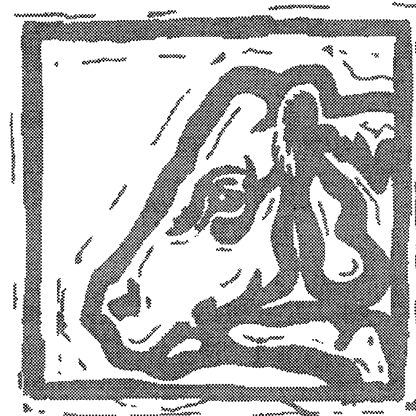


Animal SCIENCE



In cooperation with Agricultural Education
Department of Practical Arts and
Vocational-Technical Education
College of Education and
College of Agriculture, Food and Natural Resources
University of Missouri - Columbia



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



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ANIMAL SCIENCE

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FOREWORD

Development of this *Animal Science* unit is the result of MVATA Teaching Aids Committee suggestions. The unit was developed to enhance curriculum for 11th and 12th grade agriculture students. Depending on local need, an Animal Science course could replace traditional advanced production course(s).

This instructor guide and the corresponding student reference contain 30 lessons grouped into four units: Nutrition, Genetics, Reproduction, and Animal Health. Transparency masters and activity sheets have been included where appropriate. Check the Table of Contents for a detailed listing of lessons. Additional student reference copies can be purchased separately.

In an effort to provide challenging test questions that reduce guesswork, multiple-choice questions with multiple answers have been included in some of the lesson evaluations. When scoring this type of question, each possible response can be worth one point. Of course, it is the teacher's option to increase the weight of a question, if desired.

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 component parts 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.

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TABLE OF CONTENTS

ACKNOWLEDGMENTS	ii
FOREWORD	iii
OBJECTIVES	vi
COMPETENCIES	vii
REFERENCES AND MATERIALS	viii
CROSS-REFERENCE TABLE	xii
SUGGESTED TEACHING CALENDAR	xiv
COMPETENCY PROFILE	xv

Unit I - Nutrition

Lesson 1 - Importance of Animal Nutrition to Agriculture	I-1
TM 1.1: Example Feed Tag	
Lesson 2 - Livestock Digestive Systems	I-11
TM 2.1: Comparison of Digestive System Parts	
TM 2.2: Digestive System Parts of a Ruminant	
TM 2.3: Digestive System Parts of a Nonruminant	
TM 2.4: Digestive System Parts of an Avian	
Lesson 3 - Energy's Role in Livestock Nutrition	I-33
Lesson 4 - Protein's Role in Animal Nutrition	I-43
TM 4.1: Protein Utilization in the Ruminant	
TM 4.2: Barrel Stave Illustration of the Effect of Limiting Amino Acid Supplementation on Milk Production	
Lesson 5 - Minerals' Role in Animal Nutrition	I-57
Lesson 6 - Vitamins' Role in Animal Nutrition	I-71
Lesson 7 - Water's Role in Animal Nutrition	I-83
Lesson 8 - Environmental Effects on Nutrition	I-91
Lesson 9 - Formulating and Balancing Rations	I-101
AS 9.1: Formulating Rations	

Unit II - Genetics

Lesson 1 - Importance of Genetics in Agriculture	II-1
AS 1.1: Heritability Traits	
AS 1.2: Beef Herd Selection	
Lesson 2 - Basic Building Blocks of Genetics	II-15
Lesson 3 - Animal Cell Division	II-25
TM 3.1: Phases of Mitosis	
TM 3.2: Stages of Meiosis	
Lesson 4 - Basic Principles of Genetics	II-37
TM 4.1: Punnett Square Examples	
Lesson 5 - Tools for Genetic Improvement of Beef	II-47
Lesson 6 - Selection Tools for Genetic Improvement of Dairy Cattle	II-57
TM 6.1: Dairy Cow Pedigree	

Lesson 7 - Tools for Genetic Improvement of Sheep	II-67
AS 7.1: Analyzing Performance Data	
Lesson 8 - Selection Tools for Genetic Improvement of Swine	II-79

