly after reaching puberty
    2) Timing based on weight and not on age
    3) Should be at least twelve months old and weigh around 700 pounds at breeding
    4) Heifers bred to calve at two years of age by most commercial cattle producers
j) Heifers separated into different age groups and kept separate from older cows
    1) Different nutritional requirements of cows and heifers
    2) Bred heifers - different nutrient requirements than younger heifers
    3) Allows them to be fed appropriately

2. Discuss management practices for raising replacement bulls.

What management practices are implemented for replacement bulls?

a) Calved and raised with the rest of the herd until weaning
b) Separated from the rest of the calves when they are weaned at six to eight months of age
c) Separated by age between weaning and three years of age because younger bulls have different nutrient requirements
d) Typically placed on a feed ration and pasture for growth until they are about two years of age, depending on their size and weight
e) Should receive plenty of exercise to avoid problems with infertility and feet and leg defects
f) Performance records of bulls checked to monitor their development
g) Bull's semen should be tested to check fertility
h) Bull's feet and legs checked periodically to make sure they are sound because problems could affect breeding
i) Ready to use for breeding around sixteen to eighteen months of age

3. Ask students how feeding replacement breeding stock might differ from feeding cattle for slaughter. Discuss feeding programs for replacement heifers and bulls. Have students complete AS 2.1.

What types of feeding programs are appropriate for replacement stock?

a) Feeding program for replacement heifers
    1) Raised on good pasture during the summer
    2) Mineral supplements provided
    3) Feed three to five pounds of grain per animal per day if the pasture is poor
    4) Feed
        (a) Must be palatable
        (b) Should have good quality feed instead of coarse, poor quality feeds
    5) High energy feeds required by heifers being raised in cold regions to maintain body heat; nutrient needs increase 1 percent for each degree below freezing
    6) Adequate protein for growth contained in winter rations
    7) Should gain around 1 pound per day between weaning and the first breeding and about 1.25 pounds per day between weaning and calving
    8) More feed given to growing replacement heifers to grow and develop before calving than cattle being fed for market
    9) Should not be overfed because overweight heifers have calving problems and decreased milk production
    10) Flushed two to three weeks before the beginning of the breeding season
        (a) Should gain around two pounds per day
        (b) Flushed by either feeding extra grain or turning them onto lush pasture
b) Proper feeding for replacement bulls

1) Placed on high-energy rations for about five months after weaning to discover which bulls gain best
2) Bulls with the best rate of gain used in the herd or kept for sale
3) Overfeeding avoided because it affects the quality of the sperm and causes infertility
4) Young bulls
   (a) Gain about 2.5 pounds a day from weaning to fifteen months of age
   (b) Gain 2 pounds a day from fifteen months to three years old
5) Ration of at least 50 percent concentrate before the bull is a year old
6) More roughage added to the ration after the first year to complete the bull's growth

4. Have students identify the various types of records that should be kept for replacement animals.

What records should be kept?

a) Records related to performance
   1) Weaning weight (205-day weight)
   2) Rate of gain after weaning
   3) Yearling weight (365-day weight)
   4) Feed efficiency - pounds of feed required to generate 100 pounds of gain
b) Records on early breeding characteristics
   1) Frame size
   2) Scrotal circumference - bull
   3) Semen test results - bull
   4) Pelvic area measurement - heifer
   5) Other body traits
   6) EPD scores

F. ***Other Activities***

1. Ask students who have experience with beef animals how their herd replacements are selected. Do they purchase replacement animals or raise them?

2. Have a beef producer come in as a guest speaker to discuss how he or she manages their replacement stock.

G. ***Conclusion***

To maintain a beef herd, replacement animals will be needed each year. A percentage of the existing cows will die, fail to breed, or simply become too old to be productive. A successful producer will need to have a plan for their replacement. This plan will need to be in place at least one year in advance due to the reproductive timetable of beef animals. For operations that keep herd bulls, the plan must also include the bulls needed.

H. ***Answers to Activity Sheets***

1. 30 to 40 cows replaced per year
2. 5 to 6⅔ years
3. Answers will vary depending on the type of grain selected and information source sited. A bull that age should weigh about 700 to 800 pounds. Grain may be fed at 1 to 1.5 percent of the body weight.

I. ***Answers to Evaluation***

1. b
2. d
3. a
4. a

5. c

6. Heifers that are bred too early may have their growth retarded and the length of their productive life shortened.

7. Answers may include any two of the following: weaning weight, rate of gain after weaning, yearling weight, and feed efficiency.

8. Overweight heifers have calving problems and decreased milk production.

9. Answers may include any two of the following: death, breeding failure, or aging.

10. To avoid problems with infertility and feet and leg defects

UNIT IX - HERD/FLOCK MANAGEMENT Name_____

Lesson 2: Management of Beef Replacement Stock Date_____

EVALUATION

Circle the letter that corresponds with the best answer.

1. What percent of the cows need to be replaced each year in a breeding herd?

   a. 5 to 10
   b. 15 to 20
   c. 25 to 30
   d. 35 to 40

2. At what age may bulls be used for breeding?

   a. 6 to 8 months
   b. 10 to 12 months
   c. 12 to 14 months
   d. 16 to 18 months

3. Rations for bulls should be at least _____ percent concentrate before they are a year old.

   a. 50
   b. 60
   c. 70
   d. 80

4. How much would the nutrient needs for replacement animals be increased if the temperature is 30 degrees Fahrenheit?

   a. 2 percent
   b. 4 percent
   c. 6 percent
   d. 8 percent

5. About how much should heifers weigh at the first breeding?

   a. 500 pounds
   b. 600 pounds
   c. 700 pounds
   d. 800 pounds

Complete the short answer questions below.

6. Why should care be taken to prevent heifers from being bred too early?

7. What are two types of performance records that are kept to use when selecting replacement animals?

   a.

   b.

8. Why should producers avoid overfeeding replacement heifers?

9. What are two reasons that cows must be replaced in breeding herds?

   a.

   b.

10. Why should replacement bulls receive plenty of exercise?

Lesson 2: Management of Beef Replacement Stock Name_____

Planning for Replacement Stock

Objective: Formulate and implement a beef replacement stock plan.

Assume that you are a beef producer with a 200-cow herd who uses bulls instead of artificial insemination for breeding. Using the information provided in this lesson and your own research, answer the following questions. Show your calculations below each of the questions.

1. How many cows would you expect to replace each year from your 200-cow herd?

2. How many years would it take to replace the entire herd?

3. As stated in the lesson, replacement bulls should receive an additional feed ration along with grazing on a good pasture. Assume that your replacement bulls are 12 to 14 months of age. In the space below, provide an example of a ration you might use along with summer pasture. List the ingredients and include the daily amounts of each ingredient. List your sources for your information and any calculations you may have used.

UNIT IX - HERD/FLOCK MANAGEMENT

Lesson 3: Management of Beef Cows and Bulls

Competency/Objective: Develop and implement management practices for beef cows and bulls.

Study Questions

1. **What management practices should be implemented for cows?**
2. **What management practices should be implemented for bulls?**
3. **What types of feeding programs are appropriate for breeding stock?**
4. **What records should be kept?**

References

1. *Advanced Livestock Production and Management (Student Reference).* University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit IX.
2. Activity Sheet
   a) AS 3.1: Developing a Beef Breeding Herd Management Plan

UNIT IX - HERD/FLOCK MANAGEMENT

Lesson 3: Management of Beef Cows and Bulls

TEACHING PROCEDURE

A. ***Review***

The previous lesson, Lesson 2, discussed management practices for replacement stock for the breeding herd. This lesson will describe the management of the mature beef cow and bull. Because the majority of the beef herd consists of mature cows, the successful beef producer must understand their management needs. Bulls also require proper management for maximum productivity.

B. ***Motivation***

Show students pictures of beef cows with different body conditions. Ask them which one they would want to use for breeding. Discuss the importance of proper body condition for both cows and bulls.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. The success of the calf crop will be determined by the care of the cows. Discuss management practices for cows.

   What management practices should be implemented for cows?

   a) Breeding and calving seasons
      1) May choose to use either a spring calving or a fall calving program
      2) Calve in a 40- to 60-day period in either the spring or fall
      3) Breeding done within a restricted period of no more than three months in order to have the cows calve during the chosen season
         (a) Allows the producer to maintain a short calving season and a uniform calf crop
         (b) Spring calving - breeding beginning in June, calving expected around March
         (c) Fall calving - breeding in late winter, around February, and calving around late October
      4) Spring calving chosen by most producers, with the goal of having the start of the calving season fall 45 to 60 days before pasture season begins and forages become available
      5) Major factors to consider when planning breeding and calving
         (a) Type of facilities
         (b) Weather conditions
         (c) Feed supply and pricing
         (d) Pasture availability
         (e) Equipment needs
         (f) Labor issues
      6) Advantages of spring calving
         (a) Cows bred when they are in good condition and should have higher conception rates, yielding a higher calf crop
         (b) Calves in good shape in the fall for sale as feeder calves
         (c) Do not have to winter calves
         (d) Cheaper to feed a dry cow than a cow with a calf through the winter
         (e) Less grain and the maximum amount of pasture used by spring calves

7) Advantages of fall calving
   (a) Cows in better condition in calving
   (b) More milk given for a longer time by cows
   (c) Better use of pasture made during the summer by calves
   (d) Do not have to deal with flies, screw worms, and heat when calves are small
   (e) Calves ready to go directly onto pasture after weaning in the spring

b) Gestation period - typically around 283 days in length
   1) Need relatively little care during pregnancy
      (a) Proper feeding
      (b) Shelter necessary only during bad weather
      (c) Cows pastured to permit them to receive plenty of exercise; lack of exercise can increase the likelihood of difficulty during calving

2. Keeping the bull in good condition is important for maximizing conception rates. Discuss how bulls should be managed for successful production.

What management practices should be implemented for bulls?

a) Bulls separated from the rest of the herd until the producer is ready for the breeding season to begin
b) Pastured to allow them to exercise and keep them in good condition
c) At least two acres of pasture for one bull
d) Bull checked to make sure it is ready for breeding prior to the breeding season
   1) Semen checked for fertility
   2) Should receive a full physical exam to check for soundness before the breeding season
   3) Foot examination and care especially important
      (a) May need to trim the bull's hooves
      (b) Will stand squarely and walk properly with each leg directly under its weight if the hooves are trimmed properly
   4) Foot trimming and reproductive checks performed one to two months before the breeding season begins
e) Should turn the bull in with the cows once the breeding season arrives
   1) Should monitor the performance of the bull to make certain he is actively pursuing the cows and that he is breeding the herd
   2) Approximately 25 cows bred by each bull during the breeding season with natural mating
   3) Remains with the cows throughout the breeding season
f) Should remove the bull from the cow herd once the season has ended

3. A proper feeding program for cows and bulls is important for producing a large, healthy calf crop. Describe feeding programs for bulls and cows. Have students complete AS 3.1.

What types of feeding programs are appropriate for breeding stock?

a) Cows
   1) Generally pastured with supplemental feeding provided during winter months
   2) Supplemental feeding
      (a) Involves providing mineral and protein blocks or range cubes to provide the nutrients needed for growth and maintenance
      (b) Dry roughages and silage often supplied to supplement poor quality pasture
      (c) Grain provided if the roughages do not provide sufficient nutrients
      (d) Vitamin A added to the ration if the roughages or pasture are of poor quality
   3) Should be in good condition during gestation
      (a) Should not lose over 10 percent of their body condition during the winter if they are calving in the spring

(b) Should not be allowed to become too fat because being overweight will increase calving problems

4) Flushed to improve fertility rates by providing supplemental feed consisting of either grain or lush pasture for two or three weeks prior to the breeding season
5) Additional feed provided during the final weeks of the gestation period to help prepare for birth and milk production
6) After calving, supplemental nutrients fed for several weeks to help keep milk production high for sufficient calf growth
   (a) Requires 50 percent more energy
   (b) Protein, calcium, and phosphorous - needs nearly double during lactation

b) Bulls
   1) Typically fed in the same manner as the cow herd during all phases of the year
   2) Pastured for most of the year
   3) Supplemental feed provided during the winter
   4) Additional concentrate needed about six weeks prior to the breeding season to increase productivity
   5) Should not be either too fat or too thin once the breeding season begins because either condition can decrease fertility
   6) Tend to lose weight during the breeding season and are typically fed extra rations through the breeding period to help keep them in good shape

4. Ask students if they think record keeping is less or more important for the breeding herd in comparison to market animals. Discuss the importance of these records and how they are used.

What records should be kept?

a) Important in determining performance levels and whether breeding animals should be culled from the herd
b) For each calf from a cow or bull
   1) Occurrence of calving problems
   2) Birth weight
   3) Weaning weight
   4) Yearling weight
   5) Rate of gain
c) For each cow and bull
   1) Conception rates
   2) Calving rates

F. *Other Activities*

Show students different types of record keeping systems that may be used by beef producers. They may include traditional paper forms as well as computer systems.

G. *Conclusion*

The proper management of the breeding herd will play a large role in the success of the beef operation. The body condition and overall health of the herd helps determine conception rates. The body condition of cows and bulls will be dependent on the feeding programs designed by the producer. The reproductive efficiency of bulls is also affected by the soundness of their feet and legs and their overall fertility, which can be determined by testing.

I. *Answers to Activity Sheet*

Answers will vary.

J. ***Answers to Evaluation***

1. b
2. c
3. a
4. d
5. b
6. b

7. It allows the producer to maintain a short calving season and a uniform calf crop.

8. Lack of exercise can increase the likelihood of calving difficulty.

9. Answers may include any two of the following: occurrence of calving problems, birth weight, weaning weight, yearling weight, and rate of gain.

10. To keep milk production high for sufficient calf growth

UNIT IX - HERD/FLOCK MANAGEMENT Name _____

Lesson 3: Management of Beef Cows and Bulls Date _____

EVALUATION

Circle the letter that corresponds to the best answer.

1. When should beef cows be bred for a spring calving season?

   a. November
   b. September
   c. June
   d. February

2. What is the approximate number of cows that should be bred by each bull during a breeding season when using natural mating?

   a. 15
   b. 25
   c. 45
   d. 60

3. Feeding programs for cows calving in the spring should not allow them to lose more than _____ of their body condition during the winter.

   a. 10 percent
   b. 20 percent
   c. 30 percent
   d. 40 percent

4. Which of the following is an advantage of spring calving?

   a. Cows are in better condition in calving.
   b. Calves make better use of pasture during the summer.
   c. Cows give more milk for a longer time.
   d. Cows are bred when they are in good condition.

5. Additional concentrate is fed to bulls _____ prior to the breeding season.

   a. Two weeks
   b. Six weeks
   c. Two months
   d. Six months

6. When should the bull's hooves be trimmed?

   a. Six months before the start of the breeding season
   b. One to two months before the start of the breeding season
   c. One to two months after the start of the breeding season
   d. Six months after the start of the breeding season

Complete the following short answer questions.

7. Why should the length of the breeding season be limited?

8. Why should cows receive plenty of exercise?

9. What are two records that should be kept for offspring that can be used in deciding whether to cull an animal from the breeding herd?

   a.

   b.

10. Why are supplemental nutrients provided for several weeks after calving?

Lesson 3: Management of Beef Cows and Bulls Name _____

Developing a Beef Breeding Herd Management Plan

Objective: Develop a management plan for a beef herd.

Develop a breeding herd management plan for beef cattle by answering the following questions.

1. How many cows are in the herd? _____
2. How many bulls are needed? _____
3. Will you use a spring or fall calving season? _____
4. Why did you choose this calving season?

5. When will the breeding season begin? _____
6. When will the breeding season end? _____
7. What management practices could improve the reproductive efficiency of the bulls?

8. What type of feeding program would you use with the cow herd?

UNIT IX - HERD/FLOCK MANAGEMENT

Lesson 4: Management Practices for Dairy Cattle

Competency/Objective: Develop and describe management practices for dairy cattle from birth through production.

Study Questions

1. **What are some management practices performed on dairy calves?**
2. **What management practices are used when weaning dairy calves?**
3. **What management practices are used when raising replacement heifers?**
4. **What are management practices for lactating dairy cows?**
5. **What are practices for milking?**
6. **What are management practices for dry dairy cows?**
7. **What are management practices for dairy sires?**
8. **What records should be kept?**

References

1. *Advanced Livestock Production and Management* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit IX.
2. Transparency Masters
   a) TM 4.1: Identification
   b) TM 4.2: DHIA Record
   c) TM 4.3: DHIA Record
3. Activity Sheet
   a) AS 4.1: Determining Off-Flavors in Milk (Instructor)
   b) AS 4.1: Determining Off-Flavors in Milk (Student)

UNIT IX -HERD/FLOCK MANAGEMENT

Lesson 4: Management Practices for Dairy Cattle

TEACHING PROCEDURES

A. ***Review***

Lesson 3 described the management of breeding animals for beef cattle operations. As discussed previously, dairy enterprises are different from many animal enterprises because the animals are not raised primarily for their meat. The main source of income is the milk produced by the cows. Dairy producers must manage their animals differently from producers of beef cattle or swine who will market their animals for meat.

B. ***Motivation***

Begin by asking students what is done with the offspring of dairy animals. Where does most of the veal come from that is marketed to consumers in the grocery store? Discuss how this difference affects management practices on dairy farms.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Newborn dairy animals are only with the dam for a short period of time. The major purpose of breeding dairy cows is to bring them into milk production. Discuss the practices for managing dairy calves.

   What are some management practices performed on newborn dairy calves?

   a) Management practices for newborn calves
      1) Wipe the calf with a cloth, towel, or clean burlap bag if the cow does not lick it clean.
      2) Keep the calf from becoming chilled in bad weather.
      3) Dip the navel cord in 7 percent iodine solution to prevent infection.
      4) If the navel cord is bleeding, tie off with a strip of sterile cotton or linen cord.
      5) An injection of iron and vitamin A, D, and E are recommended.
      6) Colostrum
         (a) Consume 2 to 4 quarts immediately after birth
         (b) Consume 4 quarts within 12 hours after birth
   b) Identification
      1) Mark the calf with a freeze brand, ear tag, or tattoo before it is removed from the mother.
      2) Some breed associations require a photograph and sketch to document color patterns.
   c) Dehorning
      1) Dehorn calves after ten days but before they become too big to handle and leave the nursery barn.
      2) Dehorning can be done using a variety of methods.
         (a) Electrically heated iron most common
         (b) Caustic potash stick
         (c) Dehorning tube
         (d) Mechanical saws or clippers
      3) Clean and disinfect all equipment before use and between calves.

4) Isolate calves for a few days after dehorning to observe them for problems like prolonged bleeding.
5) Protect the dehorned area from flies by spraying it.

d) Removal of extra teats from heifers
1) Place the calf on its side.
2) Wash and disinfect the area.
3) Stretch the extra teat, hold it firmly, and cut it off with curved, sharp, disinfected scissors.
4) Apply iodine solution to the area.
5) Press a clean cotton cloth over the area momentarily if bleeding persists.
6) If flies are in season, treat the area with an approved fly spray.

2. Weaning dairy calves is much different than weaning beef cattle. Describe the practices for weaning dairy calves.

What management practices are used when weaning dairy calves?

a) Removed from its mother as soon as possible after its birth, often before the next milking in the parlor
b) Placed in a nursery and fed frozen colostrum that has been thawed, warmed, and placed in a bottle
c) Fed through a stomach tube inserted down the esophagus if necessary
d) Placed on a milk replacer formula or regular milk from the milking herd after the calf has received enough colostrum
e) Placed in individual hutches first day after birth
f) Encouraged to consume coarse-textured grain
g) Weaned from milk at 8 weeks or when consuming at least 1 1/2 pounds of grain per day
h) Moved to pens in groups of 6 to 8 following weaning

3. About 30 percent of dairy herd needs to be replaced each year. Most of the cows in a dairy herd are selected from the producer's herd and raised as replacement animals. They must be managed properly to be productive.

What management practices are used when raising replacement heifers?

a) Advantages of raising replacements
1) Reduced costs
2) Greater control over selection
3) Less chance of bringing disease into herd
4) Employing labor and facilities otherwise unused
5) Increased income from sale of extra heifers

b) Placed into production based on age and size
1) Age - 14 to 15 months before breeding
2) Size - 50 to 55 percent of mature weight

c) Other management practices
1) Separate from bull calves before six months to prevent indiscriminate breeding.
2) There should be no more than three months age difference in replacement animals.
3) Establish monthly worming program by 6 months.
4) Acclimate replacement heifers to milking procedures a month before calving.
(a) Herding them through holding pens
(b) Placing them in the milking stalls
(c) Letting them get used to the milking equipment
(d) Releasing them through the normal exit

4. The care of the cow during lactation plays an important role in the production of milk. Discuss the management practices needed for maximum production. Have students complete AS 4.1.

What are management practices for lactating dairy cows?

a) Placed in fresh cow group almost immediately after calving
b) Require proper rations for maximum production
    1) Rations designed to meet the animal's nutritional needs during production.
    2) Quality and quantity is important.
    3) Cow should be fed all she wants to consume of a high quality ration.
    4) Feed cow about 3 to 1 ratio of her body weight as dry matter.
c) Milking practices
    1) Must decide whether to milk two or three times a day
    2) Three times per day
        (a) Will increase milk production 6 to 20 percent
        (b) Involves additional costs, especially labor
    3) Regular milking routine recommended
d) Off-flavors in milk
    1) Ventilation
        (a) Caused by poor ventilation in the barn
        (b) Cows breathing unclean, cowy, or barn odors will change the taste
    2) Milking equipment
        (a) Foreign deposits
        (b) Reduced by clean, properly sanitized equipment
    3) Feed
        (a) Cows should not be given feed that is moldy or contain certain weeds.
        (b) Remove cows from the pasture two to four hours before milking.
        (c) Feed silage only after milking.
e) Management for milk let-down
    1) Controlled by hormone - oxytocin
    2) Gentle handling of the cow
    3) Gentle washing and drying of the teats and udder before milking
    4) Regular milking routine
f) Promoting the comfort of the cow
    1) Contented cow - more milk
    2) Maximize milk production during the lactation cycle if the dairy cow is properly cared for in terms of handling, feeding, and housing
    3) Rest 10 hours per day

5. Dairy producers should follow proper milking practices to maximize milk production. Ask students to list steps that should be used when milking cows. Discuss procedures used for milking.

What are practices for milking?

a) Wash hands with a sanitizing soap before milking and after handling any infected cows, or wear rubber gloves and dip them in a sanitizing solution between cows.
b) Clean the cow's teats before milking.
    1) Pre-wash extremely dirty teats and udders using a hose or bucket of warm water containing a detergent.
    2) Wash the teats with warm water containing a sanitizing agent.
    3) Use disposable paper towels or washable cloth to dry the udder.
c) Strip teats before attaching the milking machine.
    1) Eliminates the first milk, which is usually high in bacteria
    2) Stimulates milk let-down
d) Attach the milking machine within one minute after stimulating milk let-down.
    1) Be gentle when attaching the teat cups to avoid injury.
    2) Most cows will milk out in three to six minutes.
e) Remove the milking machine gently when the milk flow decreases and the lower part of the udder appears flabby.

f) Dip the teats immediately after removing the milking machine.
   1) Use a formulated teat dip.
   2) Dip at least two-thirds of the teat into the solution.
   3) The use of a teat dip will help reduce mastitis infections.
g) Most parlors use automotic detachment devices.

6. Dairy cows must be allowed to go through a period of rest to prepare their bodies for the next lactation cycle. Certain practices need to be followed during this dry period to maintain maximum production.

What are management practices for dry dairy cows?

a) Dry period between lactation cycles
   1) Allows the cow's body to recover and rest
   2) Increases production during next lactation cycle
   3) Increases profits
b) Bred while being milked
   1) Carries calf during 1/2 to 3/4 of the lactation period
   2) Accurate records needed to determine when calving will take place
   3) Allowed a dry period of 45 to 60 days based on the projected calving date
c) Should not be too thin at the end of lactation
   1) Body fat is replaced more efficiently during late lactation than during the dry period.
   2) Cow conditioned by providing some extra feed during the last 2 to 3 months of lactation.
d) Drying off
   1) Stop milking unless cow is producing 80 to 100 pounds per day at time of dryoff.
   2) Leaving milk in the udder will stop its secretion.
   3) Cow should not be feed grain or silage for 2 to 3 days.
   4) Feed good quality hay and water.
   5) Mastitis
      (a) Routine treatment recommended at the drying off.
      (b) Observe udder for 2 or 3 weeks for signs of mastitis.
e) Separated from the milking herd
f) Allowed plenty of exercise
g) Should not overfeed dry cows
h) Treated for internal parasites vaccinations

7. Most dairy operations do not keep their own bulls. Dairy bulls require special management. Discuss management practices for dairy sires.

What are management practices for dairy sires?

a) Artificial insemination (AI) improves herd genetics.
b) Avoid purchasing bulls with bad tempers.
c) Place a ring in the nose of young dairy bulls.
   1) Ring replaced with a larger one as the bull grows
   2) More easily controlled with a chain attached to the ring than with just a halter
d) Special housing and pens are necessary for safe handling.

8. The dairy enterprise makes more extensive use of records than any other livestock enterprise. Describe information that should be included in records. If possible, show the class actual DHIA records from a local dairy operation. Refer to TM 4.2 and 4.3.

What records should be kept?

a) Records to make decisions about management practices
   1) Production records on individual cows and the herd

2) Feed consumption records
3) Breeding and calving records

b) DHIA record program - provides variety of information for each cow
1) Cumulative pounds of milk, fat, and protein produced during the production period
2) Percentage of fat and protein in the milk
3) Recommendations for the amount of grain-concentrate to be fed
4) Monthly individual somatic cell count (SCC)

F. Other Activities

1. Arrange a field trip to a milking parlor to observe milking procedures and practices.

2. Show students a video detailing the management of milking operations. "Dairy Management Practices" (37 min.) from Creative Educational Video (CEV) provides information on dairy cow and heifer management and record keeping. CEV can be contacted at 1-800-922-9965 or on the Internet at <www.cev-inc.com>.

G. *Conclusion*

Dairy operations are quite different from most livestock operations. The profit comes from the milk produced by the cow, while the calves that are produced are secondary in importance. Successful dairy producers need to know how to raise replacement animals and manage their cows throughout the cycle of lactation and dry periods. More than any other livestock enterprise, the success of dairy farms is based on the accuracy of their records. Information from the DHIA is invaluable in assisting the dairy producer in making management decisions.

H. *Answers to Activity Sheet*

Answers will vary.

I. *Answers to Evaluation*

1. a
2. a
3. c
4. Answer must include three of the following: reduced costs, greater control over selection, less chance of bringing disease into the herd, employing labor and facilities otherwise unused, increased income from sale of extra calves

5. Freeze branding, tattooing, and ear tag

6. Answer must include the following: eliminates the first milk, which may contain bacteria; and stimulates milk let-down.

7. Answers should include the following: ventilation, milking equipment, feed

8. 45 to 60 days

9. Answers may include any two of the following: production records on individual cows and the herd, feed consumption records, and breeding and calving records.

10. Bulls are more easily controlled with a chain attached to the ring than with just a halter

UNIT IX -HERD/FLOCK MANAGEMENT Name _____

Lesson 4: Management Practices for Dairy Cattle Date _____

EVALUATION

Circle the letter that corresponds to the best answer.

1. The navel cord of a newborn dairy calf should be treated immediately after birth with a

   a. 7 percent iodine solution.
   b. Caustic stick.
   c. 7 percent alcohol solution.
   d. Pine tar solution.

2. When are dairy calves removed from their dams for weaning?

   a. As soon as possible after birth
   b. A few days after birth
   c. A few weeks after birth
   d. A few months after birth

3. How old should replacement heifers be before breeding?

   a. 4 to 5 months
   b. 9 to 10 months
   c. 14 to 15 months
   d. 19 to 20 months

Complete the short answer questions below.

4. List three advantages of raising replacement heifers.

   a.

   b.

   c.

5. What are three methods of identifying dairy calves?

   a.

   b.

   c.

6. What are the benefits of stripping the udder before milking?

   a.

   b.

7. What three things can affect the flavor of milk?

   a.

   b.

   c.

8. How long should dairy cows remain dry?

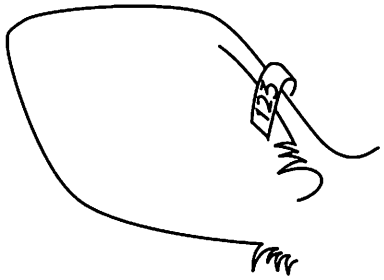
9. What are two types of records that may be kept by dairy producers?

   a.

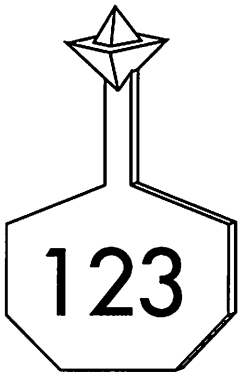
   b.

10. Why is a ring placed in the nose of dairy bulls?

Identification



Metal Ear Tag



Prenumbered Ear Tag

Tattoo

DHIA Record

TM 4.2

HERD CODE AND TYPE OF RECORD			SCALE CODE PER DAY	DATE TESTED		
ST	CO	HERD NO		MO	DAY	YEAR
43	09	0006		12	23	99
DHIRAPCS			STRING 1			

HERD SUMMARY DHI-202

PAGE 1

UNIV. OF MO FOREMOST DAIRY
RESEARCH FARM

COLUMBIA MO 65201

NON-TRADITIONAL

PRODUCTION, INCOME, & FEED COST SUMMARY

DESCRIPTION	DAILY AVERAGE PER COW ON TEST DAY		ROLLING YEARLY HERD AVERAGES	
TOTAL COWS	194		186.0	
COWS IN MILK	NUMBER 159	% 82	NUMBER 158.1	% 85
MILK LBS. (ALL COWS)	52.5		21,066	
FAT LBS. (ALL COWS)	2.12		742	
FAT PERCENT	4.0		3.5	
PROTEIN LBS. (ALL COWS)	1.76		687	
PROTEIN PERCENT	3.4		3.3	
MILK LBS. (MILKING COWS)	64.2			
	MILKING COWS	ALL COWS		
SILAGE	LBS. CONSUMED		LBS CONSUMED	%ENE
OTHER SUCCULENTS OR BLENDED RATIONS	LBS. CONSUMED		LBS CONSUMED	%ENE
DRY FORAGE	LBS. CONSUMED		LBS CONSUMED	%ENE
OTHER FEEDS	LBS. CONSUMED		LBS CONSUMED	%ENE
PASTURE	PASTURE (YES OR NO)		DAYS	%ENE
CONCENTRATES	LBS. CONSUMED		LBS CONSUMED	%ENE
VALUE OF PRODUCT $	10.20	8.25	3.055	
COST OF CONCENTRATES $				
TOTAL FEED COST $				
INCOME OVER FEED COST $				
FEED COST PER CWT. MILK $				
MILK BLEND PRICE	PER CWT	%FAT %PROT	PER CWT	%FAT %PROT

MISCELLANEOUS HERD INFORMATION

SHIPPED-TEST DAY COMPARISON	TEST DAY	YEARLY AVERAGE
SUM OF TEST DAY WTS (LBS)	10097	10683
REPORTED AV. DAILY BULK TANK WTS (LBS)		
% DEVIATION		

ASSOC.	SAMPLES RECV AT LAB		ORPC MAILED	
12				
SUPV.	MO.	DAY	MO.	DAY
15	12	24	12	27

	MILKING TIMES	WGH	SPL
1ST OR PRIOR AP	4:30 AM	Y	N
2ND	4:00 PM	Y	Y
3RD			

REPRODUCTIVE SUMMARY OF CURRENT BREEDING HERD

BR. OF HERD	TOTAL COWS IN BREEDING HERD
H	70

VOLUNTARY WAITING PERIOD (VWP)
60

	COWS WITH NO SERVICE DATES OR DIAG. OPEN		
	OPEN VWP TO 100 DAYS	OPEN OVER 100 DAYS	NUMBER DIAG. OPEN
NUMBER COWS	2	7	
% OF BREEDING HERD	3	10	

COWS BRED BUT NOT DIAG. PREG.			
DAYS OPEN AT LAST SERVICE			
FEWER THAN VWP	VWP TO 100 DAYS	OPEN 100 TO 125 DAYS	OPEN OVER 125 DAYS
15	17	3	26
21	24	4	38

DAYS TO 1ST SERVICE
75

REPRODUCTIVE SUMMARY OF TOTAL HERD

	DAYS OPEN AT 1ST SERVICE			AVG. DAYS TO 1ST SERVICE	SERVICES PER PREGNANCY		PROJECTED MINIMUM	
	NUMBER FEWER THAN VWP	NUMBER FROM VWP TO 100 DAYS	NUMBER OVER 100 DAYS		PREG. COWS	ALL COWS	CALVING INTERVAL	DAYS OPEN
1ST LACT	16	23	15	96	2.4	2.7	14.1	149
2ND LACT	4	32	10	100	2.0	3.4	14.5	160
3+ LACTS	10	31	5	79	2.4	3.7	14.7	166
ALL LACTS	30	86	30	92	2.3	3.2	14.4	158
% OF ALL 1ST SERVICES	21	59	20		CURRENT ACTUAL CALVING INTERVAL		13.7	

SERVICE OR HEAT INTERVALS	
INTERVAL LENGTH	NUMBER INTERVALS
LESS THAN 18	5
18-24	28
36-48	48
OTHER	122

SERVICES FOR PAST 12 MONTHS			
SERVICE NUMBER	NUMBER SERVICE	% SUCCESSFUL	SERVICE SIRE PTA $
1ST	165	43	+258
2ND	90	36	+281
3RD+	115	43	+233
TOTAL	394	39	+256

ABORTIONS	THIS MONTH	PAST YEAR
ACTUAL		1
APPARENT	3	14

BIRTH SUMMARY

DAM'S LACT NUM.	OFFSPRING BORN: MALES ALIVE	MALES DEAD	FEMALES ALIVE	FEMALES DEAD	CALVING DIFFICULTY SCORE 1	2	3	4	5	% 4+5
1										12
2+										5
TOTAL										7

COWS TO BE MILKING, DRY, CALVING, BY MONTH

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
* MILKING	155	155	171	163	151	139	116	109
DRY	35	31	9	13	22	30	54	58
COWS TO CALVE	12	19	15	2	4	14	10	28
HEIFERS TO CALVE								

* ASSUMES 2.5% PER MONTH CULLING RATE.

YEARLY REPRODUCTIVE SUMMARY

DATE OF TEST	% HEATS OBS.	NUMBER SERVICES	% SUCCESSFUL	NUMBER CONFIRM PREG.	NUMBER CALVING	TOTAL PREGNANT COWS
MONTH DROPPED	47	31	48	5	16	75
1-23-99	36	27	33	5	27	55
2-24-99	74	50	38	20	12	63
3-24-99	46	32	47	32	17	86
4-22-99	63	36	39	10	14	84
5-25-99	68	51	51	15	10	87
6-29-99	50	37	43	15	11	93
7-20-99	62	16	13	23	9	109
8-26-99	54	36	11	7	6	107
9-27-99	58	42	36	3	38	91
10-26-99	37	20	50	11	11	94
11-26-99	55	47		13	26	88
12-23-99	74	45		14	11	90
AVERAGES	56	37	39	14	16	87
TOTALS		439			192	

REMARKS:

DHIA Record

HERDCODE	DATE TESTED	BREED	STRING
43-09-0006	12-23-99	H	1

STAGE OF LACTATION PROFILE

		STAGE OF LACTATION (DAYS) 1 THRU 60	61 THRU 120	121 THRU 195	196 THRU 275	276 +	TOTAL OR AVERAGE
NUMBER MILKING	1ST LACT	6	18	15	11	9	59
	2ND LACT	4	9	11	10	10	44
	3+ LACTS	11	11	13	10	11	56
	ALL LACTS	21	38	39	31	30	159
AVERAGE DAILY MILK PRODUCTION	1ST LACT	52	67	66	52	45	59
	2ND LACT	82	85	68	63	41	65
	3+ LACTS	85	89	72	58	42	70
	ALL LACTS	75	78	69	57	43	65
% FAT & PROT. 1ST LACT	FAT %	4.5	3.9	3.9	4.5	4.3	4.1
	PROT %	3.2	3.2	3.3	3.8	3.9	3.4
% FAT & PROT. 2ND LACT	FAT %	4.0	3.9	3.9	4.2	4.6	4.1
	PROT %	2.9	3.1	3.5	3.6	3.9	3.5
% FAT & PROT. 3+ LACTS	FAT %	4.0	4.1	4.1	4.3	4.0	4.1
	PROT %	3.2	3.3	3.4	3.6	3.6	3.4
% FAT & PROT. ALL LACTS	FAT %	4.2	4.0	4.0	4.3	4.3	4.1
	PROT %	3.1	3.2	3.4	3.7	3.8	3.4
SCC SCR 1ST LACT		2.2	2.5	2.7	2.5	2.5	2.5
SCC SCR 2ND LACT		1.3	2.7	3.3	1.7	3.4	2.5
SCC SCR 3+ LACTS		2.0	2.3	3.4	3.4	4.2	3.1
SCC SCR ALL LACTS		1.8	2.5	3.1	2.5	3.4	2.7
SCC SCORE 3.9	NUMBER	1	5	10	5	9	30
	PERCENT	5	13	26	16	30	19

IDENTIFICATION AND GENETIC SUMMARY

AGE GROUP	NUMBER ANIMALS	AVG. AGE YR-MO	NUM. IDENTIFIED BY SIRE	NUM. IDENTIFIED BY DAM	NUMBER ID CHANGES	NO ANIMALS WITH PTAS / PAS	AVERAGE PTAS / PAS ANIMAL	AVERAGE PTAS / PAS SIRE
0-12								
13+								
REPLACEMENTS								
1ST LACT	71	2-02	70	71		33	+85	+124
2ND LACT	58	3-04	51	57		51	+83	+112
3+ LACTS	65	5-03	48	61	2	48	+79	+100
ALL LACTS	194	3-06	169	189	2	132	+82	+113
%IDENTIFIED (PRODUCING FEMALES)			87	97		NUMBER HEIFERS IN 13+ AGE GROUP OVER 30 MONTHS OF AGE		

HERD PTA $ OPTION	GENETIC PROFILE OF SERVICE SIRES: PROVEN A.I. SIRES	A.I. YOUNG SIRES	ALL OTHER SIRES
NM			
% OF HERD BRED TO	95	5	
NUMBER OF BULLS USED	48	5	1
AVERAGE PTAS OR PAS	+171	+157	
AV. PERCENTILE RANK (NET MERIT)	63		

CURRENT SOMATIC CELL COUNT SUMMARY

HERD PRODUCTION LOST FROM SCC THIS TEST PERIOD: MILK - 5,151; $ - 773

	% COWS SCC SCORE 0,1,2,3 (BELOW 142,000)	4 (142,000-283,000)	5 (284,000-568,000)	6 (569,000-1,136,000)	7,8,9 (OVER 1,136,000)
1ST LACT	68	19	8	3	2
2ND LACT	79	9		5	7
3+ LACTS	61	13	13	2	11
ALL LACTATIONS	69	14	8	3	6

PRODUCTION BY LACTATION SUMMARY

	NUMBER OF COWS	AVERAGE AGE MONTHS	SUMMIT MILK	PROJ ME 305 DAY MILK	PROJ ME 305 DAY FAT	PROJ ME 305 DAY PROTEIN	DIFFERENCE FROM HERDMATES MILK	DIFFERENCE FROM HERDMATES FAT	DIFFERENCE FROM HERDMATES PROTEIN	BODY WEIGHT
1ST LACT	71	26	69	22557	813	707	+451	+21	+15	1260
2ND LACT	58	40	90	23916	847	758	+1501	+64	+54	1350
3+ LACTS	65	63	94	23008	823	738	+552	+33	+27	1390
ALL LACTATIONS	194	42	83	23122	827	733	+808	+38	+31	1330

DRY COW PROFILE

	NUMBER DRY PERIODS	DAYS DRY	NUMBER DRY LESS THAN 40 DAYS	NUMBER DRY 40-70 DAYS	NUMBER DRY OVER 70 DAYS
1ST LACT					
2ND LACT	57	71		42	15
3+ LACTS	64	69		46	18
ALL LACTATIONS	121	70		88	33

YEARLY SUMMARY OF COWS ENTERED AND LEFT THE HERD

	COWS ENTERED HERD NUM.	COWS ENTERED HERD %	COWS LEFT HERD NUM.	COWS LEFT HERD %	NUMBER OF COWS LEFT THE HERD: DAIRY	LOW PROD.	REPO.	MAST.	UDDER	FEET & LEGS	INJURY OR OTHER	DISEASE	DIED	NOT RPTD
1ST LACT	65	35	21	11		3	3	3	1	2	3	1	5	
2ND LACT			13	7	1	1	2	2		1	2		3	1
3+ LACTS	2	1	22	12	2	1	3	4	1	4	2	1	4	
ALL LACTATIONS	67	36	56	30	3	5	8	9	2	7	7	2	12	1

YEARLY PRODUCTION AND MASTITIS SUMMARY

DATE OF TEST	DAYS IN TEST PERIOD	NUMBER COWS IN HERD ON TEST DAY	TEST DAY AVERAGES (MILKING COWS) DAYS IN MILK	TEST DAY AVERAGES (MILKING COWS) MILK	STANDARDIZED 150 DAY MILK	TEST PERIOD PERSIST. INDEX	TEST DAY AVERAGES (ALL COWS) % IN MILK	TEST DAY AVERAGES (ALL COWS) MILK	TEST DAY AVERAGES (ALL COWS) % FAT	TEST DAY AVERAGES (ALL COWS) % PROT.	ROLLING YEARLY HERD AVERAGE MILK	ROLLING YEARLY HERD AVERAGE FAT	ROLLING YEARLY HERD AVERAGE PROT.	SOMATIC CELL COUNT SUMMARY % COWS SCC SCORE 0,1,2,3 (BELOW 142,000)	4 (142,000-283,000)	5 (284,000-568,000)	6 (569,000-1,136,000)	7,8,9 (OVER 1,136,000)	AVG. SCC SCORE	WT. AVG ACTUAL SCC	NUMBER LEFT HERD DIED	NUMBER LEFT HERD SOLD
MONTH DROPPED	28	184	166	65.5	71.1	102	78	51.2	3.7	3.3	19811	716	643	74	14	6	3	3	2.4	155	2	1
1-23-99	30	181	155	69.3	74.6	100	87	60.0	3.2	3.3	19880	712	645	77	12	6	2	3	2.3	143	2	5
2-24-99	32	180	157	74.1	75.8	103	86	63.7	3.4	3.2	20047	709	649	72	13	10	3	2	2.3	141		3
3-24-99	28	187	153	72.1	72.7	98	84	60.7	3.3	3.2	20076	708	649	75	12	6	4	3	2.3	157	2	1
4-22-99	29	186	165	72.3	74.2	105	89	64.4	3.2	3.0	20090	699	648	78	9	8	1	4	2.0	118		3
5-25-99	33	185	180	73.1	76.8	104	86	63.1	3.2	3.2	20209	696	651	75	12	7	3	3	2.1	155	2	3
6-29-99	35	184	196	68.8	75.0	100	88	60.5	3.4	3.2	20350	697	657	67	16	6	4	7	2.6	268		3
7-20-99	21	182	205	66.9	75.3	101	90	59.8	3.5	3.1	20475	700	661	67	16	7	5	5	2.6	195		4
8-26-99	37	172	220	65.4	74.9	99	84	54.8	3.4	3.2	20659	706	667	67	14	9	7	3	2.6	223	2	8
9-27-99	32	192	190	63.9	72.8	105	86	54.5	3.9	3.4	20755	714	672	60	14	12	7	7	3.1	283	1	1
10-26-99	29	191	197	63.5	72.9	100	83	52.7	4.0	3.4	20885	727	679	72	12	7	5	4	2.5	201	1	4
11-26-99	31	194	181	62.0	69.9	97	85	52.7	3.9	3.4	20979	736	683	76	12	6	2	4	2.4	191	2	5
12-23-99	27	194	180	64.2	70.1	101	82	52.5	4.0	3.4	21066	742	687	69	14	8	3	6	2.8	295		4
AVERAGES	30	186	182	68.0	73.8	101	85	58.3	3.5	3.2				71	13	8	4	4	2.5	198	12	44

TEST PERIOD AV. MILK LBS. ADDED: 53.1

TEST PERIOD AV. MILK LBS. DROPPED: 49.6

Determining Off-Flavors in Milk

For this activity, prepare six samples of milk for students to use in identifying off flavors. Place the samples in numbered containers. Students may smell or taste the milk samples. Obtain enough cups for each student to use. Make arrangements for students to rinse their mouths between samples if needed.

Flavor	Method of Preparation
Bitter	Add a few drops of a 1 percent solution of quinine sulfate.
Feed	Bubble-steam volatile extract of silage or chopped forages through milk.
Flat-watery	Add water.
Foreign/disinfectant	Add hypochlorite sanitizer or laundry bleach (flavor dissipates with time).
Garlic/onion	Add garlic powder, onion juice, or a macerated section of onion.
High acid	Add cultured buttermilk to create a mixture that is 2 percent buttermilk.
Malty	Add malt extract or soak 2 teaspoons of Grapenuts cereal in 1 pint of milk for two hours before filtering.
Metallic/oxidized	Add 2 drops of cupric sulfate to 1 pint of milk and expose to direct sunlight for 15 to 30 minutes, or add 10 drops of 1% copper sulfate to 1 pint of milk and store at 5°C for 48 hours.
Rancid	Add 1 part raw milk to 9 parts warm homogenized milk and refrigerate overnight or add 2 drops of butyric acid per pint.
Salty	Add half a gram of table salt per pint of milk.
Unclean	Select from several samples of milk stored at 5° to 7°C for several days.
No defect	Use a sample from freshly purchased whole milk.

Lesson 4: Management Practices for Dairy Cattle Name _____

Determining Off-Flavors in Milk

Objective: Recognize off-flavors in milk.

Using the numbered samples of milk provided by your instructor, smell or taste the milk and then place an (X) under the sample number beside the defect that describes it. Not all of the defects will be marked.

	Samples					
Defect	1	2	3	4	5	6
Bitter						
Feed						
Flat-watery						
Foreign/disinfectant						
Garlic/onion						
High acid						
Malty						
Metallic/oxidized						
Rancid						
Salty						
Unclean						
No defect						

UNIT IX - HERD/FLOCK MANAGEMENT

Lesson 5: Managing Swine from Birth to Market

Competency/Objective: Develop and implement management practices for market swine from birth to market.

Study Questions

1. **What management practices should be performed on young pigs?**

2. **What options must be considered when determining the weaning age of pigs?**

3. **What types of feeding programs are appropriate for market swine?**

4. **What records should be kept?**

References

1. *Advanced Livestock Production and Management (Student Reference).* University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit IX.

2. Transparency Masters

   a) TM 5.1: Clipping Needle Teeth
   b) TM 5.2: Tail Docking
   c) TM 5.3: Ear Notching

3. Activity Sheets

   a) AS 5.1: Pig Production Crossword
   b) AS 5.2: Ear Notching

UNIT IX - HERD/FLOCK MANAGEMENT

Lesson 5: Managing Swine from Birth to Market

TEACHING PROCEDURES

A. ***Review***

Lesson 4 discussed herd management practices used for dairy cattle. This lesson will describe practices for managing swine from birth to market. In some ways, raising swine for market is similar to raising beef cattle; with both types of livestock, good feeding programs are essential to raise productive animals for slaughter.

B. ***Motivation***

Bring a pair of side-cutting pliers and ear notching pliers to class. Ask students if they can identify the tools. Have them explain how the tools are useful to a swine enterprise.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. The period from farrowing to weaning is important in determining the profitability in a swine operation. Certain procedures must be done to keep pigs healthy and in good condition for growth. Have students complete AS 5.1 and AS 5.2.

   What management practices should be performed on baby pigs?

   a) Clipping the navel cord
      1) Clipped with side-cutting pliers
      2) Should be cut approximately one inch from the body
      3) Treated with a tincture of iodine solution
   b) Clipping the needle teeth
      1) Done immediately after birth
      2) May use side-cutting pliers to clip the teeth at the gum line
      3) Disinfected after clipping the teeth of each pig
      4) Care taken not to cut the gum
      5) One-third to one-half of the teeth clipped in pigs over two days old
      6) Lessens the chance that the pigs will bite and cause irritation of the sow's teats, which could lead to the sow refusing to nurse
   c) Tail docking
      1) Cutting off the pig's tail one-fourth to one-half inch from the body
      2) Done when pigs are one to three days old using side-cutting pliers
      3) Should disinfect the stub of the tail with iodine spray
      4) Disinfect the pliers after each use
      5) Helps to prevent tail biting among pigs in confinement
      6) Producers of feeder pigs - always dock the pigs' tails
      7) Should not dock tails when pigs have scours
   d) Giving iron injections or an oral dose of iron
      1) Prevents pigs from developing anemia
      2) Given when pigs are two to four days old
      3) Injections
         (a) Consist of 100 to 150 milligrams
         (b) Given in the neck or shoulder, never in the ham

(c) May cause carcass staining and some loss of value when marketing occurs
4) Given carefully because overdoses may cause shock in the pigs
5) Dose repeated at two weeks of age, either by giving an injection or adding iron to the feed or water
6) Can also supply iron by placing a couple of shovels of fresh sod in the pen

e) Watched closely for scours during the first couple of weeks
1) Oral drugs usually more effective than injections in preventing scours
2) Medication dissolved in water - used when the pigs become a little older
3) Good sanitation - major role in preventing scours
4) Should contact a veterinarian if scours becomes a serious problem

f) Castration
1) Must castrate male pigs raised for slaughter
2) Best done when the pigs are young
(a) Experience less stress
(b) Job easier for the producer
3) Should castrate boars before they are two weeks old
4) Clean, sharp, and disinfected knives used
5) Pig holders used to hold pigs so that one person working alone can castrate a pig
6) Should not do other processes, such as vaccinations, at the same time as castration because it places too much stress on the pig

g) Ear notching
1) Done to identify each animal
2) Use a tool similar to a pair of pliers that removes a v-shaped notch from the ear
3) Universal ear notching code of 1-3-9-27-81 used by most producers
(a) Notches in a pig's left ear - individual pig number
(b) Notch in its right ear - litter number of the pig

h) Equalizing the litter sizes of farrowing sows
1) Move pigs from large litters to smaller litters to make the litter sizes about equal
2) Done during the first couple of days after farrowing
3) Should make certain that the pigs have nursed to receive colostrum before placing them in a new litter
4) Larger pigs generally the ones moved
5) Should make sure that the sow has the teat capacity to nurse more pigs when adding them to a litter

2. Ask students what factors a producer should consider when determining the weaning age of pigs. Discuss weaning practices.