Unit III - Reproduction

Lesson 1 - Importance of Reproduction in Livestock	III-1
TM 1.1: Comparison of Male Livestock	
TM 1.2: Parts of a Cow's Reproductive Tract (Cut-Away View)	
Lesson 2 - Reproductive Hormones	III-15
Lesson 3 - Reproductive Cycles of Common Livestock	III-21
AS 3.1: Reproductive Functions of Livestock	
Lesson 4 - Fetal Developmental Stages	III-33
Lesson 5 - Effects of the Environment on Reproduction	III-43
Lesson 6 - Management and Technology in Reproduction	III-51

Unit IV - Animal Health

Lesson 1 - Importance of Animal Health	IV-1
Lesson 2 - Immune System of Livestock	IV-11
Lesson 3 - Respiratory Diseases Affecting Livestock	IV-19
AS 3.1: Respiratory Diseases	
Lesson 4 - Diseases of the Gastrointestinal Tract	IV-35
Lesson 5 - Reproductive Diseases in Livestock	IV-49
Lesson 6 - External and Internal Parasites	IV-59
Lesson 7 - Quality Assurance Programs	IV-73

OBJECTIVES

Unit I - Nutrition

1. The student will be able to identify the importance of nutrition in livestock.
2. The student will be able to compare and contrast the different digestive systems in livestock.
3. The student will be able to describe the function of energy in livestock nutrition.
4. The student will be able to describe the function of protein in animal nutrition.
5. The student will be able to describe the function of minerals in animal nutrition.
6. The student will be able to describe the function of vitamins in livestock nutrition.
7. The student will be able to understand the function of water in animal nutrition.
8. The student will be able to determine the environmental effects on animal nutrition.
9. The student will be able to formulate a ration for livestock at the teacher's discretion.

Unit II - Genetics

1. The student will be able to describe the importance of an animal's genetic makeup and its effect on agriculture.
2. The student will be able to describe and identify basic building blocks of animal genetics.
3. The student will be able to describe and understand the process of animal cell division.
4. The student will be able to explain and apply the basic principles of genetics.
5. The student will be able to describe the use of selection tools for genetic improvement of the beef herd.
6. The student will be able to use various selection tools and develop a plan to genetically improve dairy cattle.
7. The student will be able to use selection tools for genetic improvement of the sheep flock.
8. The student will be able to describe and choose selection tools to improve a swine operation genetically.

Unit III - Reproduction

1. The student will be able to identify the importance of reproduction in livestock production.
2. The student will be able to describe the hormonal systems in livestock production.
3. The student will be able to understand and describe the reproductive cycles of common production livestock.
4. The student will be able to sequence the fetal development stages of livestock.
5. The student will be able to identify the effects of the environment on the reproductive cycle of breeding stock.
6. The student will be able to describe management and technology utilization to affect the reproductive cycle of livestock.

Unit IV - Animal Health

1. The student will be able to understand the significance of animal health in livestock.
2. The student will be able to describe aspects of the immune system of livestock.
3. The student will be able to understand and describe the diseases of the respiratory system affecting livestock.
4. The student will be able to describe the diseases of the GI tract in livestock.
5. The student will be able to understand and describe the diseases of the reproductive system in livestock.
6. The student will be able to describe the external and internal parasites of livestock and poultry.
7. The student will be able to understand and describe animal health quality assurance programs.

COMPETENCIES

Unit I - Nutrition

1. Identify the importance of nutrition to agriculture
2. Compare and contrast the digestive systems of livestock
3. Describe energy's role in nutrition
4. Describe protein's role in nutrition
5. Describe minerals' role in nutrition
6. Describe vitamins' role in nutrition
7. Describe the role of water in nutrition
8. Describe environmental effects on nutrition
9. Formulate a ration for different classes of livestock

Unit II - Genetics

1. Describe the importance of genetics on agriculture
2. Describe the basic building blocks of genetics
3. Describe animal cell division
4. Describe basic principles of genetics
5. Describe selection tools for genetic improvement of beef
6. Describe selection tools for genetic improvement of dairy herds
7. Describe selection tools for genetic improvement of sheep
8. Describe selection tools for genetic improvement of swine

Unit III - Reproduction

1. Identify the importance of reproduction in livestock production
2. Describe the hormonal system in livestock reproduction
3. Describe the reproductive cycle of common production livestock
4. Sequence the fetal developmental stages of livestock
5. Describe the effects of the environment on the reproductive cycle
6. Describe how management and technology are utilized to affect the reproductive cycle