What options must be considered when determining the weaning age of pigs?

a) Generally weaned between five and eight weeks of age
b) Should weigh at least twelve pounds when they are weaned
c) Should try to provide a constant environment during the transition period, avoiding large temperature or climate changes
d) Trend toward weaning pigs at an earlier age
1) Occurs at four weeks of age
2) Requires that the pigs are eating feed rations and getting the appropriate levels of nutrients for growth
3) Must make certain that the animals are consuming a considerable amount of feed at the time of separation
e) Put in pens of no more than 30 pigs
1) Grouped according to size
2) May group the pigs by sex at weaning because some research indicates that growth can be improved by feeding the sexes separately

3. The feeding of swine is an important aspect of pork production. Discuss feeding programs for market animals.

What types of feeding programs are appropriate for market swine?

a) Two general feeding phases
   1) Farrowing - birth to approximately 40 pounds (weaning)
   2) Grow/finish - weaning to market at 240 to 250 pounds
b) Should get young pigs started on feed as soon as possible
   1) About a quarter of all pigs lost before weaning - lost because of poor feeding
   2) Should be eating well by the time the pigs are three to four weeks of age to receive necessary nutrients
   3) Creep feeding area in place with a good quality creep feed available at all times
      (a) Commercial pelleted creep feeds adequate
      (b) Crumbled variety is available for very young pigs
      (c) Should contain sugar because the sweetness of the feed encourages them to eat
      (d) Medicated with broad-spectrum drugs for parasite control
         (1) May reduce death losses prior to weaning
         (2) May increase average daily gain by about 14 percent
   4) May also use phase feeding to more accurately meet the changing nutritional needs of young pigs
      (a) Phase feeding - feeding a special diet based on the nutritional requirements of pigs at different ages and weights
      (b) Beginning diets usually high in protein and amino acids because weaning is a critical time for muscle growth
      (c) Levels of protein and other nutrients reduced as pigs grow and their nutrient needs decrease
c) Hogs in confinement grouped by weight and/or sex into pens with no more than 50 to 60 head
   1) Grouping by weight - may help prevent larger hogs from keeping smaller animals from the feeding area
   2) Grouping by sex - allows gilts to be given feeds that are higher in amino acids than the feed given to boars
   3) Amino acids - necessary for improved growth rate and feed efficiency
   4) Amino acid requirements - higher for lean, fast-growing pigs and in the summer
   5) Grow/finish phase
      (a) Mostly fed a corn ration with a protein supplement like soybean oil meal
      (b) May feed other grains and protein supplements depending on their quality and price at that time, as long as they provide the amino acids required
d) Feed
   1) About 50 to 70 percent of the cost of swine production
   2) Reducing wasted feed important in maintaining efficiency
   3) Feeders properly adjusted to prevent waste; should check the feeder adjustments one or two times a week to make sure neither too much nor too little feed is supplied
   4) Pelleted rations create less waste and dust, but are more expensive
   5) Rodents also controlled to aid in using feed efficiently

4. As with all enterprises, records are vitally important for assessing the profitability of a swine operation. Ask students what types of records might be kept to examine the efficiency of the operation.

What records should be kept?

a) Birth weights
b) Weaning weights
c) Amount and type of feed given to market animals
d) Rate of gain
e) Feed efficiency
f) Weight at marketing

g) Death rates

F. ***Other Activities***

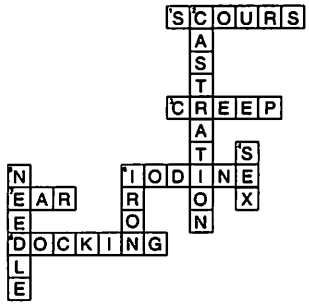
Because pigs are small and easy to handle, a producer or family member of a student may bring newly farrowed pigs to school. Students could take turns performing some of the procedures addressed in this lesson. They could clip needle teeth, castrate boar pigs, dock tails, and give iron shots. Each student should be encouraged to participate.

G. ***Conclusion***

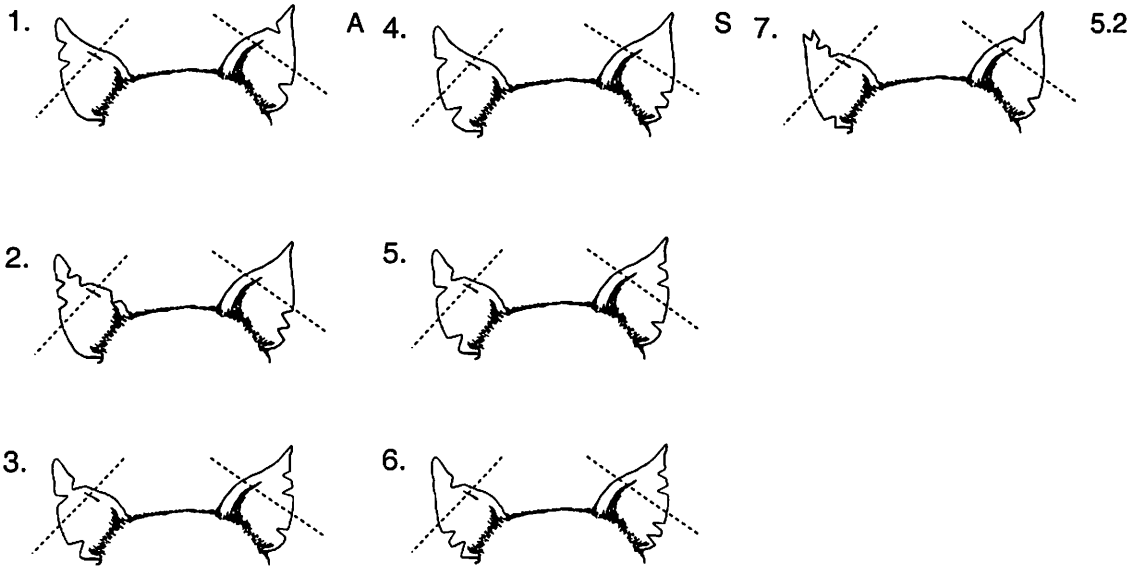
Raising swine is a big business in Missouri. Producers should know what management procedures should be done to the animals and how they should be performed. Practices like tail docking, clipping needle teeth, castration, and ear notching are all an important part of the proper management of market swine. Producers should also know how to feed swine at different stages of growth in order to produce animals of the desired weight. Records should be kept to assess the operation and help when making management decisions that will maximize profits.

H. ***Answers to Activity Sheet***

A S



5.1



5.2

I. ***Answers to Evaluation***

1. a
2. b
3. a
4. d
5. c
6. Tail docking - to prevent tail biting in confinement; clipping needle teeth - to prevent them from cause irritation to the sow's teats, which could lead to the sow refusing to nurse

7. Feeding a special diet based on the nutritional requirements of pigs at different ages and weights

8. Weight and sex

9. It may cause staining of the ham, resulting in loss of value.

10. Answers may include any two of the following: birth weights, weaning weights, the amount and type of feed given to market animals, rate of gain, feed efficiency, weight at marketing, and death rates.

UNIT IX - HERD/FLOCK MANAGEMENT Name _____

Lesson 5: Managing Swine from Birth to Market Date _____

EVALUATION

Circle the letter that corresponds to the best answer.

1. When should the first iron injection be given to baby pigs?

   a. 2 to 4 days of age
   b. 9 to 10 days of age
   c. 2 to 4 weeks of age
   d. When needed

2. Early weaning occurs at:

   a. 2 weeks of age.
   b. 4 weeks of age.
   c. 6 weeks of age.
   d. 8 weeks of age.

3. Pig tails should be docked about _____ from the body of the animal.

   a. ½ inch
   b. 2 inches
   c. 3 inches
   d. 4 inches

4. Levels of protein and amino acids are _____ as pigs grow.

   a. Increased
   b. Maintained
   c. Doubled
   d. Reduced

5. Pigs should weigh at least _____ pounds when they are weaned.

   a. 4 pounds
   b. 8 pounds
   c. 12 pounds
   d. 16 pounds

Complete the following short answer questions.

6. Why are the following practices performed in swine production?

   a. Tail docking -

   b. Clipping needle teeth -

7. What is phase feeding?

8. What are two characteristics used to group hogs when feeding in the finishing operation?

   a.

   b.

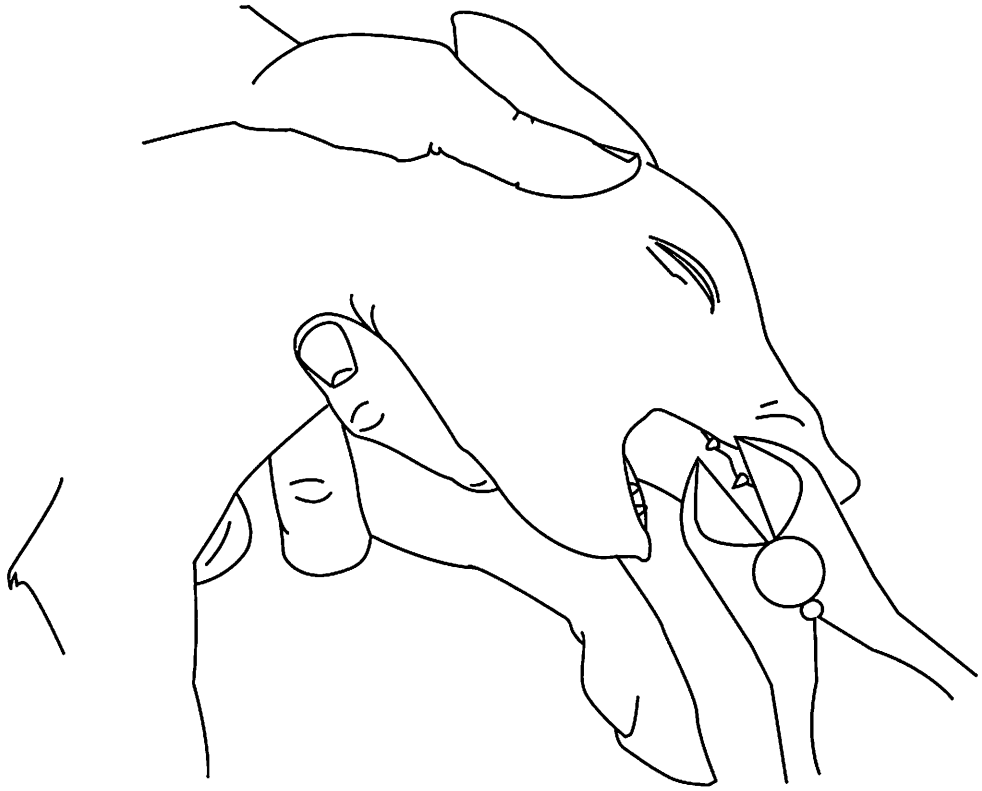
9. Why should iron injections **not** be given in the ham of the pig?

10. What are two records that can be used when evaluating the success of the operation in raising pigs from birth to marketing?

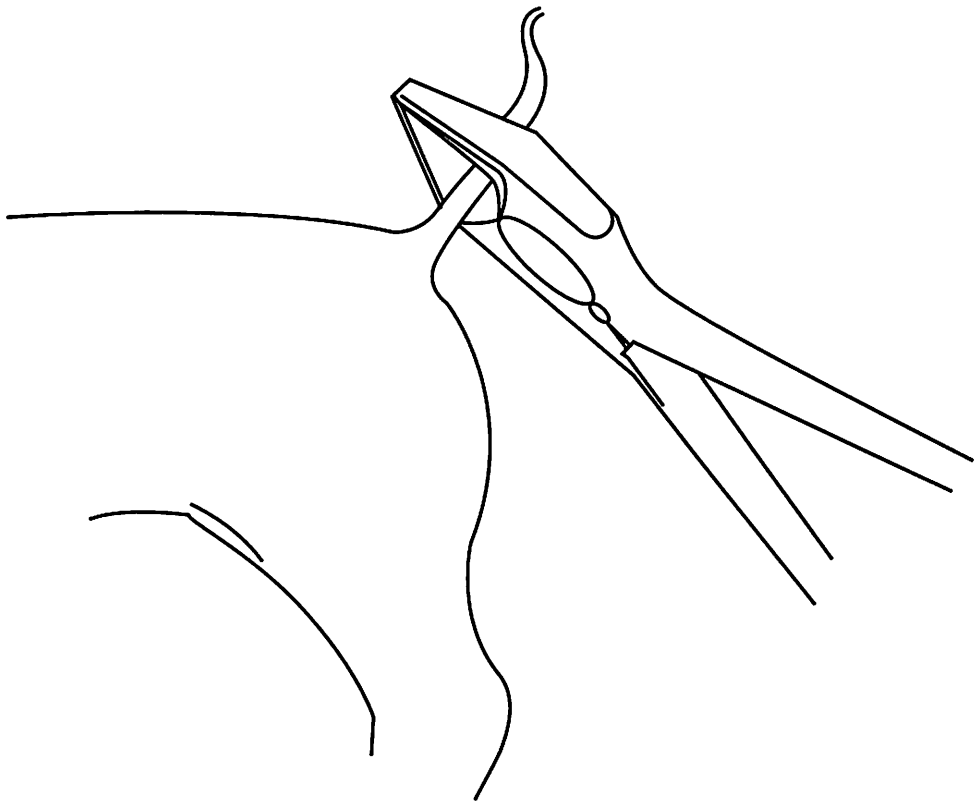
    a.

    b.

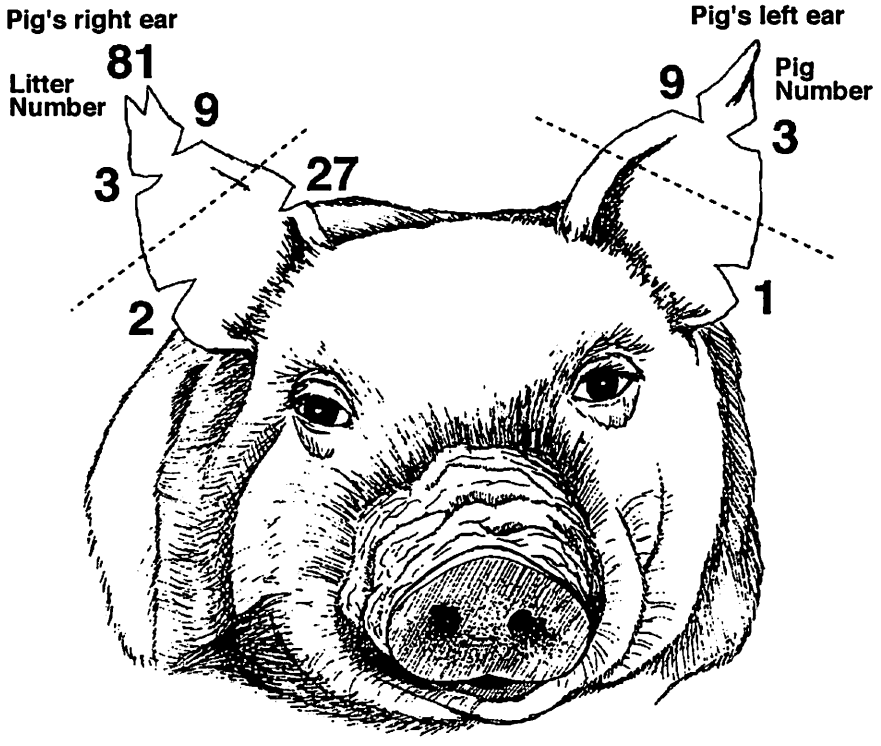
Clipping Needle Teeth



Tail Docking



Ear Notching

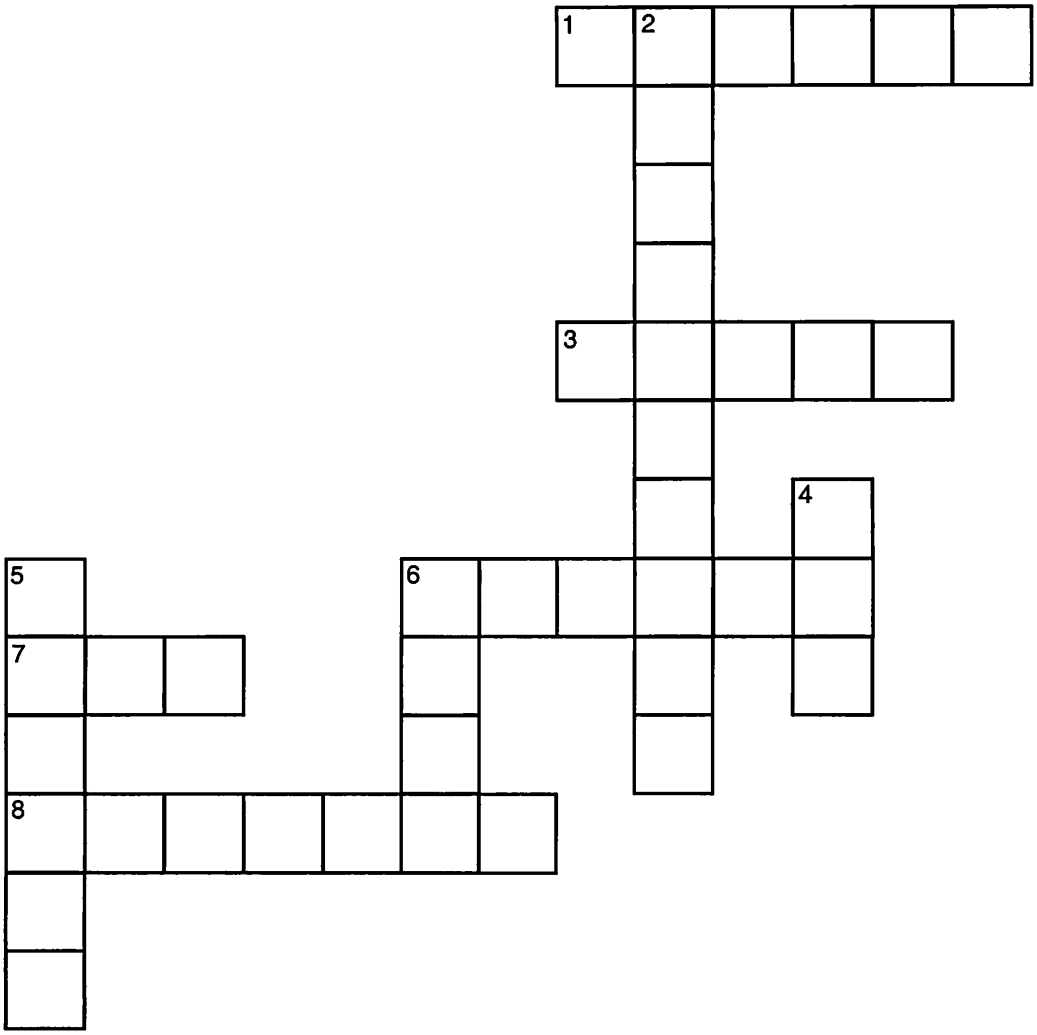


Lesson 5: Managing Swine from Birth to Market Name _____

Pig Production Crossword

Objective: Identify terms associated with swine production.

Complete the crossword puzzle below.



Across:

1. Type of diarrhea producers watch for in small pigs
3. Feeding process for young animals
6. Used to treat navel cords
7. _____ notching
8. Process of clipping tails at birth

Down:

2. Done to all young boars raised for market
4. Animals grouped by _____ when feeding
5. Type of teeth clipped at birth
6. May be supplied through injections

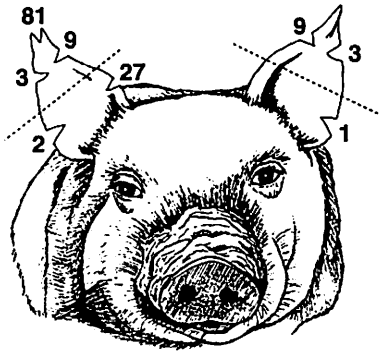
Lesson 5: Managing Swine from Birth to Market Name _____

Ear Notching

Objective: Identify the litter and pig number of swine using ear notching.

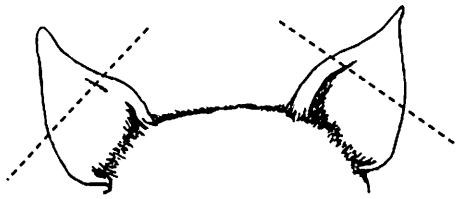
Draw notches on the ears in the appropriate place to illustrate the given litter number and pig number for each of the problems given. An illustration of the ear notching system is provided below.

Litter number

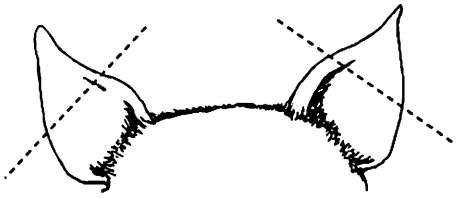


Pig number

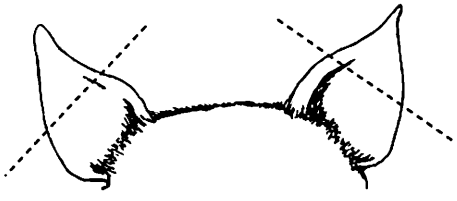
1. Litter number 6, pig number 10



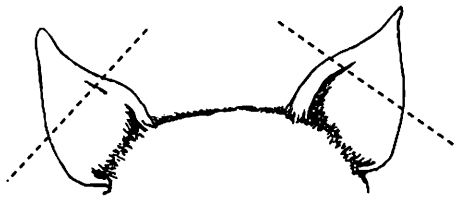
2. Litter number 51, pig number 2



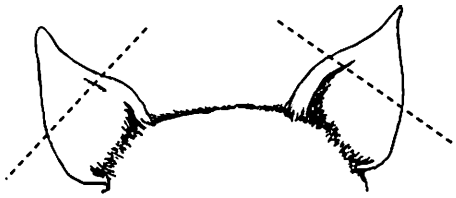
3. Litter number 14, pig number 7



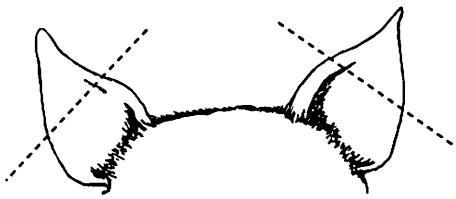
4. Litter number 13, pig number 8



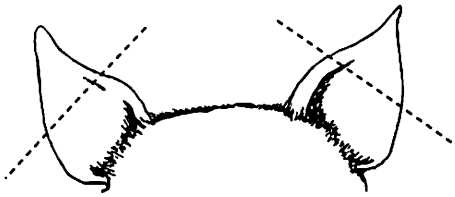
5. Litter number 14, pig number 7



6. Litter number 13, pig number 8



7. Litter number 101, pig number 10



UNIT IX -HERD/FLOCK MANAGEMENT

Lesson 6: Management Practices for Swine Breeding Stock

Competency/Objective: Develop and implement management factors for swine breeding stock.

Study Questions

1. **What management practices should be implemented for open and bred gilts and sows?**
2. **What management practices should be implemented for boars?**
3. **What types of feeding programs are appropriate for breeding stock?**
4. **What records should be kept?**

References

1. *Advanced Livestock Production and Management (Student Reference).* University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit IX.
2. Activity Sheet
   a) AS 6.1: Developing a Swine Management Record System

UNIT IX - HERD/FLOCK MANAGEMENT

Lesson 6: Management Practices for Swine Breeding Stock

TEACHING PROCEDURE

A. ***Review***

Lesson 5 discussed management practices relating to raising swine from birth to market. This lesson will focus on considerations for managing the breeding herd. Producers must properly manage their replacement stock, the gilts and young boars needed when culling older animals. Producers must know how to manage these animals until they are ready to produce their first litter. It is also important to know how to manage mature sows and boars because the majority of the herd will consist of mature animals. Good management of the breeding herd is necessary to ensure productivity.

B. ***Motivation***

Ask students to list management considerations when replacing the mature breeding stock with young boars and gilts. How might they be treated differently than market hogs? Then ask students to list some of the management considerations for working with sows and older boars.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Discuss management practices for replacement gilts and sows.

What management practices should be implemented for open and bred gilts and sows?

a) Under normal conditions, 15 to 30 percent of the sows culled at each farrowing
b) Replacement gilts selected for reproductive and carcass traits
c) May raise replacement animals or purchase them from other producers
    1) May choose to purchase replacement gilts to bring animals of greater genetic value into the herd
    2) Must have adequate resources for raising the animals, including breeding stock, facilities, and labor, if a producer raises his or her own replacement gilts
d) Separate replacement gilts from market hogs when they weigh about 150 to 200 pounds so that they may be fed a less fattening ration in preparation for breeding
e) Indication of a gilt's ability to reproduce - beginning the estrous cycle at an early age of about four and half to six months
f) Ready for breeding at about seven to eight months of age
    1) Should weigh 230 to 250 pounds at breeding
    2) Pen them near a boar when they reach five and a half months of age to ensure that gilts are ready to breed by this time
g) Bred during the second heat period to increase conception rates
h) Vaccinated and wormed prior to breeding to be sure they are healthy and ready for breeding
i) Important sow management decision - determining how often the sow will be farrowed
    1) Multiple farrowing - breeding scheduled so litters arrive throughout the year rather than having sows farrow once or twice during the year
    2) Used by large confinement operations with environmentally controlled buildings because the facilities provide protection from harsh weather conditions
    3) Entails more planning and close attention to detail
    4) Advantages

(a) Distributes workload throughout the year rather than concentrating it in one or two periods
(b) Produces a more stable market for hogs
(c) Produces a more constant supply for packers

5) Proper care of bred gilts and sows
   (a) Necessary to prevent losses during pregnancy
   (b) Designing a good feeding program
   (c) Avoiding heat stress during the summer
   (d) Temperatures above 85 degrees Fahrenheit
      (1) Reduce embryo survival rates
      (2) Result in stillborn pigs
   (e) Good ventilation and evaporative cooling or dripper systems needed for sows in confinement housing

6) Sows
   (a) Should enter heat within seven days after weaning and may then be rebred
   (b) Can synchronize estrus in a group of sows by weaning litters at the same time
   (c) Should be culled from the herd if the sow does not conceive after 28 days

2. Replacement boars are raised the same as gilts until they are separated. What management practices need to be followed until they are placed in service? Discuss the management of replacement and mature boars.

What management practices should be implemented for boars?

a) Replacement boars purchased or raised on the operation
   1) Most purchased to bring new genetic material into the herd
   2) Newly purchased boars
      (a) Isolated in clean, comfortable facilities, preferably for 60 days, before introduction into the herd
      (b) Tested during isolation for certain diseases, including pseudorabies, TGE, and brucellosis
   3) Replacement boars raised on the operation
      (a) Raised with the rest of the hogs until they reach 150 to 200 pounds
      (b) Kept in pens or crates away from the breeding herd to keep them from becoming sexually active too early

b) Tested for reproductive soundness and test mated at seven to eight months of age
   1) Done to observe if they have any problems when mating
   2) One of every ten young boars - breeding problem other than sperm motility
   3) Should observe test matings, looking for aggressiveness, desire to mate, and problems with the mating process

c) Replacement boars housed appropriately
   1) May be put in pens together; should not be penned with older breeding stock because older boars tend to fight younger animals and may cause injury
   2) May be kept in individual crates to avoid fighting and competing for feed
   3) Should be able to exercise to ensure that they are in good condition

d) Young boars ready for mating at eight months of age
   1) Test semen to check for fertility
   2) Should control how many matings take place - only once a day and no more than five times a week
   3) Hand-mated when first put into service
   4) Put in fence line contact with gilts and sows in the breeding herd to increase the desire to mate if necessary

e) Either hand mating or pen mating used with older replacement boars and mature boars
   1) Hand mating
      (a) Allows the producer to control the use of the boar and record the exact breeding date
      (b) Less stress experienced by boars and sows

(c) More labor and facilities necessary
(d) Recommended number of services for a mature boar in a hand mating system - two per day, with a maximum of seven services per week

2) Pen mating
(a) Requires fewer resources, but the farrowing rate may be lower
(b) Should provide plenty of boar power when using pen mating
(1) Groups of eight to ten sows penned with a mature boar
(2) Four to six sows penned with boars less than one year of age
(3) Consider rotating boars among groups of sows to prevent the possibility that a group may not be bred because of a problem with the boar

3) Should monitor the performance of the boar with either hand mating or pen mating and make sure that ample opportunity is given for mating sows

f) Mature boars
1) Separated from the breeding herd prior to the breeding season
2) Housed in individual crates or pens
(a) Penned with stock of equal size if they are kept in pens because larger boars may fight with or intimidate smaller boars and reduce their breeding potential
(b) Should provide sufficient room for boars to receive plenty of exercise
3) Boar's semen checked for fertility before the breeding season
4) Should also go through a full physical exam to check for soundness

g) Heat stress
1) Experienced in temperatures over 85 degrees Fahrenheit
2) Quality of semen reduced
3) Reduction in fertility rates for five weeks after exposure to high temperatures; females will have decreased conception rates and smaller litters
4) Must be kept cool and comfortable in the summer
5) Boars kept in confinement housing cooled using evaporative cooling systems or dripping systems

3. The feeding of the breeding herd is important for productivity. Proper feeding will insure higher conception rates. Ask students to describe the condition the animals should be in prior to breeding. Discuss appropriate feeding programs to achieve and maintain the proper condition.

What types of feeding programs are appropriate for breeding stock?

a) Replacement gilts
1) Gain about a pound per day until they are ready for breeding
2) Receive about five pounds of feed per day through the second estrus period
3) Flushing
(a) One way to increase reproductive efficiency; can result in larger litter sizes from gilts
(b) Should increase the ration to six to eight pounds about ten to fourteen days prior to breeding
(c) May also flush sows that have been on a restricted diet prior to breeding
(d) Sows in good condition - little to no benefit from flushing

b) Quality and quantity of proteins, minerals, and vitamins important for gestating sows and gilts
1) Growing gilts - enough of these nutrients received for both continued growth and the development of the offspring
2) Need also increases during the last month of the gestation period
(a) Majority of the growth of the young pigs takes place
(b) Reserves stored in the body for use during the lactation period because the demand for milk may be greater than can be provided by the lactating sow's diet

c) Bred gilts and sows
1) Placed on a limited feeding program to prevent them from getting too fat
2) Overfeeding

(a) Stillbirths
(b) Birth of weak pigs
(c) Farrowing difficulties

3) Bred gilts - gain 70 to 100 pounds during gestation
4) Mature sows - gain about 70 pounds during gestation
5) Four to six pounds of feed given to each animal per day
6) Make sure that bred gilts and sows are receiving sufficient feed because they will become extremely thin during lactation if they are too thin at farrowing
7) Feeding an extra pound or two of feed during the last ten days of gestation - increases pig survival and litter size at weaning

d) Farrowing ration
1) Should be bulky
2) Wheat bran, ground oats, or alfalfa meal substituted for grain in the ration
3) Prevents constipation in sows at farrowing

e) After farrowing
1) Given free access to feed five to seven days after farrowing
2) Lactating sows provided with plenty of feed
(a) Provide 1 pound of feed per lactating pig plus 6 pounds of maintenance feed for sow daily
(b) Should consist of concentrates that are rich in amino acids, minerals, and vitamins, particularly the B vitamins

f) Feed requirements for the herd boar
1) Similar to those for a mature sow of equal weight
2) Young boars - about five to six pounds of a balanced 14 percent crude protein ration per day
3) Mature boars - five to seven pounds of protein ration
4) More feed given when the boar is in service during the breeding season
5) Kept in vigorous condition
(a) Amount of feed changed if the boar is too fat or too thin
(b) Tend to overfeed boars, which results in sluggishness and decreased desire to mate
(c) Can become temporarily or permanently sterile if the ration is deficient of required nutrients over a long period

4. Only through accurate and complete records can a producer have a basis for selecting replacement animals for the breeding herd and evaluating the performance of mature animals. Ask students if they can list records that should be kept on breeding stock. Have students complete AS 6.1.

What records should be kept?

a) Records for replacement stock
1) Records on performance data
(a) Birth weight
(b) Weaning weight
(c) Feed efficiency
(d) Rate of gain
2) Records concerning early breeding characteristics
(a) Frame size
(b) Scrotal development

b) Records for mature sows and boars
1) Information related to feeding in order to monitor nutritional requirements
2) Sows
(a) Litter size and survival
(b) Farrowing difficulty
3) Boars - frequency of boar services

F. ***Other Activities***

1. Have students decide whether they would raise or purchase replacement breeding stock. Have them write a short essay explaining the reasons for their choices, including any advantages and disadvantages of the system.

2. Ask students to research feeding programs for swine to determine actual compositions of rations for sows and boars. Feeding handbooks and textbooks have sample rations. They may also obtain prices of ingredients from local sources and figure ration costs.

G. ***Conclusion***

An essential task for the successful producer is obtaining quality replacement breeding stock, either through purchasing or raising them. Knowing how to manage young animals will play a large role in the number and quality of offspring produced, which directly affects producer profits. Boars and gilts should be from quality stock and fed and managed properly to be healthy and in prime breeding condition.

Because the majority of the breeding herd consists of older animals, managing sows and boars is of equal importance. The length of the productive life of breeding stock is directly related to the kind of management, feeding, and care they have been given. The number of healthy pigs from each sow is the most important measure of success because it determines the profit for the producer at the end of the reproductive cycle.

H. ***Answers to Activity Sheet***

Answers will vary.

I. ***Answers to Evaluation***

1. c
2. a
3. b
4. d
5. b
6. c
7. b
8. a
9. a
10. c

11. Answers may include any two of the following: information on feeding, litter size and survival, and farrowing difficulty.

12. To prevent constipation in sows

13. To observe if they have any problems when mating

14. Answers may include any two of the following: distributes workload throughout the year, produces a more stable market for hogs, and produces a more constant supply for packers.

UNIT IX - HERD/FLOCK MANAGEMENT Name _____

Lesson 6: Management Practices for Swine Breeding Stock Date _____

EVALUATION

Circle the letter that corresponds to the best answer.

1. How many sows are normally replaced after each farrowing?

   a. 5 to 10 percent
   b. 10 to 15 percent
   c. 15 to 30 percent
   d. 20 to 40 percent

2. How many females should a young boar breed at first?

   a. 1 per day, 5 for the week
   b. 1 per day, 7 for the week
   c. 2 per day, 7 days a week
   d. As many as he will naturally service

3. When should sows enter heat after weaning a litter of pigs?

   a. About 2 days after weaning
   b. About 3 to 7 days after weaning
   c. About 7 to 10 days after weaning
   d. About 2 weeks after weaning

4. When should gilts be bred for the first time?

   a. During the first heat cycle
   b. At 5 months of age
   c. At 10 months of age
   d. During the second heat cycle

5. Sows and boars may suffer heat stress when the temperature rises above _____.

   a. 70 degrees Fahrenheit
   b. 85 degrees Fahrenheit
   c. 95 degrees Fahrenheit
   d. 100 degrees Fahrenheit

6. How much feed should gilts receive during flushing?

   a. 1 to 2 pounds
   b. About 5 pounds
   c. 6 to 8 pounds
   d. About 10 pounds

7. When should young boars and gilts be removed from the market swine herd?

   a. After the gilts' first heat cycle
   b. At 150 to 200 pounds
   c. At 230 to 250 pounds
   d. At 12 months of age

8. Mature boars should receive _____ of a balanced 14 percent crude protein ration per day.

   a. About 5 to 7 pounds
   b. About 8 to 10 pounds
   c. About 12 pounds
   d. As much as they will eat

9. Bred gilts should gain _____ pounds during gestation.

   a. 70 to 100
   b. 90 to 120
   c. 110 to 140
   d. 130 to 160

10. Young boars are ready for mating at _____ of age.

   a. 4 months
   b. 6 months
   c. 8 months
   d. 10 months

Complete the following short answer questions.

11. What are two records that should be kept for mature sows?

   a.

   b.

12. Why should the farrowing ration be bulky?

13. Why are young boars test mated?

14. What are two advantages of a multiple farrowing system?

   a.

   b.

Lesson 6: Management Practices for Swine Breeding Stock Name _____

Developing a Swine Management Record System

Objective: Develop a record form for swine replacement stock.

In the space below, design a record form to use for recording information about a sow in the breeding herd. Include all the information necessary for choosing a replacement gilt and evaluating a mature sow.

UNIT IX -HERD/FLOCK MANAGEMENT

Lesson 7: Sheep Management from Birth to Market

Competency/Objective: Develop and describe management practices for market sheep from birth to market.

Study Questions

1. **What management practices should be performed for lambs?**

2. **What factors should be considered when determining the weaning age for sheep?**

3. **What factors should be considered when determining a feeding program for market sheep?**

4. **What records should be kept?**

References

1. *Advanced Livestock Production and Management (Student Reference).* University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit IX.

2. Transparency Masters

   a) TM 7.1: Tail Docking and Castration

3. Activity Sheet

   a) AS 7.1: Developing a Management Calendar

UNIT IX - HERD/FLOCK MANAGEMENT

Lesson 7: Sheep Management from Birth to Market

TEACHING PROCEDURES

A. ***Review***

Lesson 7 described management practices used for swine in the breeding herd. Some of the same management practices described in the preceding lesson on swine are similar to those used for sheep. However, other practices are unique to sheep production. This lesson will outline the management of sheep from birth to market. These practices can make a significant contribution to the success of the sheep operation.

B. ***Motivation***

Ask students if they can list some management practices required for sheep production that differ from those required for other species of livestock. What are some similarities?

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. As with most livestock enterprises, one of the most important times in a sheep's life is immediately after its birth. Certain management practices should be followed to enable an animal to grow and develop successfully, which is the first step toward making a profit. Ask students to list management practices used for lambs. Show the class TM 7.1. It would be even more effective if actual castration and docking equipment were displayed.

   What management practices should be performed for lambs?

   a) Bonding
      1) The bonding process is critical to the lamb's survival after its birth.
      2) Bonding can be disrupted by several factors.
         (a) Presence of animals such as dogs or other ewes
         (b) Abnormal amount of human activity
         (c) Crowding
         (d) Illness of the ewe
      3) Provide aid in the bonding process.
         (a) Penning the ewe in close proximity with her lamb
         (b) Placing the lamb near the ewe's nose so she can identify it as her own and lick it clean
         (c) Rubbing the lamb with birth fluids
   b) Grafting
      1) Grafting involves placing a lamb with another ewe who delivered a single lamb.
      2) Rub the orphan lamb all over with the fluids from the birth and place it at the ewe's nose.
   c) Cleaning the lamb
      1) Hypothermia can be a problem in cold weather.
      2) Clean the lamb for the ewe using clean towels if she is too tired.
      3) Keep the lamb where the ewe can see it so she will recognize it as hers.
   d) Nursing
      1) Nursing on colostrum within the first two hours after birth is crucial.

2) Unplug ewes by gently stripping the teats to remove the waxy plugs at the ends of the teats.
3) Guide lambs that have trouble finding the teats.

e) Cutting the umbilical cord
1) Cut the umbilical cord with clean scissors if it is broken off at a point longer than 2 inches.
2) Dip the remaining navel cord in a 7 percent iodine solution.
(a) Hold the container against the lamb's belly with the lamb tilted back to submerge the cord and the surrounding area.
(b) Be careful not to drench the lamb in too much iodine solution, because the ewe may reject the lamb if its scent is hidden.
(c) Dip the umbilical cord as soon as possible after birth to prevent bacteria from entering the area.
(d) After 12 hours, many producers choose to dip the navel of the lamb again for extra protection.

f) Identification using ear tagging
1) Ear tags should be of an appropriate size to avoid snagging.
2) Tagging should be done with sanitary applicators.
3) Place the tag in the lamb's ear in a way that will prevent it from being torn out easily.

g) Castration and tail docking
1) These processes may be done after the lamb is a few days old but before it reaches six to seven weeks of age.
2) Performing the procedures on a younger animal could interfere with bonding.
3) They are much more painful and produce more of a setback in the growth of the lamb as it ages.
4) Make sure that equipment is sanitary and that a sanitizing agent is applied to the affected area.
(a) Castration
(1) Methods - applying rubber bands to the scrotum using an elastrator and crushing the spermatic cord with an emasculator or burdizzo, or cutting the scrotum open and surgically removing the testicles
(2) Performed to prevent indiscriminate breeding
(3) Helps reduce injuries by eliminating aggressive behavior in young males
(4) Aids in pelt removal and carcass quality at slaughter
(b) Docking
(1) Performed to reduce the possibility of soiling the lamb's tail with urine or feces, which could lead to fly striking problems
(2) Done using hot iron cautery, an elastrator and rubber bands, or an emasculator and surgical instruments

2. Discuss the importance of knowing when to wean lambs. Ask student what factors must be taken into consideration when determining the correct timing.

What factors should be considered when determining the weaning age for sheep?

a) May successfully occur at an early age if the lamb is consuming enough nutrients through creep feeding to meet its growth and maintenance requirements
1) Early weaning
(a) May be accomplished around nine weeks of age if the lamb weighs about 40 pounds
(b) Beneficial to the ewe as well as the lamb
(c) Requires fewer nutrients if the ewe does not have to produce milk, which can reduce management costs
2) Late weaning - approximately 12 weeks of age

b) Management consideration for weaning
1) Leaving the lambs in their current environment and removing the ewes

2) Will adapt better to the weaning process if they remain in familiar surroundings for feeding

3. After weaning, the feeding program used until the lambs are marketed should be designed to fit the needs of the producer. Describe the factors that should be considered when outlining a feeding program. Have students complete AS 7.1.

What factors should be considered when determining a feeding program for market sheep?

a) The feeding program is tailored to the style of production.
   1) Dry lot production - more protein
   2) Pasture systems - more roughage
b) The ration given to lambs can be changed about three weeks after weaning.
   1) Do not need as much protein once they reach 60 pounds
      (a) Protein sources like soybean meal reduced
      (b) Replaced with high-quality alfalfa hay
   2) Should make changes gradually to allow rumen microorganisms to adapt to avoid digestive problems
   3) Should keep feed fresh and available at all times to reduce overeating and digestive upsets
c) Producers should be aware of certain mineral deficiencies in the soil that can affect the nutritional quality of roughage.
   1) Selenium and copper deficiencies
      (a) Reduced growth
      (b) Illnesses
   2) Should supply supplements to provide adequate intake of nutrients
d) Producers should be aware of and able to recognize poisonous plants.
   1) Common poisonous plants
      (a) Milkweeds
      (b) Weeds from nightshade family
   2) Other common plants that accumulate high levels of nitrates (1 percent or more)
e) Producers may shear their lambs in late May to improve gain for lambs that will be fed into the summer months.
   1) Makes lambs more comfortable
   2) Reduces occurrences of pneumonia and other conditions that bother full-fleeced lambs in the summer

4. As with all livestock enterprises, keeping accurate and complete records is important. The records are useful when determining profits for the sheep operation.

What records should be kept?

a) Amount and type of feed given before weaning
b) Age of lamb at weaning
c) Amount and analysis of feed given during the growing stage
d) Age in days and weight at marketing

F. ***Other Activities***

1. Arrange a field trip to a sheep farm in the spring during the lambing season. If possible, have a producer demonstrate docking and castration. The producer may also discuss the feeding program used for market lambs.

2. Obtain pictures of local plants that are harmful to sheep. Discuss the effect of these plants on sheep.

G. ***Conclusion***

Certain practices should be carried out after lambing to ensure that the lamb is healthy and productive. These practices include making sure the lamb nurses colostrum, tail docking, and castration. Good management practices while weaning and feeding the lamb will aid in producing a marketable lamb in as short a time period as possible. These management practices will be important in determining the producer's profit.

H. ***Answers to Activity Sheet***

Answers will vary.

I. ***Answers to Evaluation***

1. a
2. b
3. b
4. b
5. d
6. a

7. Answers may include any two of the following: hot iron cautery, an elastrator and rubber bands, or an emasculator and surgical instruments.

8. To allow rumen microorganisms to adapt to avoid digestive problems

9. Answers may include any two of the following: prevents indiscriminate breeding, helps reduce injuries by eliminating aggressive behavior in young males, and aids in pelt removal and carcass quality at slaughter.

10. Answers may include any two of the following: amount and type of feed given before weaning, age of the lamb at weaning, amount and analysis of the feed given during the growing stage, and age in days and weight at marketing.

UNIT IX - HERD/FLOCK MANAGEMENT Name_____

Lesson 7: Sheep Management from Birth to Market Date_____

EVALUATION

Circle the letter that corresponds to the best answer.

1. If the umbilical cord is broken off at a point longer than _____ inches, the producer should cut it off with clean scissors.

   a. 2
   b. 3
   c. 4
   d. 5

2. Grafting is the process of:

   a. Preparing the lambs for early feeding.
   b. Placing an orphan lamb with a new ewe.
   c. Weaning lambs.
   d. Docking the lamb's tail.

3. Early weaning may take place at _____ weeks of age if the lamb weighs _____ pounds.

   a. 8, 30
   b. 9, 40
   c. 10, 50
   d. 11, 60

4. What does unplugging the ewe mean?

   a. Pulling the lamb out of the birth canal
   b. Removing waxy plugs at the ends of its teats
   c. Breaking the water bag
   d. Shaving the hair around its hind legs

5. What management technique will help ewes be more receptive to raising orphan lambs?

   a. Having orphan lambs nurse from the ewe
   b. Allowing the ewe to smell the placenta of the lamb
   c. Rubbing clipped wool from the ewe on the lamb
   d. Rubbing the birth fluids of the ewe on the lamb

6. The ration given to lambs can be changed about _____ weeks after weaning because they need less _____ once they reach 60 pounds.

   a. 3, protein
   b. 4, energy
   c. 3, energy
   d. 4, protein

Complete the short answer questions below.

7. What are two common methods of docking lambs?

   a.

   b.

8. Why should changes in a lamb's diet be made gradually?

9. What are two reasons that lambs are castrated?

   a.

   b.

10. What are two types of records that may be kept for market lambs?

    a.

    b.

Tail Docking and Castration

KNIFE BURDIZZO ELASTRATOR

Lesson 7: Sheep Management from Birth to Market Name_____

Developing a Management Calendar

Objective: Make appropriate decisions concerning the management of sheep from birth to market.

Fill in the blanks below.

From birth until weaning:

1. List three management practices performed.

   a. _____ Age _____

   b. _____ Age _____

   c. _____ Age _____

At weaning:

2. List two management practices performed.

   a. _____

   b. _____

While feeding for market:

3. List two management practices performed.

   a. _____

   b. _____

UNIT IX - HERD/FLOCK MANAGEMENT

Lesson 8: Management of Sheep Breeding Stock

Competency/Objective: Develop and describe management practices for replacement and breeding stock.

Study Questions

1. **What are management practices for open and bred ewes?**

2. **What are management practices for replacement and breeding rams?**

3. **What records should be kept for replacement and breeding stock?**

References

1. *Advanced Livestock Production and Management (Student Reference).* University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit IX.

2. Activity Sheet

   a) AS 8.1: Management Activities for Breeding Stock

UNIT IX - HERD/FLOCK MANAGEMENT

Lesson 8: Management of Sheep Breeding Stock

TEACHING PROCEDURES

A. ***Review***

Lesson 8 described how to manage young lambs and market lambs raised for the meat and wool enterprise. Managing sheep for replacement breeding stock is somewhat different. Replacement animals must be managed properly to be productive. Whether these animals are raised by the producer or purchased from another farm, it is important to follow established management practices. Mature breeding animals must also be managed properly, or they will not be as productive as possible. Good management of breeding stock will help the operation be efficient and productive.

B. ***Motivation***

Obtain some pictures of mature rams and ewes. Include pictures of animals that are in excellent condition and some that are in poor condition. Ask students which ones they would want in their breeding herd and why. Ask them to be specific in justifying their reasoning.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. The development of quality replacement breeding stock is important if a producer is interested in producing a quality lamb crop. Selection was discussed in an earlier lesson, but proper management is also necessary to produce quality offspring. Discuss management factors for ewes.

   What are management practices for open and bred ewes?

   a) Replacement ewe lambs
      1) Fed and managed like market lambs during the early stages of their growth
      2) Removed from the feeding herd at about 75 pounds and fed a less concentrated ration
      3) Overfeeding
         (a) Become too fat for breeding
         (b) Lower conception rates
      4) Puberty
         (a) Eight to ten months of age depending on the breed
         (b) Bred when about 70 percent developed in body size
            (1) Lamb at 24 months of age
            (2) 19 months of age when bred
      5) Puberty until breeding
         (a) Fed according to a feeding program designed to keep them in condition but not too fat
         (b) Fed pasture or high quality roughage, with some grain
         (c) Flushed 10 to 14 days before breeding by giving extra grain consisting of corn and oats
   b) Timing of breeding - determined by when producer wants ewes to lamb
      1) Spring lambing
         (a) Lambing in late February, March, or April
         (b) Bred in August or September, the middle of the normal breeding season

(c) Sheared prior to lambing
(d) May be crotched before breeding
(e) Results in higher lambing rates because breeding takes place during the optimal time
(f) Early spring lambing
(1) Aides in controlling parasites
(2) May have severe weather during lambing
(3) Requires better housing
(g) Late spring lambing - may not be able to market lambs early enough to take advantage of the higher prices available earlier in the year

2) Fall lambing
(a) Lambs born before December 25
(b) Must choose a breed of sheep that will breed out of normal breeding season
(1) Rambouillet
(2) Dorset
(3) Corriedale
(4) Hampshire
(5) Suffolk
(c) Bred in May, June, or early July
(d) May be sheared in April or May
(e) May be crotched before lambing
(f) Lambs marketed in early spring when higher prices are usually received
(g) Disadvantages
(1) More grain needed for feed due to lack of pasture
(2) Difficult to breed ewes out of season
(3) Lighter birth weight

c) Pregnancy testing
1) Important after breeding
(a) Cost of feeding and housing unproductive open ewes avoided
(b) Allows producers to determine whether rebreeding is necessary
2) Making determination soon as possible - important to profits and uniformity in lambing crops

d) Pregnant ewes
1) Good nutritional and health management practices important - affects lamb size and number of lambs produced
2) Ewes frequently observed for pregnancy-related diseases - at least twice a day
3) Feeding
(a) Good quality pasture to meet the ewe's nutrient requirements
(1) Should not overstock the ewe herd on limited grassland because overgrazing can easily occur
(2) May preserve pasture quality by rotating pastures
(b) Supplemental feeding of hay or silage if necessary
(c) Feed away from barn - encourages walking, increasing the amount of exercise
4) Last six weeks of pregnancy
(a) Ewe kept healthy by feeding some grain, protein supplement, and antibiotics
(b) High level of roughage to maintain proper weight while not letting the ewe get too fat

e) After lambing
1) Amount of grain reduced for the first ten days
2) Should be fed a ration with more bulk, such as oats, bran, or hay
3) Addition of more grain at ten days of age
4) Extra rations for ewes nursing twins
5) Should always receive plenty of fresh water, especially during lactation
6) Ewe's ration reduced to amounts fed during gestation when the lamb is about two months old
7) Feed intake reduced at weaning

2. Rams are probably the easiest animals in the flock to manage. Rams need very little care. Describe the care required for rams. Have students complete AS 8.1, and then discuss the recommended management activities for rams and ewes with the class.

What are management practices for replacement and breeding rams?

a) Replacement rams
   1) Removed from the market herd before ewe lambs reach puberty
   2) At least eight months old before they are used for breeding
b) Breeding rams
   1) Nutrient requirements
      (a) Generally require only enough pasture to meet nutrient requirements
      (b) May be fed 1 to 1.5 pounds of corn during the breeding season, especially if the ram is thin
      (c) Overfeeding avoided because rams that gain too much weight lose interest in breeding
   2) Kept separate from ewes until breeding time
      (a) Allows producer to control conception
      (b) Kept in barn or lot with room for exercise
   3) Management practices before breeding
      (a) Sheared in the spring and before breeding for spring lambing programs
      (b) Sheared in late spring prior to the breeding season for fall lambing programs
      (c) Feet trimmed and in good condition prior to the breeding season because unsound feet can cause a ram not to breed
      (d) Breeding soundness tests - sperm count and libido tests conducted before turning the ram in with the ewes

3. Records showing the management practices for breeding animals are an important management tool for sheep producers. Discuss the records that may be kept for breeding stock.