Unit IV - Animal Health

1. Identify the importance of animal health in livestock
2. Describe aspects of the immune system of domestic livestock
3. Describe the diseases of the respiratory system affecting livestock
4. Describe the diseases of the gastrointestinal tract in livestock
5. Describe the diseases of the reproductive system in livestock
6. Describe the major external and internal parasites of livestock
7. Describe animal health quality assurance programs

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 - 3) *Profit by Using EPDs* (14 minutes, AG video 147)
 - 4) *Cattle Breed Identification: Dairy* (21 minutes, AG video 220)
 - 5) *Beef Reproduction II* (43 minutes, AG video 7)
 - 6) *Embryo Transfer of Beef and Dairy Cattle* (13 minutes, AG video 177)

- 7) *Artificial Insemination of Beef and Dairy Cattle* (10 minutes, AG video 178)
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- Also included on this disc are the University Extension Directory for the University of Missouri System and the MU Center for Independent Study Course Catalog.
- Minimum computer requirements are: IBM-compatible machine with 80386 or better processor, ISO 9660 compatible CD-ROM drive, Microsoft Windows 3.1, 4 megabytes of RAM, and at least 4 MB free space on the hard drive.
- For the special academic price, call 800/292-0969 or write to Extension Publications, 2800 Maguire, University of Missouri, Columbia, MO 65211. E-mail can be sent to xplor@ext.missouri.edu.
- 6) The Agricultural Electronic Bulletin Board Service contains a wealth of information. It is available via modem call at 573/882-8289, 9600 baud, protocol N-8-1 or E-7-1.

CROSS-REFERENCE TABLE

Animal Science Competencies	Missouri Core Competencies and Key Skills for Science
Unit I - Nutrition	
1. Identify the importance of nutrition to agriculture	
2. Compare and contrast the digestive systems of livestock	
3. Describe energy's role in nutrition	
4. Describe protein's role in nutrition	
5. Describe minerals' role in nutrition	
6. Describe vitamins' role in nutrition	
7. Describe the role of water in nutrition	
8. Describe environmental effects on nutrition	
9. Formulate a ration for different classes of livestock	
Unit II - Genetics	
1. Describe the importance of genetics on agriculture	10C-1: Predict the phenotypic and genotypic ratios of the offspring of a dihybrid cross using a Punnett square 10C-4: Associate the roles of genetic variation and natural selection with change in organisms over time
2. Describe the basic building blocks of genetics	10B-1: Describe the functions of the organelles of a cell (cell wall, cell membrane, nucleus, ribosome, mitochondrion, chloroplastid, vacuole) 10B-3: Describe the structure and function of DNA 10D-8: Compare and contrast photosynthesis and cellular respiration
3. Describe animal cell division	10A-2: Distinguish between mitosis and meiosis 10B-1: Describe the functions of the organelles of a cell (cell wall, cell membrane, nucleus, ribosome, mitochondrion, chloroplastid, vacuole)
4. Describe basic principles of genetics	10C-1: Predict the phenotypic and genotypic ratios of the offspring of a dihybrid cross using a Punnett square 10C-4: Associate the roles of genetic variation and natural selection with change in organisms over time 10D-9: Analyze the risks and benefits of genetic engineering to society
5. Describe selection tools for genetic improvement of beef	
6. Describe selection tools for genetic improvement of dairy herds	10C-4: Associate the roles of genetic variation and natural selection with change in organisms over time 10D-9: Analyze the risks and benefits of genetic engineering to society