What records should be kept for replacement and breeding stock?

a) Amounts and kinds of feed provided
b) Dates and types of all vaccinations given to breeding animals
c) Number of ewes exposed to each ram
d) Dates of breeding
e) Dates and results of pregnancy tests
f) Anticipated lambing dates

F. ***Other Activities***

Have students interview a sheep producer to learn the management practices that he or she uses for the breeding flock.

G. ***Conclusion***

Replacement breeding animals are the foundation of the breeding flock. Good ewe or ram replacements should be raised by following a recommended feeding and management program. Good management must continue after the animals join the breeding herd. As with any livestock enterprise, records are necessary for the producer to know where she or he stands in terms of the management of the breeding flock.

H. ***Answers to Activity Sheet***

1. Not recommended
2. Recommended
3. Not recommended

4. Not recommended
5. Recommended
6. Recommended
7. Not recommended
8. Recommended
9. Recommended
10. Not recommended

I. ***Answers to Evaluation***

1. c
2. c
3. d
4. a

5. To allow producers to determine whether rebreeding is necessary and avoid the cost of feeding and housing unproductive open ewes

6. Answers may include any two of the following: amounts and kinds of feed provided, dates and types of all vaccinations given to breeding animals, number of ewes exposed to each ram, dates of breeding, dates and results of pregnancy tests, and anticipated lambing dates.

7. Because unsound feed can cause a ram not to breed

8. Answers may include any two of the following: more grain is needed for feed due to lack of pasture, it is difficult to breed ewes out of season, and lambs may be lighter in birth weight.

9. Because breeding takes place during the normal breeding season, the optimal time

10. Sperm count and libido tests

UNIT IX - HERD/FLOCK MANAGEMENT Name_____

Lesson 8: Management of Sheep Breeding Stock Date_____

EVALUATION

Circle the letter that corresponds to the best answer.

1. Ewe lambs should be exposed to the ram for breeding at:

   a. 8 months of age.
   b. 12 months of age.
   c. 19 months of age.
   d. 24 months of age.

2. When should breeding take place for spring lambing?

   a. February, March, or April
   b. June or July
   c. August or September
   d. October, November, or December

3. What may be done during breeding season if a ram is thin?

   a. The ram should not be allowed to breed.
   b. The ram should be vaccinated for illnesses.
   c. The ram should be sheared.
   d. The ram should be fed corn.

4. How long should the amount of grain fed to ewes be reduced after lambing?

   a. 10 days
   b. 15 days
   c. 20 days
   d. 25 days

Complete the short answer questions below.

5. Why is pregnancy testing important to sheep producers?

6. What are two items that should be included in records in relation to the breeding flock?

   a.

   b.

7. Why is it important to trim the feet of the ram prior to breeding season?

8. What are two disadvantages of fall lambing?

   a.

   b.

9. Why can spring lambing result in higher lambing rates?

10. What are two breeding soundness tests that should be conducted on rams?

    a.

    b.

Lesson 8: Management of Sheep Breeding Stock Name_____

Management Activities for Breeding Stock

Objective: Select recommended management practices for breeding sheep.

Place a checkmark under the appropriate column showing if the activity is or is not a recommended practice for breeding sheep. Be prepared to discuss your answers with the class.

		Recommended	Not Recommended
1.	Breed ewe lambs at 8 to 10 months of age.	_____	_____
2.	Select the Dorset breed for the production of fall lambs.	_____	_____
3.	Observe ewes twice a day during gestation.	_____	_____
4.	Plan a fall lambing program to save on grain feeding costs.	_____	_____
5.	Record breeding dates and anticipated lambing dates.	_____	_____
6.	Provide plenty of fresh water for the ewe during lactation.	_____	_____
7.	Allow the ewe to get as fat as possible just before lambing time.	_____	_____
8.	Keep rams separate from ewes until breeding time.	_____	_____
9.	Trim the ram's feet prior to breeding season.	_____	_____
10.	Plan an early spring lambing season to aid in controlling parasites.	_____	_____

UNIT IX - HERD/FLOCK MANAGEMENT

Lesson 9: Management Practices for Horse Production

Competency/Objective: Develop and describe appropriate management practices for horse production.

Study Questions

1. **What are management practices for foals?**
2. **What are management practices for weaning foals?**
3. **What types of feeding programs are appropriate for horses?**
4. **What management practices are appropriate for mares?**
5. **What are some factors to consider when managing stallions?**
6. **What records should be kept when managing horses?**

References

1. *Advanced Livestock Production and Management (Student Reference).* University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit IX.
2. Activity Sheet
   a) AS 9.1: Management Activities for Horses

UNIT IX - HERD/FLOCK MANAGEMENT

Lesson 9: Management Practices for Horse Production

TEACHING PROCEDURES

A. ***Review***

Lesson 9 described the management of the sheep breeding flock. Although managing horses is similar in some ways to managing other types of livestock, including sheep, differences do exist because horses are raised for a different purpose. All of the other livestock enterprises produce meat or other animal products that are consumed by the general public. However, horses are raised for recreational purposes or for work. They therefore have some special management considerations that do not apply to other livestock.

B. ***Motivation***

Ask students to list and explain major differences in the management of horses in comparison to animals like cattle or hogs.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. The birth of a foal usually requires more attention than the birth of the young of other livestock animals. Discuss management practices for foals. How do they compare to those for other species of livestock?

   What are management practices for foals?

   a) Care of the navel cord
      1) Breaks 2 to 4 inches from body within three to five hours after the birth
      2) Must cut it if it does not break
         (a) String tied tightly 6 to 7 inches from the foal
         (b) Clean, dull scissors used to cut the cord on the side of the string closest to the mare
         (c) End of the cord dipped in iodine solution to prevent infection
   b) Nurse to receive colostrum
      1) Should be guided to the mare's udder and teats by the producer if the foal has not nursed after two hours
      2) May keep colostrum on hand in a refrigerator to use if the foal cannot obtain colostrum from the mare
   c) Bowel movement
      1) Within four to twelve hours after birth
      2) Meconium
         (a) Feces impacted in the bowel before birth
         (b) Will kill the foal if not eliminated shortly after birth
      3) Should give an enema if necessary to promote elimination of the meconium
      4) Milk intake reduced if the foal starts to scour
   d) Special training at an early age
      1) Should place a well-fitted halter on the foal at ten to fourteen days of age
      2) Tied in the stall next to the mare after a few days of wearing the halter
         (a) Only remain tied for 30 to 60 minutes
         (b) Never left unattended because serious injury could occur

(c) Handling and grooming done while the foal is tied
(d) Should pick the foal's feet up to allow it to become used to having its feet handled

3) Leading the foal while leading the mare
(a) Done while leading mare starting at ten to fourteen days after foaling
(b) Later led by itself at a walk and a trot

4) Trained to stop and go on command

5) Should stand in show position when stopped, standing squarely on all four legs with its head up

e) Castration
1) Not performed on the young horse
2) Put off until around one year of age
3) Usually done in the spring before hot weather and flies become a problem; reduces the chances of screwworm infestations

2. Describe the management practices used when weaning foals.

What are management practices for weaning foals?

a) Weaned at four to six months of age
1) May wean earlier at about three months
(a) If the mare is rebred
(b) If mare is being worked
(c) If the mare or foal is not doing well
2) Must be eating grain and roughage properly before weaning
3) Feed given to the mare reduced to aid in drying up her milk

b) Removing the mare from the foal
1) Left in the stall and the mare removed
2) Should not see mare for several weeks

c) Weaned foals
1) Allowed to run in pasture a few days after weaning
2) Only pastured together, not with older animals
3) Should avoid having too many foals running together, or they may injure each other
4) Timid foals separated from others and placed in a separate pen or pasture

3. Producers must give special consideration to the management of feeding programs for horses because the horse's digestive system is more delicate than that of most other livestock. Discuss feeding programs for horses.

What types of feeding programs are appropriate for horses?

a) Fed according to their size, stage of growth, condition, and amount of work

b) All diets - at least 50 percent roughage

c) Fed and watered regularly
1) Amount and type of feed adjusted according to condition of horse
2) Condition - amount of fat cover on the animal's body; moderate condition desirable
(a) Individual ribs felt but not seen
(b) Backbone level with surrounding tissue
(c) Area around the tailhead slightly rounded
3) Watered before feeding if water is not available free-choice
4) Overheated horse - should not drink too much water, because it will cause colic or founder

d) Quality of feed
1) Extremely important because horses are sensitive to feed quality
2) Colic and founder caused by improper feeding
3) No moldy or dusty feed
4) No access to feed given to cattle

(a) Has a growth stimulant included for the production of rumen bacteria
(b) Deadly if ingested by a horse

e) Activity level
   1) Idle horses
      (a) Fed an increased amount of hay
      (b) May be given only half the grain that active horses receive
   2) Tired horses
      (a) Fed only half the ration
      (b) Fed the rest about an hour later
   3) Should not be worked immediately after a full feeding of grain

4. Good management of mares is an important aspect of producing a healthy foal. Discuss different management practices for mares.

What management practices are appropriate for mares?

a) Artificial lights to control the onset of the breeding season
   1) Alter the mare's perception of the length of the day
   2) Easiest method - lights turned on 30 minutes before sundown and left on to produce sixteen hours of light
   3) Lag period of 60 to 90 days between beginning the program and the onset of the mare's estrous cycle
   4) Begin the program in November to breed the mare in February

b) Feeding practices
   1) Open mares
      (a) Fed carefully in preparation for the breeding season
      (b) Amount and type of feed - depends on body condition
      (c) Energy content especially important - amount given will depend on the weight of the mare and whether she needs to gain weight
      (d) May need to feed supplemental grain to thin mares
   2) Pregnant mares
      (a) Healthy pregnant mares that are not too thin or too fat - do not need extra grain during first two-thirds of pregnancy if fed good quality hay
      (b) Older and thin mares - some extra grain
      (c) Additional grain needed in the last third of the gestation period to meet increased energy needs
      (d) Proper nutrition - especially important if a mare is to be rebred during the first estrus cycle after foaling while nursing the newborn foal
      (e) Should not overfeed pregnant mares; fat mares will likely have trouble when foaling

c) Pregnancy checks
   1) Done in early fall to make sure that mares have not experienced losses during pregnancy
   2) Open mares
      (a) Checked by a veterinarian to make sure they are healthy
      (b) Handled with other open mares for the next breeding season

d) Exercise
   1) Necessary during pregnancy to prepare the body for foaling
   2) Can be turned out to pasture for exercise

e) After foaling
   1) Fed properly to meet the nutrient requirements of lactating mares
   2) Very little grain fed during the first seven to ten days after foaling
   3) Amount gradually increased to promote milk production
   4) Too much grain - excess milk production, which could cause the foal to scour

5. Stallions will need special management due to their aggressive nature. Handlers will need to take care when around stallions to avoid being injured. Discuss the management of stallions. Have students complete AS 9.1.

What are some factors to consider when managing stallions?

a) Temperament
   1) Hard to manage and control
   2) Even more high strung or nervous during breeding season
   3) Special bridles with control bits used at this time
b) Special housing
   1) Kept in separate quarters from mares
   2) Best arrangement
      (a) Roomy box stall
      (b) Access to a two- to three-acre pasture for exercise
c) Exercise and a proper diet
   1) Receive daily exercise to maintain thriftiness
   2) Grain added to the diet for energy during the breeding season

6. Records can assure the producer that he or she is making wise management decisions that will maximize profits. Discuss the types of records that are kept for horses.

What records should be kept when managing horses?

a) Teasing dates
b) Breeding dates
c) Palpation results
d) Expected foaling dates
e) Feeding records

F. ***Other Activities***

1. Show the class videos related to the lesson. For example, Creative Educational Video (CEV) has several videos about feeding programs for horses in their equine nutrition and feeding series.

2. Have a local horse breeder come in as a guest speaker to talk about the challenges of working with foals, mares, and stallions.

G. ***Conclusion***

Managing horses can be challenging. Mistakes in management are usually more costly than with other species of livestock due to the higher purchase price of the animals. Horses are also more delicate in terms of feeding and handling. Changes in diet can have a greater effect than with other types of animals, and injuries to feet and legs can easily occur. Producers therefore need to manage their horses carefully to prevent losses.

H. ***Activity Sheet***

Answers will vary.

I. ***Answers to Evaluation***

1. c
2. b
3. d
4. a
5. b

6. d
7. Give an enema
8. For energy

9. Answers may include any two of the following: teasing dates, breeding dates, palpation results, expected foaling dates, and feeding records.

10. To make sure mares have not experienced losses during pregnancy

UNIT IX - HERD/FLOCK MANAGEMENT Name_____

Lesson 9: Management Practices for Horse Production Date_____

EVALUATION

Circle the letter that corresponds to the best answer.

1. The navel cord on the newborn foal:

   a. Will break inside the mare.
   b. Should be cut with a sharp knife.
   c. Should be treated with iodine.
   d. Will be removed by the mare.

2. All diets should consist of at least _____ percent roughage.

   a. 25
   b. 50
   c. 75
   d. 80

3. To control the onset of the breeding season, producers should turn on artificial lights before sundown so the mares receive _____ hours of light.

   a. 4
   b. 8
   c. 12
   d. 16

4. Idle horses should be fed more _____ and less _____ than active horses.

   a. Hay, grain
   b. Grain, hay
   c. Hay, minerals
   d. Grain, water

5. Foals should be weaned at:

   a. 1 month of age.
   b. 4 to 6 months of age.
   c. 8 to 10 months of age.
   d. 12 months of age.

6. It is recommended that foals be castrated:

   a. Within 3 to 4 days after foaling.
   b. At weaning.
   c. At 6 months of age.
   d. Around 1 year of age.

Complete the short answer questions below.

7. What can the producer do if a natural bowel movement does not occur soon after foaling?

8. Why should some grain be added to the stallion's diet during the breeding season?

9. What are two types of records horse producers may keep when breeding and raising horses?

   a.

   b.

10. Why do producers conduct pregnancy checks in early fall?

Lesson 9: Management Practices for Horse Production Name_____

Management Activities for Horses

Objective: Explain the management practices used for horses.

Fill in the required information for each item listed below.

1. Caring for the Foal

   a. Problems associated with newborn foals

   b. Procedures for caring for foals

   c. Procedures for weaning the foal

2. Caring for the mature horse

   a. Feeding program for the mature horse

b. Management considerations for broodmares

c. Feeding program for broodmares

d. Management considerations for stallions

e. Records to be kept for the mature horse

UNIT IX - HERD/FLOCK MANAGEMENT

Lesson 10: Management Practices for Poultry Production

Competency/Objective: Develop and describe management practices for poultry production.

Study Questions

1. **What management practices should be performed for newly hatched poultry?**
2. **How do feeding programs compare for different classes of poultry?**
3. **What management practices are used when producing meat or eggs?**
4. **What records should be kept?**

References

1. *Advanced Livestock Production and Management (Student Reference).* University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit IX.
2. Transparency Masters

   TM 10.1: Chick and Poult with Trimmed Beaks
3. Activity Sheet

   AS 10.1: Designing a Poultry Enterprise

UNIT IX - HERD/FLOCK MANAGEMENT

Lesson 10: Management Practices for Poultry Production

TEACHING PROCEDURES

A. ***Review***

Lesson 10 discussed management practices for horse production. In contrast to raising horses, the management of poultry focuses on the production of a product for human consumption. This lesson will describe management practices used in producing meat or eggs.

B. ***Motivation***

Ask students their perception of how most poultry is raised in the United States. Discuss general management issues raised by their answers.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Success in the poultry industry begins with a healthy, well-managed baby chick. Keeping death losses at a minimum is one of the first goals of producers. Discuss the different management practices for young birds.

   What management practices should be performed for newly hatched poultry?

   a) Brooding management for chicks
      1) Care and management of the newly hatched poultry
      2) First five to six weeks of the chick's life
   b) Brooder house
      1) Chicks not brooded near other poultry because of the danger of disease transmission
      2) 300 feet between brooder houses or brooder houses and other livestock buildings
      3) Enclosed with a fence
      4) Entrance gate locked at all times
      5) Include predator control and biosecurity features when designing brooder houses
   c) Chicks approximately the same age
      1) No more than seven days between the youngest and oldest
      2) Involves following an all-in, all-out system
         (a) Group of birds placed in the brooder house only after all other birds have been removed
         (b) Facility cleaned and disinfected before bringing in the next batch of chicks
   d) Temperature control
      1) Important for the survival of the new chick because chicks require heating until fully feathered
         (a) 90 to 95 degrees Fahrenheit for day-old chicks
         (b) Measured about three inches off the floor under the brooder
         (c) Decreased about five degrees each week until it reaches 70 to 75 degrees
         (d) Behavior of chicks
            (1) Best indication of proper temperature
            (2) Too cold if they bunch together under the brooder and cheep
            (3) Too hot if they move out from under brooder, pant, and hold out their wings

(e) Cool temperatures - increase health problems
(f) High temperatures - decrease growth

2) Heat usually supplied using hover-type floor brooders
   (a) Should be ready two weeks before the chicks arrive to test the equipment
   (b) Seven to ten square inches of space per bird under the brooder
   (c) May surround brooder by brooder guard set out 36 inches from edge of the brooder
      (1) Keeps chicks near the warmth
      (2) Should be removed after chicks are one week old

e) Floor space required per chick
   1) Depends on the production purpose and the type of bird
   2) Breeding birds - more space than laying birds
   3) Broilers - least amount of space
   4) Adequate space necessary to avoid overcrowding

f) Ventilation
   1) Important for controlling humidity and diseases
   2) Controlled by raising or lowering curtains on open-sided houses
      (a) Closed at first
      (b) Kept open longer during the day as chicks grow
      (c) Length of time varies
         (1) Outside temperature
         (2) Feather development of chicks
      (d) Closed in the evening
   3) Mechanical ventilation systems also installed in brooder houses

g) Lighting
   1) Left on all night during the first week
   2) Keeps chicks from crowding or piling up if they are disturbed

h) Proper litter
   1) Clean as possible
   2) Not treated with insecticide
   3) Several inches deep
   4) Contain 25 percent moisture after the chicks are three weeks old
      (a) Important for dust control
      (b) Keeps chicks from dehydrating
      (c) Dry atmosphere - chicks do not grow or feather well
   5) Should not be too moist because wet litter can promote diseases

i) Food and water
   1) Started on feed as soon as possible after hatching
   2) Should be clean and fresh
   3) Special waterers and feeders
      (a) Used until chicks are large enough to eat and drink from standard equipment
      (b) Adequate space provided so each chick has access

j) Beak trimming
   1) Process of cutting off ⅓ to ½ of upper beak and ¼ of the lower beak in chickens
   2) Helps prevent cannibalism
   3) May be done when chicks are a day old
   4) Also trimmed at one to two weeks of age
   5) If done too early
      (a) May not be permanent
      (b) May have to be repeated

k) Brooding turkey poults
   1) Similar to brooding chicks
   2) More floor, waterer, and feeder space
   3) Temperature requirements
      (a) White birds - 100 degrees Fahrenheit
      (b) Dark birds - 95 degrees Fahrenheit
   4) Beak trimming

(a) 5/8 to 3/4 of the upper beak in turkeys
(b) Done at one to three weeks of age

5) Desnooding
(a) Removal of the snood, the fleshy appendage at the base of the upper beak
(b) Reduces fighting in males
(c) Prevents head injuries

6) Toe clipping - prevents scratches that can cause turkeys to be graded lower at market

2. Feeding programs will differ after brooding depending on the purpose of the birds. Discuss the different feeding programs used for laying hens, broilers, breeding flocks, and turkeys.

How do feeding programs compare for different classes of poultry?

a) Protein levels
1) Egg production
(a) 14.5 percent protein
(b) Somewhat lower than protein provided during the growth phase of the young chick
(c) May receive higher levels of protein if a phase feeding program is used
(1) Phase feeding - laying hens receive different levels of protein depending on factors such as age and stage of production
(2) Begin production period at 17 to 18 percent protein, which is fed through the peak production period
(3) Level of protein gradually decreased to 15 percent by the end of laying period

2) Broilers
(a) Fed a high protein ration
(b) 18 percent protein from about 6 weeks of age until marketing

b) Vitamins and minerals necessary in feeding programs for layers for proper egg formation
1) Calcium
2) Phosphorus
3) Manganese
4) Vitamin A
5) Vitamin D

c) Feed conversion
1) Important for both laying hens and broilers
2) Refers to the pounds of feed required to produce a dozen eggs or a pound of meat
3) Factors that affect feed conversion levels
(a) Type of feed used
(b) Genetic background of bird
(c) Additives used in the feed
(d) General management of operation

4) Standards in broiler industry - 1.85 to 1.95 pounds of feed for each pound of meat produced
5) Standards for laying hens - 4.3 pound of feed per dozen eggs

d) Feeding program for breeding flocks of chickens
1) Differs from programs used for layers and broilers
2) Fed a special mash fortified with vitamins and minerals
(a) Vitamin A
(b) Vitamin D
(c) Vitamin B_{12}
(d) Riboflavin
(e) Niacin
(f) Manganese

3) Broiler breeder replacement pullets and hens - diets low in energy to avoid becoming fat

e) Feeding programs for replacement pullets for laying and breeding flocks
   1) Often involve restricted feeding to avoid overfeeding
      (a) Reach sexual maturity too early
      (b) Produce too many small eggs
   2) Methods to reduce feed intake
      (a) Skip-a-day feeding - feeding on alternating days between 9 weeks of age and maturity
      (b) Feeding low protein and low lysine diets - keep pullets from meeting their need for energy and protein for maximum growth
      (c) Limited feeding
         (1) Putting out only the amount of feed the chickens will consume in a short time, such as two to three hours
         (2) Feeding two to three times each day

f) General feeding principles for feeding turkeys
   1) Similar to those used in feeding chickens
   2) Major differences
      (a) Protein levels
         (1) Starting levels - 28 percent
         (2) Reduced to 26 percent at four to six weeks of age
         (3) Separated by sex because toms have higher protein needs than hens
      (b) Importance of the vitamins biotin and pyridoxine in the diet
   3) Turkeys fed for breeding
      (a) Do not require feed restriction
      (b) Holding rations - average energy levels fed to maintain stable development
      (c) Breeding rations - adequate levels of vitamins and minerals to promote egg formation

3. Management will differ in poultry production when raising chickens for meat or eggs. Describe the management practices used to produce these products. Hand out AS 10.1.

What management practices are used when producing meat or eggs?

a) Pullets raised for laying flocks
   1) May be raised in cages or on floors, but the trend is toward confinement in cages
   2) Raised in one of two systems
      (a) Partial cage growing - chicks brooded using floor brooding for about 6 to 10 weeks
      (b) Complete cage growing - chicks are brooded and raised in cages

b) Amount of light
   1) Control the onset of sexual maturity and the production of eggs in hens
      (a) Before pullets reach 21 weeks
         (1) Amount of light received gradually decreased to eight hours
         (2) Then increase by 15 minutes a day until 14 to 16 hours of light is provided using artificial or natural and artificial light
      (b) Turkey breeders - 14 hours of light a day while laying
   2) Producers of broilers and turkeys
      (a) Control amount of light provided to encourage eating and growth
      (b) Broilers
         (1) May receive 23 hours of light a day
         (2) May use intermittent light - three hours of darkness for every hour of light
      (c) Market turkeys - 16 hours of light

c) Forced molting to increase the productive life of laying hens
   1) Molting
      (a) Shedding and growing a new set of feathers
      (b) Occurs after 8 to 12 months of production
      (c) Accompanied by decreases in egg production

2) Forced molting
   (a) Involves taking the hens out of production for a certain period to allow their reproductive system to rest during molting, which takes 6 to 8 weeks
   (b) Triggered by altering the feeding program
      (1) Birds not fed for a specified time
      (2) Then provide low nutrient feeds
   (c) Used to provide two or three cycles of production
   (d) Improved egg quality after molting over hens that have not molted

4. As with all livestock enterprises, complete and accurate records must be kept. Ask students to list records that might be kept for layers and for broilers and turkeys.

What records should be kept?

a) Records for layers
   1) Information on egg production (numbers per hen)
   2) Death losses
   3) Egg quality and size
   4) Amound of feed used
b) Records for broilers and turkeys
   1) Rate of growth
   2) Feed consumption
   3) Death losses
   4) Quality of birds produced

F. ***Other Activities***

Show students a video on egg or broiler production. Creative Educational Video (CEV), for example, has a video on egg production. Have students discuss the differences they observe in poultry production in comparison to most livestock enterprises.

G. ***Conclusion***

Poultry production is a livestock enterprise that focuses on confinement production. To be successful, large numbers of animals must be managed carefully for maximum production. Beginning with the young chicks, producers must manage their birds properly to control diseases and keep productivity at high levels.

H. ***Answers to Activity Sheet***

Answers will vary.

I. ***Answers to Evaluation***

1. a
2. b
3. c
4. b
5. c

6. Beak trimming reduces cannibalism.

7. Answers may include any two of the following: rate of growth, feed consumption, death losses, and quality of the birds produced.

8. Taking hens out of production for a certain period to allow their reproductive system to rest during molting

9. Answers may include any two of the following: information on egg production (numbers per hen), death losses, egg quality and size, and amount of feed used.

10. Skip-a-day feeding; low protein, low lysine diets; and limited feeding

UNIT IX - HERD/FLOCK MANAGEMENT Name_____

Lesson 10: Management Practices for Poultry Production Date_____

EVALUATION

Circle the letter that corresponds to the best answer.

1. Brooding management involves the first:

   a. 5 to 6 weeks of life.
   b. 8 to 10 weeks of life.
   c. 12 to 14 weeks of life.
   d. 17 to 18 weeks of life.

2. How much light should hens receive when producing eggs?

   a. 10 to 12 hours
   b. 14 to 16 hours
   c. 18 to 20 hours
   d. 22 to 24 hours

3. What should the temperature under the brooder be for day-old chicks?

   a. 70 to 75 degrees Fahrenheit.
   b. 80 to 85 degrees Fahrenheit.
   c. 90 to 95 degrees Fahrenheit.
   d. 100 to 105 degrees Fahrenheit.

4. Broilers should produce a pound of meat for each:

   a. 1 to 1.5 pounds of feed.
   b. 1.85 to 1.95 pounds of feed.
   c. 2.3 to 2.5 pounds of feed.
   d. 3 to 4 pounds of feed.

5. How far apart should broiler houses be located?

   a. 100 feet
   b. 200 feet
   c. 300 feet
   d. 400 feet

Complete the short answer questions below.

6. Why is beak trimming an important management practice for poultry?

7. What are two types of records that should be kept for broilers and turkeys?

   a.

   b.

8. What is forced molting?

9. What are two types of records that should be kept for layers?

   a.

   b.

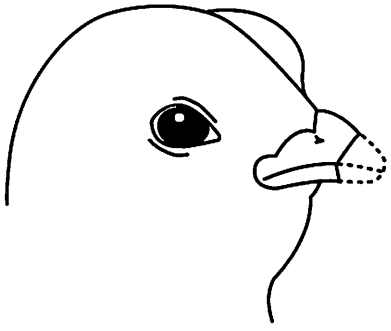
10. What are three feeding programs used to restrict feed intake and avoid overfeeding replacement pullets?

    a.

    b.

    c.

Chick and Poult with Trimmed Beaks



Baby Chick

Baby Poult

Lesson 10: Management Practices for Poultry Production Name_____

Designing a Poultry Enterprise

Objective: Design a poultry operation.

Using information from this lesson, design a poultry operation for layers, broilers, or turkeys. Describe it by writing a short essay on this sheet. The information in the essay should include a detailed description of the management practices to be used on the operation.

UNIT X - MARKETING

Lesson 1: Marketing Options for Livestock Enterprises

Competency/Objective: Develop a marketing plan for a specific livestock enterprise.

Study Questions

1. **What are marketing options for beef enterprises?**
2. **What are marketing options for dairy enterprises?**
3. **What are marketing options for swine enterprises?**
4. **What are marketing options for sheep enterprises?**
5. **What are marketing options for horse enterprises?**
6. **What are marketing options for poultry enterprises?**
7. **How is a marketing option selected?**
8. **What is a marketing plan?**

References

1. *Advanced Livestock Production and Management* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 2000, Unit X.
2. Activity Sheets
   a) AS 1.1: Developing a Marketing Plan for a Livestock Enterprise
   b) AS 1.2: Analyzing a Stocker Cattle Operation

UNIT X - MARKETING

Lesson 1: Marketing Options for Livestock Enterprises

TEACHING PROCEDURES

A. ***Introduction***

The culmination of all the activities involved in running a livestock enterprise is selling or marketing the product. Making a profit from the marketing activity is necessary for an operation to be successful. This lesson focuses on the options that livestock producers have for marketing and the factors that affect their selection.

B. ***Motivation***

Ask students to imagine they are beef producers. If they had animals that were ready to sell today, where would they market their animals? Ask them how they made that decision.

C. ***Assignment***

D. ***Supervised Study***

E. ***Discussion***

1. Ask students to list the types of markets available to beef enterprises. Discuss each of the marketing options available to producers.

What are marketing options for beef enterprises?

a) Terminal market
   1) Commonly called public stockyards
   2) Usually located near a large center of population
   3) Facilities owned by a stockyard company
      (a) Charges a fee while animals are in the stockyard, ownership of the animals does not transfer to the stockyard company
      (b) Holding facility used until the animals are purchased by a packer for slaughter
   4) Costs
      (a) Yardage (facility rental)
      (b) Feed
      (c) Insurance
      (d) Selling fee
      (e) Deducted from the price received for the animals
   5) Beef cattle assigned to a commission firm
      (a) Two or more commission firms in most terminal markets
      (b) Acts as a selling agent and charges a commission fee to the seller for services in finding a buyer and negotiating the selling price
   6) Only about 30 terminal markets today
   7) Used by fewer producers as a method of marketing livestock; only about 12 percent of the packer supply is purchased by this method

b) Auction
   1) Animals sold by public bidding with the animals going to the highest bidder
   2) Local sale barn
   3) Convenient to the producer
   4) Charge for the use of the facilities by the auction barn
      (a) Yardage
      (b) Insurance

(c) Health inspections
(d) Deducted from the selling price received by the producer

5) Feeder, slaughter, and purebred breeding animals sold by this method
6) Livestock associations
   (a) Coordinate and sponsor consignment auctions for local members of their associations
   (b) Consignment auction - producer entrusts the livestock for sale under the direction of an agent for a fee
7) Large number of feeder animals sold through the auction process
8) About 18 percent of the packers' supply from auction markets

c) Direct or contract sales
   1) Used by larger beef producers
   2) No commission firms or brokers involved
   3) Sales made to a livestock dealer or order buyer who works for a packer or feedlot company
   4) Animals bought at the farm and shipped directly to the packer or the feedlot
   5) Price
      (a) Based on the weight of the animals after they arrive at their destination
      (b) Shrinkage
         (1) Major factor that affects price
         (2) Loss of weight during shipping
         (3) Affected by distance, weather, and handling of the animals
   6) Increasing numbers of slaughter animals sold on a grade and yield basis through direct sales
      (a) Value of the animal determined after it is slaughtered
      (b) Usually provides a better price to the producer who raises higher quality livestock with less fat, or waste, and a higher grade
   7) Increasing number of livestock being sold through direct sales
      (a) Provides about 70 percent of the packers' supply
      (b) Each year more feeder animals marketed using this method

d) Electronic marketing
   1) System of marketing using Internet established by several livestock associations
   2) Used for feeder cattle; potential expansion into marketing of other types of cattle
   3) Similar to an auction
      (a) Bid over the Internet; do not have to travel to auction barns
      (b) Information gathered by graders and supplied to the buyer in advance
   4) Graders
      (a) Work for livestock associations
      (b) Supply the buyers with information
         (1) How the animals were raised
         (2) Weight
         (3) Confirmation
         (4) Feeding program
         (5) Current health

e) Futures market
   1) Involves trading contracts for future delivery of a specified amount of animal, such as pounds of beef
   2) Most trading at the Chicago Mercantile Exchange
   3) Involves a broker
      (a) Receives a fee based on the size of the contract
      (b) Receives an initial amount of money from the producer called margin money to support the contract
   4) Producers
      (a) Hedge on the price received for animals - lock in a price for the livestock
      (b) Receive price on contract whether cash market goes up or down
      (c) Know breakeven price before buying a contract
      (d) Keep good records and understand the pricing system

5) Involves feeder and slaughter cattle

f) Purebred marketing - specialized business
   1) Purebred cattle sold through auctions and private sales.
   2) Performance records usually supplied to buyers.
   3) Advertising done through breed association publications or magazines.

g) Marketing cycle of cattle
   1) Highest prices - follow a cattle inventory cycle of nine to thirteen years
   2) Marketing timed to hit the price peaks of the cycle

2. Discuss the markets for dairy enterprises. Ask students how marketing milk differs from marketing beef.

What are the marketing options for dairy enterprises?

a) Sold as either Grade A or Manufacturing (Grade B or Grade C) milk
   1) Based on standards under which the milk is produced
   2) Governed by state regulations
   3) Grade A milk used for fluid
      (a) Milk that meets high standards relating to temperature, bacterial count, somatic cell count, and chemicals.
      (b) Receives higher prices than Grade B milk.
      (c) Grade A milk is divided into classes.
         (1) Class I milk marketed as fluid milk for drinking - receives highest prices.
         (2) Excess used for other purposes, such as cheese, butter, and frozen dairy products.

b) 80 percent of milk produced - marketed through dairy cooperatives

c) Other 20 percent of milk
   1) Sold to private firms
   2) Sold directly to consumers
   3) Used on the operation

d) Dairy cooperatives
   1) Supply daily markets for milk
   2) Provide services
      (a) Assist with quality control
      (b) Sell milking supplies and equipment
      (c) Coordinate milk weights and tests
      (d) Assist with inspection problems
   3) Provide marketing and market outlook information
      (a) Negotiate milk prices with processors
      (b) Balance milk supplies among different processors
      (c) Participate in federal order hearings

e) Federal milk marketing orders
   1) Established under the Agricultural Marketing Agreement Act of 1937
   2) Purpose
      (a) Maintain an orderly market
      (b) Establish prices for Class I fluid
      (c) Ensure a sufficient quantity of wholesome milk for consumers

f) Pay price - January 2000 guidelines
   1) Value is determined for compoents that are protein, fat, and other (lactose and minerals).
   2) Price adjustment for the percentage usage of Grade A fluid (Class I) in the federal market order.
   3) Somatic cell adjustment based from ±350,000 SCC level.
   4) Amount of adjustment depends on the cheese price.

g) Quantity of milk produced
   1) Seasonal variations

2) National average for milk production
   (a) Highest in May
   (b) Lowest in November

h) Price
   1) Varies seasonally
   2) Lowest prices paid in May and June
   3) Highest prices paid in November and December
   4) Deductions made from each milk check for marketing, promotion, and hauling fees

i) Demand
   1) Overall demand for milk products has increased by 1.5 to 3 percent per year.
   2) Decreased per capita for fluid milk and increased for cheese.
   3) Increased competition from soft drinks and substitute dairy products.
   4) Research and development activities conducted by the United Dairy Industry Association and the National Dairy Council to reverse this trend
   5) Most of the advertising dollars aimed at increasing the demand for Class I milk

3. Ask students how the marketing of hogs compares to the marketing of milk and beef. Which does it more resemble? Discuss the marketing of swine in comparison to beef.

What are marketing options for swine enterprises?

a) Uses many of the same marketing options as the beef industry
   1) Terminal markets
   2) Auctions at sale barns
   3) Contract or direct sales
   4) Electronic marketing
   5) Futures marketing
   6) Purebred sales strategies

b) Contract or direct sales method
   1) Most popular method of marketing swine
   2) About 76 percent of all hogs sold in the United States marketed by this method
   3) Animals transported shorter distances and have less shrinkage
   4) Vertical and horizontal integration - contribute to the trend toward direct sales
   5) Livestock alliances
      (a) Aid smaller producers with this form of marketing
      (b) Collect small shipments of hogs from several producers to make a larger delivery to the packer
      (c) Gives small producers more bargaining power for pricing

c) Other methods
   1) About 12 percent of the hogs sold are marketed through terminal markets.
   2) About 8 percent are sold through auctions.

d) Marketing cycle for hogs
   1) Much shorter than for beef cattle because of their shorter life cycle
   2) Peaks in hog prices every three to four years
   3) Impacts prices from the economic principle of supply and demand
   4) Short marketing cycle
      (a) rapid increases in supply, sending prices lower quickly, as demonstrated during the 1998-99 production year.
      (b) Prices driven to an all-time low, reaching as low as 9 cents per pound in some sections of the country.
      (c) Supply corrections are necessary to cause prices to start increasing steadily.
   5) Price
      (a) Based on the quality of the product
      (b) Most hogs
         (1) Sold on a weight basis
         (2) Receive price discounts for hogs that are either above or below specified weights demanded by the packer

(c) Selling on a grade and yield basis increasing
(1) Premium received for animals with less waste and high-quality meat.
(2) Payment made after the hogs are slaughtered.
(3) Producer not involved in the evaluation of animals.

6) Time of year
(a) Prices rise in April and peak in July.
(b) Variations beginning to level due to large producers distributing farrowings evenly during the year.

4. Sheep are raised for income from two sources, meat and wool. Discuss how these products are marketed.

What are marketing options for sheep enterprises?

a) Two potential sources of income - meat and wool
1) Demand - has decreased in both areas
2) Greater decreases in the market for wool, which has led to focus on raising hair breeds of sheep

b) Marketing options
1) Direct marketing for most of the sales of lambs
(a) Large producers with operations in western states - market their animals directly to packing firms
(b) Producers in midwestern states like Missouri
(1) Combine their market lambs into larger units for direct marketing to packers
(2) Allows bargaining for better prices
2) Decreasing use of terminal markets and auctions
3) Wool marketed by local producers
(a) Combine their wool during shearing season
(b) Market their product to large buyers
(c) Marketed in two categories
(1) Apparel
(2) Carpet wool

c) Market lambs
1) As hothouse lambs, animals under three months of age sold between Christmas and Easter.
2) Graze them through the summer and market them at about 110 to 130 pounds in late summer.

d) Lamb prices
1) Rise during the spring, peaking in May, and then tend to fall off
2) Lowest packer prices received in June and July

e) Wool prices
1) Prices vary seasonally, with prices at their highest in spring and peaking in May.
2) Largely determined by the amount of clean wool produced; clean wool is the wool that remains after the removal of impurities.
3) Length, density, and diameter of the wool affects its value by establishing grade.

5. Marketing of horses is different from other types of livestock because they are companion animals rather than animals that produce a product to be sold. Discuss marketing options for horses.

What are marketing options for horses?

a) Direct sales
1) Private transaction for most horse sales
2) Methods of finding out about a horse for sale
(a) Advertisements in a newspaper or magazine

(b) Finding a dealer over the Internet
(c) Through word of mouth from a friend or neighbor

3) Price
(a) Private negotiation between the parties involved
(b) Established by the condition of the animal, its age, and training received

b) Auctions
1) Regular sales at some horse auctions, usually held on a seasonal basis in the spring or fall.
2) Prices determined through bidding.
3) Examination of the animal before the sale is customary to establish a fair value.

6. Discuss the marketing of poultry. Because of the nature of the poultry industry, marketing is very different than with other types of animals. Ask students what effect vertical integration would have on marketing options for the producer.

What are the marketing options for poultry?

a) Almost totally vertically integrated
b) Producers
1) Contract with the large integrators
2) Generally do not make marketing decisions
3) Birds owned and marketed by integrator
4) Few actual sales of live birds or eggs
c) Niche markets -
1) Selling specialty, free-range products
2) Retailers on a local or regional level

7. Discuss the importance of making sound marketing decisions. What impact would the selection of a particular marketing option have on an operation? Discuss factors that may influence the choice of a marketing option.

How is a marketing option selected?

a) Based on personal preference
b) Profit potential - most important factor to consider
c) Location of the production unit
d) Type of livestock product
e) Quantity of the livestock product
f) Quality of the livestock product
g) Market risk

8. Ask students to list steps in developing a marketing plan. What should be included in the plan? Discuss the parts of a marketing plan. Have students complete AS 1.1 and 1.2.

What is a marketing plan?

a) Requires several steps
1) Know the costs of the operation.
(a) Analyze the variable and fixed costs associated with the livestock enterprise.
(b) Analysis of costs will reveal the breakeven price.
2) Know what prices can be expected.
(a) Informed about prices and the market outlook for the coming year
(b) Optional step
(1) Taking a look at the operation's product
(2) Consider alternative enterprises if the operation is not a profitable
3) Study the marketing alternatives.
4) Make a plan.

(a) Develop a market plan
(1) Reduces risk
(2) Put in writing
(b) Low-risk plan
(1) Completes some sales early in the season to cover costs.
(2) Sell the bulk of the product at a reasonable price objective based on the market outlook.
(3) Hold a small amount of the product in hopes of making a greater profit.
(c) Market plan
(1) When to market
(2) Where to market
(3) Number of units to be sold

5) Take action and stick to the plan.
(a) Maintain accurate cost records and monitor market prices to track success.
(b) Keep up-to-date.

b) Need good marketing information to plan effectively
1) Sources different depending on livestock enterprise
2) Two general sources
(a) Internal
(1) Producer's operation
(2) Track costs per unit of animal marketed
a. Look at resources available
b. History of production
c. Financial statements
d. Cost accounting system
(b) External information
(1) Outside factors that will influence production and prices
(2) Weather forecasts, price reports, news developments, supply and demand data, market analysis, and market advisories
(3) Electronic information services, radio, television, newspapers, newsletters, and personal contacts with analysts or brokers

F. ***Other Activities***

1. Have a guest speaker, such as a livestock buyer or marketing specialist for a livestock association, talk to the class.

2. Obtain paper copies of livestock contracts used in marketing and discuss them with the students.

3. Show students a copy of a video used for video conferencing sales.

4. Have an auctioneer demonstrate the auction process.

5. Have students obtain information on prices from various sources (DTN, USDA daily reports, etc.).

G. ***Conclusion***

Depending on the nature of the livestock industry and the characteristics of the owner's operation, producers may have several options for marketing, or they may have relatively few options. The option chosen should be selected after analyzing all the factors involved, including the potential for profit and the market risk. Devising a marketing plan will allow the producer to make better decisions for marketing livestock and livestock products.

H. ***Answers to Activity Sheet***

AS 1.1

Answers will vary.

AS 1.2

1. 66,000 pounds (120 × 550 pounds)
2. 63,360 pounds (66,000 pounds × 96%)
3. 99 cents per pound (66,000 pounds × .95 = $62,700; $62,700 ÷ 66,000 pounds)
4. $72,022.50 (825 pounds × 120 = 99,000 pounds; 99,000 pounds × 97% = 96,030 pounds; 96,030 pounds × .75 cents)
5. 32,670 pounds and 272.25 pounds per animal (96,030 pounds - 63,360 pounds = 32,670 pounds; 32,670 pounds ÷ 120 = 272.25 pounds)
6. 1.95 pounds per day (272.25 pounds ÷ 140 days = 1.95 pounds)
7. $6,875
8. 21 cents ($6,875 ÷ 32,670 pounds of gain)
9. 72.45 cents per pound (66,000 pounds × .95 = $62,700; $62,700 + $6,875 = $69,575; $69,575 ÷ 96,030 pounds = .7245)

I. ***Answers to Evaluation***

1. c
2. b
3. a
4. d
5. a
6. d
7. b

8. Answers may include any three of the following: personal preference, profit potential, location of the production unit, type of livestock product, size of the livestock product, quality of the livestock product, and market risk.

9. They give small producers bargaining power by combining production units into larger numbers.

10. Direct sales and auctions

11. Maintain an orderly market, establish prices for Class I fluids, and ensure a sufficient quantity of wholesome milk for consumers.

12. The poultry industry is almost totally vertically integrated and marketing decisions are made by the integrator.

13. Know the costs of the operation; know what prices can be expected; study the marketing alternatives; make a plan; and take action and stick to the plan.

14. Auctions at local sale barns are more convenient to the producer.

15. Answers may include any three of the following: supply a daily market, assist with quality control, sell milking supplies and equipment, coordinate milk weights and tests, assist with inspection problems, provide marketing and market outlook information, negotiate milk prices with processors, balance milk supplies among different processors, and participate in federal order hearings.

UNIT X - MARKETING Name _____

Lesson 1: Marketing Options for Livestock Enterprises Date _____

EVALUATION

Circle the letter that corresponds to the best answer.

1. Beef cattle prices follow a cattle inventory cycle of _____ years.

   a. 3 to 5
   b. 6 to 9
   c. 9 to 13
   d. 10 to 14

2. When do lamb and wool prices tend to peak?

   a. February
   b. May
   c. September
   d. December

3. Which of the following marketing options is decreasing in usage?

   a. Terminal markets
   b. Purebred marketing
   c. Contract markets
   d. Futures marketing

4. What method of marketing is most commonly used for marketing sheep and swine?

   a. Futures marketing
   b. Purebred marketing
   c. Auctions
   d. Direct sales

5. How long is the marketing cycle for swine?

   a. 3 to 4 years
   b. 6 to 8 years
   c. 10 to 13 years
   d. 15 to 19 years

6. When are the highest prices paid for milk?

   a. February and March
   b. May and June
   c. August and September
   d. November and December

7. What is shrinkage?

   a. Reduction in the price offered
   b. Loss of weight during shipping
   c. Decreases in market size
   d. Losses on the futures market

Complete the following short answer questions.

8. What are three factors that may be considered when selecting a marketing option?

   a.

   b.

   c.

9. How do livestock alliances aid in marketing?

10. What are the two ways most horses are sold?

    a.

    b.

11. What effect did the Agricultural Marketing Agreement Act of 1937 have on the marketing of milk?

12. Why do few poultry producers have to make marketing decisions?

13. What are the five basic steps in developing a marketing plan?

    a.

    b.

    c.

    d.

    e.

14. Why are auctions popular with producers who have smaller operations?

15. What are three ways that dairy cooperatives assist producers?

    a.

    b.

    c.

Lesson 1: Marketing Options for Livestock Enterprises Name _____

Developing a Marketing Plan for a Livestock Enterprise

Objective: Develop a marketing plan for a specific livestock enterprise.

Using the information presented in this lesson, describe and justify a marketing plan for your operation in the space below. Include responses to the following questions.

Species of livestock: _____

1. What type of marketing method did you select?

2. What factors did you take into consideration to make the selection?

3. When do you expect to implement your plan (what time of the year)?

4. How did you determine the price you expect to receive? What were your sources of information?

Lesson 1: Marketing Options for Livestock Enterprises Name _____

Analyzing a Stocker Cattle Operation

Objective: Students will analyze a stocker cattle operation and figure the breakeven price.

Read the following scenario and answer the questions.

You purchased 120 head of steer calves that average 550 pounds in weight for 95 cents per pound. The calf shrink percentage when the animals reached the farm was 4 percent. The production costs for the 120 head totaled $6,875. After a 140-day grazing period, the cattle weighed an average of 825 pounds each. You agree to sell them at the farm for 75 cents per pound with a 3 percent shrink. Assume you avoided any death loss.

1. What is the total purchase weight of the steers?

2. What is the total weight of the calves brought home with a 4 percent shrinkage?

3. What is the price per cwt. (hundredweight) of the steers upon arrival at the farm?

4. What is the total price received for the steers upon selling?

5. How much did the steers gain? Include the total amount and average per animal.

6. What was the average daily gain per steer from purchase to selling date?

7. What was the total cost of production for this group of steers?

8. What was the cost of production per pound of gain?

9. What is the breakeven selling price (per pound) that must be received for this group of steers?

Advanced Livestock Production and Management

Curriculum Guide: *Advanced Livestock Production and Management*

Unit: I. Issues in Animal Agriculture

Unit Objective:

Students will evaluate current issues in animal agriculture by researching a position on the use of biotechnology in agriculture and defending the position in a classroom debate.

Show-Me Standards: 2.3, CA6

References:

A Guide to Parliamentary Debate. American Parliamentary Debate Association. Accessed May 8, 2003, from http://www.apdaweb.org/guide/.

Advanced Livestock Production and Management. University of Missouri-Columbia, Instructional Materials Laboratory, 2000.

Biotechnology. Accessed May 8, 2003, from http://www.foodsafety.gov/~fsg/biotech.html.

Biotechnology Portal. College of Agriculture and Life Sciences, University of Arizona. Accessed May 8, 2003, from http://cals.arizona.edu/biotechnology/education.html.

Pork Science and Technology. National Pork Board. Accessed May 8, 2003, from http://www.porkscience.org/default.asp.

Science. American Association for the Advancement of Science. Accessed May 9, 2003, from http://www.sciencemag.org/.

Students may use additional outside sources to complete this activity.

Instructional Strategies/Activities:

- Students will engage in study questions in lesson 1.
- Students will complete AS 1.1, Survey of Consumer's Views of Animal Agriculture; and AS 1.2, Current Issues Affecting Animal Agriculture.
- Additional activities that relate to the unit objective can be found under the heading "Other Activities" in the following location: p. I-6 (1, 2).

Performance-Based Assessment:

The instructor will randomly assign each student a position either in favor of or opposed to the use of biotechnology in animal agriculture. Students will research their position and take part in a classroom debate. The instructor will mediate the debate.

Assessment will be based on the thoroughness of the student's research, ability to clearly and persuasively defend the assigned position, and participation in the debate.

Unit I—Issues in Animal Agriculture
Instructor Guide

The instructor should assign the performance-based assessment activity at the beginning of the unit. Students will work toward completing the activity as they progress through the unit lessons. The assessment activity will be due at the completion of the unit.

1. Randomly assign each student a position either in favor of or opposed to the use of biotechnology in animal agriculture.

2. Have students research their position and take part in a classroom debate.

3. Lead a class discussion prior to the debate to help students focus their research. Discussion topics could include general principles of biotechnology, as well as any current specific biotechnology issues. Sample topics could include questions such as the following:
   - ❑ Are bioengineered foods safe or potentially unsafe for consumers or the environment? What evidence supports your conclusion?
   - ❑ What are the potential economic advantages of using bioengineered foods? What are the potential disadvantages?
   - ❑ Should all bioengineered food require labeling? Why or why not?

4. Use the topics discussed in class as the framework for the debate.
   a. Structure the debate formally or informally, as desired.
   b. If a formal debate style is preferred, such as a policy debate or parliamentary debate, information about conducting and judging debates can be accessed on the Internet. For example, information about parliamentary debate can be found at the American Parliamentary Debate Association, accessed May 9, 2003, from http://www.apdaweb.org/guide/.

5. Students may use material found in the unit or discussed in class as well as additional outside material to prepare for the debate.

6. Students should arrange their findings into an outline form.

7. Students may refer to their outline during the debate but should present their evidence in their own words.

8. Guide the debate as needed to encourage the students to apply their research.

9. Have students turn in their outline and a complete bibliography of their sources following the debate.

10. Students must take part in the debate to receive full points for this activity.

11. The final assessment score will be based on the thoroughness of the student's research, ability to clearly and persuasively defend the assigned position and respond to the questions, and participation in the debate.

Unit I—Issues in Animal Agriculture
Student Handout

1. The instructor will randomly assign you a position either in favor of or opposed to the use of biotechnology in animal agriculture.

2. You will research your position and take part in a classroom debate.

3. You may use material found in the unit or discussed in class as well as additional outside material to prepare for the debate.

4. Arrange your findings into an outline form.

5. You may refer to your outline during the debate but should present your evidence in your own words.

6. Turn in your outline and a complete bibliography of your sources following the debate.

7. You must take part in the debate to receive full points for this activity.

8. Your final assessment score will be based on the thoroughness of your research, your ability to clearly and persuasively defend your assigned position and respond to the questions asked, and your participation in the debate.