Animal Science Competencies	Missouri Core Competencies and Key Skills for Science
7. Describe selection tools for genetic improvement of sheep	
8. Describe selection tools for genetic improvement of swine	10C-4: Associate the roles of genetic variation and natural selection with change in organisms over time 10D-9: Analyze the risks and benefits of genetic engineering to society
Unit III - Reproduction	
1. Identify the importance of reproduction in livestock production	10B-4: Describe the structure and function of human reproductive organs
2. Describe the hormonal system in livestock reproduction	
3. Describe the reproductive cycle of common production livestock	10A-2: Distinguish between mitosis and meiosis 10B-4: Describe the structure and function of (human) reproductive organs
4. Sequence the fetal developmental stages of livestock	10B-4: Describe the structure and function of (human) reproductive organs 10C-7: Sequence the developmental stages of the (human) fetus
5. Describe the effects of the environment on the reproductive cycle	10A-7: Describe the significance of the light and dark phases of photosynthesis
6. Describe how management and technology are utilized to affect the reproductive cycle	10C-4: Associate the roles of genetic variation and natural selection with change in organisms over time
Unit IV - Animal Health	
1. Identify the importance of animal health in livestock	
2. Describe aspects of the immune system of domestic livestock	10C-2: Hypothesize how genetic resistance develops from continued exposure to pesticides or antibiotics
3. Describe the diseases of the respiratory system affecting livestock	
4. Describe the diseases of the gastrointestinal tract in livestock	10B-5: Associate common human diseases with organs affected
5. Describe the diseases of the reproductive system in livestock	
6. Describe the major external and internal parasites of livestock	10A-6: Classify species associations into types of symbiosis: commensalism, mutualism, and parasitism
7. Describe animal health quality assurance programs	

SUGGESTED TEACHING CALENDAR
(in days, one period per day)

	DAYS
Unit I - Nutrition	50
1. Importance of Nutrition to Agriculture	5
2. Livestock Digestive Systems	7
3. Energy's Role in Livestock Nutrition	7
4. Protein's Role in Animal Nutrition	7
5. Minerals' Role in Animal Nutrition	4
6. Vitamins' Role in Animal Nutrition	5
7. Water's Role in Animal Nutrition	5
8. Environmental Effects on Nutrition	5
9. Formulating and Balancing Rations	5
Unit II - Genetics	40
1. Importance of Genetics in Agriculture	4
2. Basic Building Blocks of Genetics	7
3. Animal Cell Division	5
4. Basic Principles of Genetics	8
5. Tools for Genetic Improvement of Beef	4
6. Selection Tools for Genetic Improvement of Dairy Cattle	4
7. Tools for Genetic Improvement of Sheep	4
8. Selection Tools for Genetic Improvement of Swine	4
Unit III - Reproduction	30
1. Importance of Reproduction in Livestock	6
2. Reproductive Hormones	5
3. Reproductive Cycles of Common Livestock	4
4. Fetal Developmental Stages	4
5. Effects of the Environment on Reproduction	5
6. Management and Technology Effects in Reproduction	6
Unit IV - Animal Health	50
1. Importance of Animal Health	7
2. Immune System of Livestock	7
3. Respiratory Diseases Affecting Livestock	7
4. Diseases of the Gastrointestinal Tract	7
5. Reproductive Diseases in Livestock	7
6. External and Internal Parasites	7
7. Quality Assurance Programs	8

ANIMAL SCIENCE 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. Nutrition

1. Identify the importance of nutrition to agriculture (A001)
2. Compare and contrast the digestive systems of livestock (A002)
3. Describe energy's role in nutrition (A003)
4. Describe protein's role in nutrition (A004)
5. Describe minerals' role in nutrition (A005)
6. Describe vitamins' role in nutrition (A006)
7. Describe the role of water in nutrition (A007)
8. Describe environmental effects on nutrition (A008)
9. Formulate a ration for different classes of livestock (A009)

3	2	1	N

B. Genetics

1. Describe the importance of genetics on agriculture (B001)
2. Describe the basic building blocks of genetics (B002)
3. Describe animal cell division (B003)
4. Describe basic principles of genetics (B004)
5. Describe selection tools for genetic improvement of beef (B005)
6. Describe selection tools for genetic improvement of dairy herds (B006)
7. Describe selection tools for genetic improvement of sheep (B007)
8. Describe selection tools for genetic improvement of swine (B008)

3	2	1	N

C. Reproduction

1. Identify the importance of reproduction in livestock production (C001)
2. Describe the hormonal system in livestock reproduction (C002)
3. Describe the reproductive cycle of common production livestock (C003)
4. Sequence the fetal developmental stages of livestock (C004)
5. Describe the effects of the environment on the reproductive cycle (C005)
6. Describe how management and technology are utilized to affect the reproductive cycle (C006)

3	2	1	N

D. Animal Health

1. Identify the importance of animal health in livestock (D