Advanced Livestock Production and Management

Unit I—Issues in Animal Agriculture
Scoring Guide

Name _____

Assessment Area	Criteria	0 Points	1 Point	2 Points	3 Points	4 Points	Weight	Total
Outline	❑ Thorough and well researched ❑ Addresses the issues and questions ❑ Provides good supporting evidence ❑ Well organized ❑ Spelling and grammar are correct	0 criteria met	1-2 criteria met	3 criteria met	4 criteria met	All 5 criteria met	X 19	
Debate	❑ Takes part in debate ❑ Persuasive ❑ Speaks clearly ❑ Listens and responds directly and constructively to other participants	0 criteria met	1 criterion met	2 criteria met	3 criteria met	All 4 criteria met	X 6	
TOTAL								

Final Assessment Total _____**/100 pts.**

Comments:

Advanced Livestock Production and Management

Curriculum Guide: *Advanced Livestock Production and Management*

Unit: II. Enterprises

Unit Objective:

Students will use management principles developed in the unit to explain, in an oral report, how basic resources—market, land, capital, labor, and management—should be applied to establish and maintain a successful livestock enterprise.

Show-Me Standards: 2.1, CA6

References:

Advanced Livestock Production and Management. University of Missouri-Columbia, Instructional Materials Laboratory, 2000.

Missouri Farm Facts. Accessed January 21, 2003, from http://agebb.missouri.edu/mass/farmfact/.

MU Extension. University of Missouri-Columbia. Accessed January 21, 2003, from http://muextension.missouri.edu/explore/agguides/.

Students may use additional outside sources to complete this activity.

Instructional Strategies/Activities:

- Students will engage in study questions in lessons 1 through 7.
- Students will complete AS 2.1, Preparing a Beef Enterprise Budget; AS 3.1, Preparing a Dairy Enterprise Budget; AS 3.2, Considerations for Starting a Dairy Enterprise; AS 4.1, Describing Swine Enterprises; AS 4.2, Preparing a Swine Enterprise Budget; AS 5.1, Preparing a Sheep Enterprise Budget; AS 5.2, Resources Necessary for Sheep Enterprises; AS 6.1, Interviewing a Horse Producer; AS 6.2, Horse Breeds; and AS 7.1, Poultry Enterprise Internet Search.
- Additional activities that relate to the unit objective can be found under the heading "Other Activities" in the following locations: p. II-5 (1, 2), p. II-17, p. II-29 (1, 2), p. II-43 (1, 2), p. II-56, p. II-69, and p. II-82 (1, 2).

Performance-Based Assessment:

Students will be divided into groups with each group assigned to report on one of the enterprises discussed in the unit—beef cattle, dairy cattle, swine, sheep, horses, and poultry. The groups will use management principles to determine how basic resources—market, land, capital, labor, and management—should be applied to establish and maintain a successful livestock enterprise and present their findings to the class in an oral report.

Assessment will be based on the overall content and presentation of the report. At the instructor's discretion, students will contribute to the assessment process by providing a brief evaluation of the performance of the other members of their group.

Unit II—Enterprises
Instructor Guide

The instructor should assign the performance-based assessment activity at the beginning of the unit. Students will work toward completing the activity as they progress through the unit lessons. The assessment activity will be due at the completion of the unit.

1. Divide the class into groups and assign each group one of the livestock enterprises discussed in the unit—beef cattle, dairy cattle, swine, sheep, horses, and poultry.

2. Have the groups determine how basic resources should be used and applied to establish and maintain a successful livestock enterprise.

3. Have students present their findings to the class in an oral report.

4. Have students use the five required resources discussed in the unit to form the outline of their report. Students should address the following resources:
   - ❑ Market
   - ❑ Land
   - ❑ Capital
   - ❑ Labor
   - ❑ Management

5. Students may use material found in the unit or discussed in class, such as the enterprise budget activity sheets (p. II-21, p. II-33, p. II-61), as well as additional outside material to complete their report.
   a. For example, additional information can be found in *Missouri Farm Facts*, accessed January 21, 2003, from http://agebb.missouri.edu/mass/farmfact/ and at the University of Missouri Extension web site at http://muextension.missouri.edu/explore/agguides/, accessed January 21, 2003.
   b. Students may not use the source material word for word and must provide a complete bibliography of their sources following their report.
   c. Students should also incorporate other elements, such as illustrations or charts, and make use of presentation software or other equipment or material as needed to make the report interesting and informative.
   d. Students should be prepared to answer questions about their report.

6. If desired, have students contribute to the assessment process by completing a short evaluation of their teammates' performance in completing the report. A peer evaluation form is included following the scoring guide.
   a. Have students complete the peer evaluation form by following the instructions listed at the top. Students should base their assessment on how much each person contributed to the project.
   b. If tasks are divided so that students do only one type of task to contribute to the project, have students adjust their peer evaluation form by disregarding the category that does not apply to a particular teammate. Instead of assessing teammates on two categories worth 0 to 3 points, students will assess teammates on one category worth 0 to 6 points.
   c. To determine the final peer evaluation score, add up the scores that a student receives from the other members of the group and divide the total by the number of scores received. The maximum number of points possible for each student is 6.

7. The final assessment score will be a combination of the student's report score and final peer evaluation score.

Unit II—Enterprises
Student Handout

1. The instructor will divide the class into groups and assign each group a livestock enterprise.

2. Determine the resources you would need and how they should be used in order to establish and maintain a successful livestock enterprise. Be sure to address the following resources:
   - ❑ Market
   - ❑ Land
   - ❑ Capital
   - ❑ Labor
   - ❑ Management

3. You may use material found in the unit or discussed in class as well as additional outside material to complete your report.
   a. You may not use the source material word for word and must provide the instructor with a complete bibliography of your sources following your report.
   b. You should also incorporate other elements, such as illustrations or a chart, and make use of presentation software or other equipment or material as needed to make the report interesting and informative.
   c. Be prepared to answer questions from your instructor and classmates regarding your report.

4. If requested, you will contribute to the assessment process by completing a short evaluation of your teammates' performance in developing the report.
   a. Following the report, fill out the peer evaluation score sheet.
   b. Give the completed score sheet to your instructor.

5. Your final assessment score will be a combination of your report score and your final peer evaluation score.

Advanced Livestock Production and Management

Unit II—Enterprises
Scoring Guide

Name _____

Assessment Area	Criteria	0 Points	1 Point	2 Points	3 Points	4 Points	Weight	Total
Information and Content of Enterprise Evaluation	❑ Information is complete ❑ Facts are accurate ❑ Addresses all five required resources ❑ Answers questions from the instructor or students correctly ❑ Provides a thorough overview of a successful enterprise	0 criteria met	1-2 criteria met	3 criteria met	4 criteria met	All 5 criteria met	X 16	
Presentation of Report	❑ Well organized ❑ Emphasizes key points ❑ Uses correct grammar; no spelling or grammar errors in charts or other written elements ❑ Good use of supporting material	0 criteria met	1 criterion met	2 criteria met	3 criteria met	All 4 criteria met	X 5	
Delivery of Oral Report	❑ Holds audience interest ❑ Speaks clearly ❑ Good posture ❑ Maintains eye contact	0 criteria met	1 criterion met	2 criteria met	3 criteria met	All 4 criteria met	X 2.5	
Peer Evaluation						6 pts. maximum		
TOTAL								

Final Assessment Total _____**/100 pts.**

Comments:

Unit II—Enterprises
Peer Evaluation **Name**_____

Write your name on the line above. Fill in the names of your teammates in the spaces provided below. For each category listed below, give each teammate a score from 0 to 3 based on his or her contribution to the project. Use the following guide.

- 0—no contribution
- 1—minimal contribution
- 2—average contribution
- 3—excellent contribution

Add the person's score in each category and place the total in the column at the right. Give the completed score sheet to your instructor.

Project development includes tasks such as planning and research. Project completion includes writing, assembling, or presenting the project. If tasks are divided so that you or your teammates do only one type of task to contribute to the project, consult the instructor about how to adjust your evaluation form.

Name of Teammate	Project Development 0-3 Points	Project Completion 0-3 Points	Total (6 Points Max.)

Advanced Livestock Production and Management

Curriculum Guide: *Advanced Livestock Production and Management*

Unit: III. Selection

Unit Objective:

Students will apply principles of animal selection developed in the unit to judge classes of livestock and explain their judgments using appropriate terminology.

Show-Me Standards: 1.10, CA1

References:

Advanced Livestock Production and Management. University of Missouri-Columbia, Instructional Materials Laboratory, 2000.

Lipsey, J. *Livestock Judging Techniques.* University of Missouri-Columbia Extension. Accessed January 23, 2003, from http://muextension.missouri.edu/explore/agguides/ansci/g02952.htm.

Livestock Judging. Agripedia. University of Kentucky, College of Agriculture. Accessed May 5, 2003, from http://www.ca.uky.edu/agripedia/agmania/livestock/index.htm.

Missouri CDE Handbook. Accessed January 23, 2003, from http://www.dese.state.mo.us/divvoced/ag_cde_guidelines.htm#CDE%20Event.

Virtual Livestock Judging Contest. Accessed May 5, 2003, from http://www.swine.net/vljc.htm.

Sources for livestock judging videos include the Career and Technical Education Resources (CATER) library, University of Missouri-Columbia, accessed May 5, 2003, from http://mvrc.coe.missouri.edu/, and the Academic Support Center, University of Missouri-Columbia, accessed May 5, 2003, from http://media.asc.missouri.edu/htbin/wwform/145/wwk770.

Students may use additional outside sources to complete this activity.

Instructional Strategies/Activities:

- Students will engage in study questions in lessons 1 through 8.
- Students will complete AS 1.1, Livestock Terminology; AS 2.1, Selecting Livestock Based on Performance Data; AS 4.2, Udder Characteristics; AS 5.2, Selecting the Best Boar; AS 6.1, Selecting Ewes and Rams; AS 7.1, Selecting the Appropriate Horse; and AS 8.1, Judging Laying Hens Based on Pigmentation.
- Additional activities that relate to the unit objective can be found under the heading "Other Activities" in the following locations: p. III-54 (1, 3, 4), pp. III-71–III-72 (1, 2, 3, 5), p. III-90 (1, 2), p. III-110 (1, 2), p. III-127 (1), and p. III-148 (3).

Performance-Based Assessment:

Students will judge a class of animals from each type of livestock covered in the unit—beef cattle, dairy cattle, swine, sheep, horses, and poultry. Students must place the classes and provide written reasons for their placement by using appropriate terminology and techniques developed in the lesson.

Assessment will be based on the student's placement of the classes and ability to clearly and persuasively defend the placement.

Unit III—Selection
Instructor Guide

The instructor should assign the performance-based assessment activity at the beginning of the unit. Students will work toward completing the activity as they progress through the unit lessons. The assessment activity will be due at the completion of the unit.

1. Using video, live animals, or both, present students with a class of animals from each type of livestock covered in the unit—beef cattle, dairy cattle, swine, sheep, horses, and poultry.

2. Have students place each class and provide a written set of notes for their placement of each class.

3. Students should apply selection criteria described in the unit to place each class and use correct terminology to explain their placement.

4. This activity should help prepare students for the Livestock Judging, Horse Evaluation, Dairy Cattle, and Poultry Career Development Events. Have students use the same style and format they would use for filling out notes for these events.
   a. Explain or review event guidelines and livestock judging as needed.
   b. Refer to the *Missouri CDE Handbook* for guidelines regarding Career Development Events. The *Missouri CDE Handbook* is available from the Missouri Department of Elementary and Secondary Education at http://www.dese.state.mo.us/divvoced/ag_cde_guidelines.htm#CDE%20Event.
   c. Additional information regarding livestock judging can be found at the University of Missouri Extension web site, such as *Livestock Judging Techniques*, accessed January 23, 2003, from http://muextension.missouri.edu/explore/agguides/ansci/g02952.htm.

5. The final assessment score will be based on the student's placement of the classes and ability to clearly and persuasively explain the placement.

Unit III—Selection
Student Handout

1. The instructor will present a class of animals from each type of livestock covered in the unit—beef cattle, dairy cattle, swine, sheep, horses, and poultry.

2. Place each class and provide a written set of notes for your placement of each class.

3. Apply selection criteria described in the unit to place each class and use correct terminology to explain your placement.

4. Turn in your placements and notes.

5. Your final assessment score will be based on your placement of the classes and ability to clearly and persuasively explain your placement.

Advanced Livestock Production and Management

Unit III—Selection
Scoring Guide

Name _____

Assessment Area	Criteria	0 Points	1 Point	2 Points	3 Points	4 Points	Weight	Total
Overall Class Placement Skills and Presentation	❑ Makes accurate observations and judgments ❑ Emphasizes key points ❑ Uses correct terminology ❑ Well organized ❑ No spelling or grammar errors	0 criteria met	1-2 criteria met	3 criteria met	4 criteria met	All 5 criteria met	X 10	
TOTAL								/40 pts.

Assessment Area	Beef Cattle 0-10 Points	Dairy Cattle 0-10 Points	Swine 0-10 Points	Sheep 0-10 Points	Horses 0-10 Points	Poultry 0-10 Points	Total
Individual Classes of Livestock and Poultry							
TOTAL							/60 pts.

Final Assessment Total _____**/100 pts.**

Comments:

Advanced Livestock Production and Management

Curriculum Guide: *Advanced Livestock Production and Management*

Unit: IV. Breeding

Unit Objective:

Students will demonstrate an understanding of principles of livestock breeding by explaining in an oral report the factors that affect the conception rate for a type of livestock or the hatchability rate for poultry.

Show-Me Standards: 2.1, SC4

References:

Advanced Livestock Production and Management. University of Missouri-Columbia, Instructional Materials Laboratory, 2000.

Agriculture Publications. MU Extension. University of Missouri-Columbia. Accessed May 16, 2003, from http://muextension.missouri.edu/explore/agguides/.

FBMA Beef Management (CD). University of Missouri-Columbia, Farm Business Management Analysis, 2001.

FBMA Horse Management for Adults (CD). University of Missouri-Columbia, Farm Business Management Analysis, 2002.

Students may use additional outside sources to complete this activity.

Instructional Strategies/Activities:

- Students will engage in study questions in lessons 1 through 7.
- Students will complete AS 1.1, Exploring Breeding Systems; AS 2.1, Artificial Insemination of Swine; AS 4.1, Improving Conception Rates; AS 5.1, Planning for Breeding; and AS 7.1, Evaluating Eggs for Fertility.
- Additional activities that relate to the unit objective can be found under the heading "Other Activities" in the following locations: p. IV-5, p. IV-32 (2, 3), p. IV-67, and p. IV-81 (1, 2).

Performance-Based Assessment:

Students will be divided into groups. Each group will develop an oral report that explains the factors that affect the conception rate for a type of livestock or the hatchability rate for poultry. The presentation should be 15 minutes long and include appropriate visual elements.

Assessment will be based on the overall content and presentation of the oral report. At the instructor's discretion, students will contribute to the assessment process by providing a brief evaluation of the performance of the other members of their group.

Unit IV—Breeding
Instructor Guide

The instructor should assign the performance-based assessment activity at the beginning of the unit. Students will work toward completing the activity as they progress through the unit lessons. The assessment activity will be due at the completion of the unit.

1. Divide the class into groups and assign each group one of the types of livestock discussed in the unit—cattle, sheep, swine, horses, and poultry.

2. Have each group develop an oral report that explains the factors that affect the conception rate for one of the types of livestock or the hatchability rate for poultry and give the report to the class. The report should be 15 minutes long.

3. Have students incorporate appropriate visuals into their report, such as drawings, illustrations from magazines, a handout, transparency masters, a slide show using presentation software, or a combination of these elements. Indicate to students which of these supporting elements are acceptable or preferred.

4. Students may use material found in the unit or discussed in class as well as additional outside material to complete their report.

5. Students may not use the source material word for word and must provide a complete bibliography of their sources following their report.

6. Students should be prepared to answer questions about their topic.

7. Guide or correct the students' presentations, if needed.

8. If desired, have students contribute to the assessment process by completing a short evaluation of their teammates' performance in developing their report. A peer evaluation form is included following the scoring guide.
   a. Have students complete the peer evaluation form by following the instructions listed at the top. Students should base their assessment on how much each person contributed to the project.
   b. If tasks are divided so that students do only one type of task to contribute to the project, have students adjust their peer evaluation form by disregarding the category that does not apply to a particular teammate. Instead of assessing teammates on two categories worth 0 to 3 points, students will assess teammates on one category worth 0 to 6 points.

c. To determine the final peer evaluation score, add up the scores that a student receives from the other members of the group and divide the total by the number of scores received. The maximum number of points possible for each student is 6.

9. The final assessment score will be based on the overall content and presentation of the report and final peer evaluation score.

Unit IV—Breeding
Student Handout

1. The instructor will divide the class into groups and assign each group one of the types of livestock discussed in the unit.

2. Develop an oral report that explains the factors that affect the conception rate for your assigned type of livestock. For poultry, develop a report about factors that affect the hatchability rate.

3. Present your report to the class. Reports should be 15 minutes long.

4. Include appropriate visuals in your report, such as drawings, illustrations from magazines, a handout, a slide show using presentation software, or a combination of these or other supporting materials indicated by the instructor.

5. You may use material found in the unit or discussed in class as well as additional outside material to complete your report.

6. You may not use the source material word for word and must provide the instructor with a complete bibliography of your sources following your report.

7. Be prepared to answer questions from the instructor and your classmates regarding your topic.

8. If requested, you will contribute to the assessment process by completing a short evaluation of your teammates' performance in developing the report.
   a. Following the presentation, fill out the peer evaluation score sheet.
   b. Give the completed score sheet to your instructor.

9. Your final assessment score will be based on the content and presentation of your report and your final peer evaluation score.

Advanced Livestock Production and Management

Unit IV—Breeding
Scoring Guide

Name _____

Assessment Area	Criteria	0 Points	1 Point	2 Points	3 Points	4 Points	Weight	Total
Information and Content of Report	❑ Provides a thorough overview and addresses all key topics ❑ Facts are accurate ❑ Well organized ❑ Supporting materials emphasize and clarify key points ❑ Answers questions from the instructor or students correctly	0 criteria met	1-2 criteria met	3 criteria met	4 criteria met	All 5 criteria met	X 18.5	
Presentation of Report	❑ Speaks clearly and holds audience interest ❑ Maintains good posture and eye contact ❑ No grammar errors in presentation; no spelling, grammar, or punctuation errors in any written material ❑ Needs little or no prompting from the instructor	0 criteria met	1 criterion met	2 criteria met	3 criteria met	All 4 criteria met	X 5	
Peer Evaluation						6 pts. maximum		
TOTAL								

Final Assessment Total _____**/100 pts.**

Comments:

Unit IV—Breeding
Peer Evaluation

Name_____

Write your name on the line above. Fill in the names of your teammates in the spaces provided below. For each category listed below, give each teammate a score from 0 to 3 based on his or her contribution to the project. Use the following guide.

- 0—no contribution
- 1—minimal contribution
- 2—average contribution
- 3—excellent contribution

Add the person's score in each category and place the total in the column at the right. Give the completed score sheet to your instructor.

Project development includes tasks such as planning and research. Project completion includes writing, assembling, or presenting the project. If tasks are divided so that you or your teammates do only one type of task to contribute to the project, consult the instructor about how to adjust your evaluation form.

Name of Teammate	Project Development 0-3 Points	Project Completion 0-3 Points	Total (6 Points Max.)

Advanced Livestock Production and Management

Curriculum Guide: *Advanced Livestock Production and Management*

Unit: V. Parturition

Unit Objective:

Students will apply parturition management strategies by devising a birthing checklist for one of the types of livestock discussed in the unit and providing a written explanation for the items and steps they included on their checklist.

Show-Me Standards: 1.8, SC3

Reference:

Advanced Livestock Production and Management. University of Missouri-Columbia, Instructional Materials Laboratory, 2000.

Instructional Strategies/Activities:

- Students will engage in study questions in lessons 1 through 5.
- Students will complete AS 1.1, Assisting With Abnormal Births; AS 2.1, Farrowing Information; AS 3.1, Assisting With Lambing; AS 4.1, Assisting With Abnormal Presentations; and AS 5.1, Incubating and Hatching Eggs.
- Additional activities that relate to the unit objective can be found under the heading "Other Activities" in the following locations: p. V-6 (1) and p. V-27 (2).

Performance-Based Assessment:

Each student will develop a parturition checklist for one of the types of livestock discussed in the unit. The checklist will include equipment they will need and steps they should take before and after parturition. Students will also provide a written explanation for the items and steps they included on their checklist.

Assessment will be based on the overall content and presentation of the checklist and explanations.

Unit V—Parturition
Instructor Guide

The instructor should assign the performance-based assessment activity at the beginning of the unit. Students will work toward completing the activity as they progress through the unit lessons. The assessment activity will be due at the completion of the unit.

1. Randomly assign each student one of the following types of livestock: cattle, swine, sheep, horses, or poultry.

2. Have students develop a parturition checklist for their assigned type of livestock.

3. Explain that the checklist should include the equipment they will need and steps they should take 24 hours before and after parturition. If this time period is less critical for a particular type of livestock, adjust the time accordingly. For example, students who are assigned poultry could develop a general hatching and incubation checklist.

4. The checklist should include only key words and phrases and fit on one 8 1/2-by-11-inch sheet of paper so that it could be easily posted or carried.

5. Have students write, on separate paper, a brief explanation for each piece of equipment and step that tells why they included it on their checklist.

6. Explanations should be in complete sentences and use correct spelling and grammar.

7. Have students turn in their explanations along with their checklists.

8. The final assessment score will be based on the overall content and presentation of the checklist and explanations.

Unit V—Parturition
Student Handout

1. The instructor will assign you a type of livestock.

2. Develop a parturition checklist for your assigned type of livestock that includes the equipment you will need and steps you should take before and after parturition.

3. The checklist should include only key words and phrases and fit on one 8 1/2-by-11-inch sheet of paper so that it could be easily posted or carried.

4. On separate paper, write a brief explanation for each piece of equipment and step that tells why you included it on your checklist.

5. Explanations should be in complete sentences and use correct spelling and grammar.

6. Turn in your explanations along with your checklist.

7. Your final assessment score will be based on the overall content and presentation of your checklist and explanations.

Advanced Livestock Production and Management

Unit V—Parturition
Scoring Guide

Name _____

Assessment Area	Criteria	0 Points	1 Point	2 Points	3 Points	4 Points	Weight	Total
Thoroughness	Checklist and explanations are complete	Failed	Poor	Fair	Good	Excellent	X 8.75	
Accuracy	Information and explanations are accurate	Failed	Poor	Fair	Good	Excellent	X 8.75	
Organization	Checklist is well organized and emphasizes key points	Failed	Poor	Fair	Good	Excellent	X 5	
Technical Considerations	Spelling, grammar, and punctuation are correct	Failed	Poor	Fair	Good	Excellent	X 2.5	
TOTAL								

Final Assessment Total _____**/100 pts.**

Comments:

Advanced Livestock Production and Management

Curriculum Guide: *Advanced Livestock Production and Management*

Unit: VI. Animal Health

Unit Objective:

Students will demonstrate an understanding of animal health issues by researching a common livestock health problem and designing a poster and handout that outline its symptoms, causes, treatment, and prevention.

Show-Me Standards: 1.8, SC4

References:

Advanced Livestock Production and Management. University of Missouri-Columbia, Instructional Materials Laboratory, 2000.

NetVet Veterinary Resources and the Electronic Zoo. Accessed April 4, 2003, from http://netvet.wustl.edu.

Students may use additional outside sources to complete this activity.

Instructional Strategies/Activities:

- Students will engage in study questions in lessons 1 through 10.
- Students will complete AS 1.1, Identifying Symptoms; AS 1.2, Understanding Health Problems in Cattle; AS 2.1, Developing a Dairy Herd Health Plan; AS 2.2, Lifecycle of Internal Parasites; AS 2.3, Controlling Parasites; AS 3.1, Researching Vaccines; AS 4.1, Herd Health and Quality Assurance; AS 5.1, Understanding Sheep Health Problems; AS 8.1, Researching Vaccines; AS 8.2, Internal and External Parasites of Horses; and AS 9.1, Evaluating Health Problems in the Poultry Flock.
- Additional activities that relate to the unit objective can be found under the heading "Other Activities" in the following locations: p. VI-11 (1, 2, 3, 4), p. VI-33 (1, 2), p. VI-67, p. VI-89, p. VI-103 (1, 2), p. VI-118, p. VI-130 (1, 2), p. VI-147, and p. VI-158 (1).

Performance-Based Assessment:

Each student will research a common livestock health problem and design a poster that outlines its symptoms, causes, treatment, and prevention. Students will also create a handout that summarizes their poster and can be given to their classmates. Students can assemble these handouts in a notebook to keep as a reference source following the poster presentation.

Assessment will be based on the overall content and presentation of the poster and handout.

Unit VI—Animal Health
Instructor Guide

The instructor should assign the performance-based assessment activity at the beginning of the unit. Students will work toward completing the activity as they progress through the unit lessons. The assessment activity will be due at the completion of the unit.

1. Choose a type of livestock from those discussed in the unit, preferably one that is prominent in the area.

2. Assign a disease or parasite that is common to that type of animal to each student. Students could also choose their topic, if preferred.

3. Have students research their assigned health problem and create a poster explaining its symptoms, causes, treatment, and prevention.

4. Have students create a handout that summarizes their poster.

5. Instruct students to print handouts on standard 8 1/2-by-11-inch paper so that they can assemble the handouts in a notebook as a reference source following the poster presentation.

6. Have students hang their posters on the walls and visit each poster to read what their classmates have written and pick up a handout.

7. Students may use additional outside material to complete their posters and handouts.
   a. Students may not use the source material word for word and must provide a complete bibliography of their sources along with a copy of their handout.
   b. Students should also incorporate other elements, such as photos, as needed to make the poster and handout interesting and informative.

8. After students have visited all the posters, give them the opportunity to ask questions they have regarding any of the posters or handouts.

9. Students should be prepared to answer questions about their poster and handout.

10. Correct or supplement the students' information or answers, if needed.

11. Discuss any diseases or parasites not addressed by the posters, if necessary.

12. The final assessment score will be based on the overall content and presentation of the poster and handout.

Unit VI—Animal Health
Student Handout

1. The instructor will choose a type of livestock and assign you a disease or parasite that is common to it.

2. Research your assigned disease or parasite and create a poster explaining its symptoms, causes, treatment, and prevention.

3. Create a handout that summarizes the information contained in your poster.
   a. Print your handouts on standard 8 1/2-by-11-inch paper so they can be easily assembled in a notebook as a reference source following the poster presentation.
   b. Make enough handouts for each member of your class and your instructor to have a copy.

4. Hang your poster on the wall and visit all the posters to read what your classmates have written and pick up a handout for each poster.

5. You may use additional outside material to complete your poster and handout.
   a. You may not use the source material word for word and must provide the instructor with a complete bibliography of your sources along with a copy of your handout.
   b. Incorporate other elements, such as photos, as needed to make your poster and handout interesting and informative.

6. After visiting all the posters, you will have the opportunity to ask questions you have regarding any of the posters or handouts.

7. Be prepared to answer questions from the instructor and your classmates regarding your topic.

8. Your final assessment score will be based on the overall content and presentation of your poster and handout.

Advanced Livestock Production and Management

Unit VI—Animal Health
Scoring Guide

Name _____

Assessment Area	Criteria	0 Points	1 Point	2 Points	3 Points	4 Points	Weight	Total
Overall Health Program	Addresses symptoms, causes, treatment, and prevention	Failed	Poor	Fair	Good	Excellent	X 7.5	
Information and Content	Complete and accurate	Failed	Poor	Fair	Good	Excellent	X 7.5	
Handout	Summarizes key elements of health program	Failed	Poor	Fair	Good	Excellent	X 2.5	
Organization	Well organized	Failed	Poor	Fair	Good	Excellent	X 2.5	
Technical Considerations	Spelling, grammar, and punctuation	Failed	Poor	Fair	Good	Excellent	X 2.5	
Supporting Material	Good use of photos or other supporting material	Failed	Poor	Fair	Good	Excellent	X 2.5	
TOTAL								

Final Assessment Total _____**/100 pts.**

Comments:

Advanced Livestock Production and Management

Curriculum Guide: *Advanced Livestock Production and Management*

Unit: VII. Facilities and Equipment

Unit Objective:

Students will demonstrate an understanding of the facility needs of livestock by devising a farm plan and explaining it to the class in an oral report that includes appropriate visuals.

Show-Me Standards: 1.8, CA6

References:

Advanced Livestock Production and Management. University of Missouri-Columbia, Instructional Materials Laboratory, 2000.

Agriculture Publications. MU Extension. University of Missouri-Columbia. Accessed May 12, 2003, from http://muextension.missouri.edu/explore/agguides/.

NASCO On-Line Catalogs. Accessed May 12, 2003, from http://www.enasco.com/prod/Home.

Students may use additional outside sources to complete this activity.

Instructional Strategies/Activities:

- Students will engage in study questions in lessons 1 through 6.
- Students will complete AS 1.1, Designing Beef Cattle Facilities; AS 3.1, Swine Facilities and Equipment Collage; AS 4.1, Dogs as Sheep Equipment; AS 5.1, Saddles, Bits, and Bridles; and AS 6.1, Designing a Poultry Production Facility.
- Additional activities that relate to the unit objective can be found under the heading "Other Activities" in the following locations: p. VII-8, p. VII-27, p. VII-39, p. VII-56 (1, 2), and p. VII-93 (1, 2, 3).

Performance-Based Assessment:

Students will be divided into groups. Each group will develop a farm plan for one of the types of livestock discussed in the unit—beef cattle, dairy cattle, swine, sheep, horses, and poultry—and explain the plan to the class in an oral report that includes visuals of the facilities and equipment they will need.

Assessment will be based on the overall content and presentation of the report. At the instructor's discretion, students will contribute to the assessment process by providing a brief evaluation of the performance of the other members of their group.

Unit VII—Facilities and Equipment
Instructor Guide

The instructor should assign the performance-based assessment activity at the beginning of the unit. Students will work toward completing the activity as they progress through the unit lessons. The assessment activity will be due at the completion of the unit.

1. Divide the class into groups and assign each group one of the types of livestock discussed in the unit—beef cattle, dairy cattle, swine, sheep, horses, and poultry.

2. Have each group develop an oral report about the facility and equipment requirements for that type of livestock and present the report to the class.

3. Have students incorporate appropriate visuals into their presentation, such as illustrations from magazines, a handout or map, transparency masters, a slide show using presentation software, or a combination of these elements. Indicate to students which of these supporting elements are acceptable or preferred.

4. Have students explain how the facilities work together for the operation of the whole farm. For example, students could organize their report as if they were giving a tour of the farm.

5. Students may use material found in the unit or discussed in class as well as additional outside material to complete their presentations.

6. Students may not use the source material word for word and must provide a complete bibliography of their sources following their report.

7. Guide or correct the students' presentations, if needed.

8. If desired, have students contribute to the assessment process by completing a short evaluation of their teammates' performance in developing their report. A peer evaluation form is included following the scoring guide.
   a. Have students complete the peer evaluation form by following the instructions listed at the top. Students should base their assessment on how much each person contributed to the project.

b. If tasks are divided so that students do only one type of task to contribute to the project, have students adjust their peer evaluation form by disregarding the category that does not apply to a particular teammate. Instead of assessing teammates on two categories worth 0 to 3 points, students will assess teammates on one category worth 0 to 6 points.
c. To determine the final peer evaluation score, add up the scores that a student receives from the other members of the group and divide the total by the number of scores received. The maximum number of points possible for each student is 6.

9. The final assessment score will be based on the overall content and presentation of the report and final peer evaluation score.

Unit VII—Facilities and Equipment
Student Handout

1. The instructor will divide the class into groups and assign each group one type of livestock discussed in the unit.

2. Develop an oral report about the facility and equipment requirements for your assigned type of livestock and present the report to the class.

3. Include appropriate visuals in your report, such as illustrations from magazines, a handout or map, a slide show using presentation software, or a combination of these or other supporting materials indicated by the instructor.

4. Explain how the facilities work together for the operation of the whole farm. For example, the report could be organized as if you were giving a tour of the farm.

5. You may use material found in the unit or discussed in class as a starting point as well as additional outside material to complete your presentation.

6. You may not use the source material word for word and must provide the instructor with a complete bibliography of your sources following your report.

7. Be prepared to answer questions from your instructor and classmates regarding your topic.

8. If requested, you will contribute to the assessment process by completing a short evaluation of your teammates' performance in developing the report.
   a. Following the report, fill out the peer evaluation score sheet.
   b. Give the completed score sheet to your instructor.

9. Your final assessment score will be based on the overall content and presentation of your report and your final peer evaluation score.

Advanced Livestock Production and Management

Unit VII—Facilities and Equipment
Scoring Guide

Name _____

Assessment Area	Criteria	0 Points	1 Point	2 Points	3 Points	4 Points	Weight	Total
Information and Content of Report	❑ Provides a thorough overview and addresses all key topics ❑ Facts are accurate ❑ Well organized ❑ Supporting materials emphasize and clarify key points ❑ Answers questions from the instructor or students correctly	0 criteria met	1-2 criteria met	3 criteria met	4 criteria met	All 5 criteria met	X 18.5	
Presentation of Report	❑ Speaks clearly and holds audience interest ❑ Maintains good posture and eye contact ❑ No grammar errors in presentation; no spelling, grammar, or punctuation errors in any written material ❑ Needs little or no prompting from the instructor	0 criteria met	1 criterion met	2 criteria met	3 criteria met	All 4 criteria met	X 5	
Peer Evaluation						6 pts. maximum		
TOTAL								

Final Assessment Total _____/100 pts.

Comments:

Unit VII—Facilities and Equipment
Peer Evaluation

Name_____

Write your name on the line above. Fill in the names of your teammates in the spaces provided below. For each category listed below, give each teammate a score from 0 to 3 based on his or her contribution to the project. Use the following guide.

- 0—no contribution
- 1—minimal contribution
- 2—average contribution
- 3—excellent contribution

Add the person's score in each category and place the total in the column at the right. Give the completed score sheet to your instructor.

Project development includes tasks such as planning and research. Project completion includes writing, assembling, or presenting the project. If tasks are divided so that you or your teammates do only one type of task to contribute to the project, consult the instructor about how to adjust your evaluation form.

Name of Teammate	Project Development 0-3 Points	Project Completion 0-3 Points	Total (6 Points Max.)

Advanced Livestock Production and Management

Curriculum Guide: *Advanced Livestock Production and Management*

Unit: VIII. Animal Feeding

Unit Objective:

Students will demonstrate an understanding of livestock nutritional requirements by explaining the feeding options available for a type of livestock on a display board that will be exhibited in class.

Show-Me Standards: 1.8, SC4

References:

Advanced Livestock Production and Management. University of Missouri-Columbia, Instructional Materials Laboratory, 2000.

Agriculture Publications. MU Extension. University of Missouri-Columbia. Accessed May 16, 2003, from http://muextension.missouri.edu/explore/agguides/.

FBMA Beef Management (CD). University of Missouri-Columbia, Farm Business Management Analysis, 2001.

FBMA Horse Management for Adults (CD). University of Missouri-Columbia, Farm Business Management Analysis, 2002.

Missouri Dairymen's Resource Guide. University of Missouri Outreach & Extension. Accessed May 20, 2003, from http://agebb.missouri.edu/dairy/index.htm.

Students may use additional outside sources to complete this activity.

Instructional Strategies/Activities:

- Students will engage in study questions in lessons 1 through 2.
- Students will complete AS 1.1, Selecting High Quality Roughage.
- Additional activities that relate to the unit objective can be found under the heading "Other Activities" in the following locations: p. VIII-9 (1, 2, 3, 4) and VIII-22 (1, 2).

Performance-Based Assessment:

Students will be divided into groups. Each group will develop a display board that explains the feeding options available for one of the types of livestock discussed in the unit—beef cattle, dairy cattle, swine, sheep, horses, and poultry. The display boards will be exhibited in class.

Assessment will be based on the overall content and presentation of the display board. At the instructor's discretion, students will contribute to the assessment process by providing a brief evaluation of the performance of the other members of their group.

Unit VIII—Animal Feeding
Instructor Guide

The instructor should assign the performance-based assessment activity at the beginning of the unit. Students will work toward completing the activity as they progress through the unit lessons. The assessment activity will be due at the completion of the unit.

1. Divide the class into groups and assign each group one of the types of livestock discussed in the unit—beef cattle, dairy cattle, swine, sheep, horses, and poultry.

2. Have each group develop a display board that explains the feeding options available for its assigned type of livestock.

3. Have students incorporate appropriate visuals into their display board, such as drawings or other illustrations, as well as written summaries of key information, and other supporting elements as needed to make the display interesting and informative. Indicate to students what kinds of supporting elements are acceptable or preferred.

4. There are study questions in Lesson 2 of this unit that address the feeding options for each type of livestock. Have students use the class discussion of their livestock's feeding options as the basis of their display board.

5. Exhibit completed display boards in class.

6. Students may use material found in the unit or discussed in class as well as additional outside material to complete their display board.

7. Students may not use the source material word for word and must provide a complete bibliography of their sources along with their display board.

8. If desired, have students contribute to the assessment process by completing a short evaluation of their teammates' performance in developing their display board. A peer evaluation form is included following the scoring guide.
   a. Have students complete the peer evaluation form by following the instructions listed at the top. Students should base their assessment on how much each person contributed to the project.

b. If tasks are divided so that students do only one type of task to contribute to the project, have students adjust their peer evaluation form by disregarding the category that does not apply to a particular teammate. Instead of assessing teammates on two categories worth 0 to 3 points, students will assess teammates on one category worth 0 to 6 points.
c. To determine the final peer evaluation score, add up the scores that a student receives from the other members of the group and divide the total by the number of scores received. The maximum number of points possible for each student is 6.

9. The final assessment score will be based on the overall content and presentation of the display board and final peer evaluation score.

Unit VIII—Animal Feeding
Student Handout

1. The instructor will divide the class into groups and assign each group one type of livestock discussed in the unit.

2. Develop a display board that explains the feeding options available for your assigned type of livestock. Completed display boards will be exhibited in class.

3. Incorporate appropriate visuals into your display board, such as drawings or other illustrations, as well as written summaries of key information, and other supporting elements indicated by your instructor.

4. Use the class discussion of your livestock's feeding options as the basis of your display board.

5. You may also use additional outside material to complete your display board.

6. You may not use the source material word for word and must provide the instructor with a complete bibliography of your sources along with your display board.

7. If requested, you will contribute to the assessment process by completing a short evaluation of your teammates' performance in developing the project.
   a. Once your display board has been set up in class, fill out the peer evaluation score sheet.
   b. Give the completed score sheet to your instructor.

8. Your final assessment score will be based on the overall content and presentation of your display board and your final peer evaluation score.

Advanced Livestock Production and Management

Unit VIII—Animal Feeding
Scoring Guide

Name _____

Assessment Area	Criteria	0 Points	1 Point	2 Points	3 Points	4 Points	Weight	Total
Information and Content of Display Board	Addresses all key topics; information is complete; facts are accurate	Failed	Poor	Fair	Good	Excellent	X 16	
Presentation	Well organized; good use of supporting materials	Failed	Poor	Fair	Good	Excellent	X 5	
Technical Considerations	No spelling, grammar, or punctuation errors	Failed	Poor	Fair	Good	Excellent	X 2.5	
Peer Evaluation						6 pts. maximum		
TOTAL								

Final Assessment Total _____**/100 pts.**

Comments:

Unit VIII—Animal Feeding
Peer Evaluation

Name_____

Write your name on the line above. Fill in the names of your teammates in the spaces provided below. For each category listed below, give each teammate a score from 0 to 3 based on his or her contribution to the project. Use the following guide.

- 0—no contribution
- 1—minimal contribution
- 2—average contribution
- 3—excellent contribution

Add the person's score in each category and place the total in the column at the right. Give the completed score sheet to your instructor.

Project development includes tasks such as planning and research. Project completion includes writing, assembling, or presenting the project. If tasks are divided so that you or your teammates do only one type of task to contribute to the project, consult the instructor about how to adjust your evaluation form.

Name of Teammate	Project Development 0-3 Points	Project Completion 0-3 Points	Total (6 Points Max.)

Advanced Livestock Production and Management

Curriculum Guide: *Advanced Livestock Production and Management*

Unit: IX. Herd/Flock Management

Unit Objective:

Students will demonstrate an understanding of livestock management practices by explaining an assigned management practice and demonstrating how it is correctly performed by giving an oral presentation to the class.

Show-Me Standards: 2.1, CA6

References:

Advanced Livestock Production and Management. University of Missouri-Columbia, Instructional Materials Laboratory, 2000.

Agriculture Publications. MU Extension. University of Missouri-Columbia. Accessed May 13, 2003, from http://muextension.missouri.edu/explore/agguides/.

Students may use additional outside sources to complete this activity.

Instructional Strategies/Activities:

- Students will engage in study questions in lessons 1 through 10.
- Students will complete AS 2.1, Planning for Replacement Stock; AS 3.1, Developing a Beef Breeding Herd Management Plan; AS 5.2, Ear Notching; AS 6.1, Developing a Swine Management Record System; AS 7.1, Developing a Management Calendar; AS 8.1, Management Activities for Breeding Stock; AS 9.1, Management Activities for Horses; and AS 10.1, Designing a Poultry Enterprise.
- Additional activities that relate to the unit objective can be found under the heading "Other Activities" in the following locations: p. IX-6 (1, 2), p. IX-23 (1, 2), p. IX-33, p. IX-45 (1, 2), p. IX-64, p. IX-85 (1, 2), p. IX-95 (1, 2), p. IX-107, and p. IX-118 (2).

Performance-Based Assessment:

Students will be divided into groups. Each group will explain a management practice discussed in the unit, such as dehorning cattle or docking lambs' tails, and demonstrate how the procedure is correctly performed by giving an oral presentation to the class.

Assessment will be based on the overall content and presentation of the oral report and demonstration. At the instructor's discretion, students will contribute to the assessment process by providing a brief evaluation of the performance of the other members of their group.

Unit IX—Herd/Flock Management
Instructor Guide

The instructor should assign the performance-based assessment activity at the beginning of the unit. Students will work toward completing the activity as they progress through the unit lessons. The assessment activity will be due at the completion of the unit.

1. Divide the class into groups and assign each group a management practice discussed in the unit, such as dehorning cattle, docking lambs' tails, ear-notching pigs, halter-training foals, or trimming the beaks of chicks.
   a. Select an activity for each type of livestock discussed in the unit.
   b. Assign additional activities for some types of livestock as needed, depending on the size of the class.

2. Have each group explain how its assigned management practice is correctly performed by giving an oral report and demonstration of the procedure. As part of their report, students should explain the following:
   - ❑ Tools and materials needed for the procedure
   - ❑ Why the procedure is performed
   - ❑ When it should be performed
   - ❑ How it is done

3. As part of their demonstration, students should include appropriate visual elements, such as examples or pictures of the tools and materials needed for the procedure or illustrations of how the procedure is correctly performed. Indicate to students what demonstration activities are acceptable or preferred. Sample demonstration activities are listed below.
   a. Students could pass the equipment around to classmates.
   b. Students could develop a class-participation activity that simulates the activity, such as giving students cardboard or paper pigs' ears to notch.
   c. Students could perform the procedure on live animals, if appropriate. Students should consult the instructor prior to any activity involving live animals and should only perform activities the instructor determines are suitable and safe. Demonstrations involving live animals should only be performed by qualified individuals with the permission and supervision of the instructor.

4. Students should be prepared to answer questions regarding their presentation.

5. Guide or correct the students' presentations, if needed.

6. Students may use material found in the unit or discussed in class as well as additional outside material to complete their presentations.
   a. Students may not use the source material word for word and must provide a complete bibliography of their sources, including sources of illustrations.
   b. Students should make use of presentation software or other equipment or materials as needed to make the presentation interesting and informative.

7. If desired, have students contribute to the assessment process by completing a short evaluation of their teammates' performance in developing their report. A peer evaluation form is included following the scoring guide.
   a. Have students complete the peer evaluation form by following the instructions listed at the top. Students should base their assessment on how much each person contributed to the project.
   b. If tasks are divided so that students do only one type of task to contribute to the project, have students adjust their peer evaluation form by disregarding the category that does not apply to a particular teammate. Instead of assessing teammates on two categories worth 0 to 3 points, students will assess teammates on one category worth 0 to 6 points.
   c. To determine the final peer evaluation score, add up the scores that a student receives from the other members of the group and divide the total by the number of scores received. The maximum number of points possible for each student is 6.

8. The final assessment score will be based on the overall content and presentation of the demonstration and final peer evaluation score.

Unit IX—Herd/Flock Management
Student Handout

1. The instructor will divide the class into groups and assign each group a livestock management practice discussed in the unit.

2. Explain how your assigned procedure is correctly performed by presenting an oral report and demonstration to the class. As part of your report, be sure to explain the following:
   - ❑ Tools and materials needed for the procedure
   - ❑ Why the procedure is performed
   - ❑ When it should be performed
   - ❑ How it is done

3. Include appropriate visual elements in your demonstration, such as examples or pictures of the tools and materials used for the procedure or illustrations of how the procedure is correctly performed.

4. You may use material found in the unit or discussed in class as well as additional outside material to complete your report and demonstration.
   a. You may not use the source material word for word and must provide the instructor with a complete bibliography of your sources, including sources of illustrations.
   b. You should make use of presentation software or other equipment or materials as needed to make the report and demonstration interesting and informative.

5. Be prepared to answer questions from your instructor and classmates regarding your presentation.

6. If requested, you will contribute to the assessment process by completing a short evaluation of your teammates' performance in developing the presentation.
   a. Following the report and demonstration, fill out the peer evaluation score sheet.
   b. Give the completed score sheet to your instructor.

7. Your final assessment score will be based on the overall content and delivery of your report and demonstration and your final peer evaluation score.

Advanced Livestock Production and Management

Unit IX—Herd/Flock Management
Scoring Guide

Name _____

Assessment Area	Criteria	0 Points	1 Point	2 Points	3 Points	4 Points	Weight	Total
Information and Content	❑ Information is complete ❑ Facts are accurate ❑ Supporting materials emphasize and clarify key points ❑ Well organized ❑ Answers questions from the instructor or students correctly	0 criteria met	1-2 criteria met	3 criteria met	4 criteria met	All 5 criteria met	X 18	
Delivery of Presentation	❑ Holds audience interest ❑ Speaks clearly and uses correct grammar ❑ Maintains good posture and eye contact ❑ Needs little or no prompting from the instructor	0 criteria met	1 criterion met	2 criteria met	3 criteria met	All 4 criteria met	X 5.5	
Peer Evaluation						6 pts. maximum		
TOTAL								

Final Assessment Total _____**/100 pts.**

Comments:

Unit IX—Herd/Flock Management
Peer Evaluation

Name_____

Write your name on the line above. Fill in the names of your teammates in the spaces provided below. For each category listed below, give each teammate a score from 0 to 3 based on his or her contribution to the project. Use the following guide.

- 0—no contribution
- 1—minimal contribution
- 2—average contribution
- 3—excellent contribution

Add the person's score in each category and place the total in the column at the right. Give the completed score sheet to your instructor.

Project development includes tasks such as planning and research. Project completion includes writing, assembling, or presenting the project. If tasks are divided so that you or your teammates do only one type of task to contribute to the project, consult the instructor about how to adjust your evaluation form.

Name of Teammate	Project Development 0-3 Points	Project Completion 0-3 Points	Total (6 Points Max.)

Advanced Livestock Production and Management

Curriculum Guide: *Advanced Livestock Production and Management*

Unit: X. Marketing

Unit Objective:

Students will demonstrate an understanding of market planning principles by developing marketing plans for two different types of livestock and explaining the anticipated similarities and differences between the two plans in a written report.

Show-Me Standards: 1.2, CA4

Reference:

Advanced Livestock Production and Management. University of Missouri-Columbia, Instructional Materials Laboratory, 2000.

Students may use additional outside sources to complete this activity.

Instructional Strategies/Activities:

- Students will engage in study questions in lesson 1.
- Students will complete AS.1.1, Developing a Marketing Plan for a Livestock Enterprise; and AS 1.2, Analyzing a Stocker Cattle Operation.
- Additional activities that relate to the unit objective can be found under the heading "Other Activities" in the following location: p. X-9 (1, 2, 5).

Performance-Based Assessment:

Students will complete AS 1.1, Developing a Marketing Plan for a Livestock Enterprise, as part of the instructional activities of the unit. For the performance-based assessment, they will develop a marketing plan for a second type of livestock and compare the two by explaining anticipated similarities and differences in marketing methods, factors affecting enterprise selection, time of year for implementing the plan, and expected results. Students will present their work in a written report.

Assessment will be based on the overall content and presentation of the report.

Unit X—Marketing
Instructor Guide

The instructor should assign the performance-based assessment activity at the beginning of the unit. Students will work toward completing the activity as they progress through the unit lessons. The assessment activity will be due at the completion of the unit.

1. As part of the instructional activities for the unit, have students complete AS 1.1, Developing a Marketing Plan for a Livestock Enterprise, for one type of livestock.

2. For the performance-based assessment, have students use the activity sheet to develop a marketing plan for a second type of livestock and compare the two in a written report.

3. Have students use the questions from the activity sheet to form the outline of their report. Students should explain anticipated similarities and differences in the following:
   - ❑ Marketing methods
   - ❑ Factors affecting enterprise selection
   - ❑ Time of year for implementing the plan
   - ❑ Price you expect to receive

4. Students may use material found in the unit or discussed in class as well as additional outside material to complete their report.
   a. Students may not use the source material word for word and must provide a complete bibliography of their sources along with their report.
   b. Students should make use of presentation software or other equipment or material as needed to make the report interesting and informative.

5. The final assessment score will be based on the overall content and presentation of the report.

Unit X—Marketing
Student Handout

1. Develop a marketing plan for two different types of livestock discussed in the unit. Fill out two copies of AS 1.1, one for each type of livestock.

2. Compare the two marketing plans in a written report.

3. Use the questions from the activity sheet to form the outline of your report. Explain anticipated similarities and differences in the following:
   - ❑ Marketing methods
   - ❑ Factors affecting enterprise selection
   - ❑ Time of year for implementing the plan
   - ❑ Price you expect to receive

4. You may use material found in the unit or discussed in class as well as additional outside material to complete your report.
   a. You may not use the source material word for word and must provide the instructor with a complete bibliography of your sources, including any interviews.
   b. You should make use of presentation software or other equipment or material as needed to make the report interesting and informative.

5. Your final assessment score will be based on the overall content and presentation of your report.

Advanced Livestock Production and Management

Unit X—Marketing
Scoring Guide

Name _____

Assessment Area	Criteria	0 Points	1 Point	2 Points	3 Points	4 Points	Weight	Total
Thoroughness	Addresses marketing methods, selection factors, time of implementation, and expected price for both enterprises	Failed	Poor	Fair	Good	Excellent	X 8.75	
Accuracy	Comparisons are accurate based on information presented	Failed	Poor	Fair	Good	Excellent	X 8.75	
Organization	Well organized	Failed	Poor	Fair	Good	Excellent	X 5	
Presentation	Spelling, grammar, and punctuation are correct	Failed	Poor	Fair	Good	Excellent	X 2.5	
TOTAL								

Final Assessment Total _____**/100 pts.**

Comments: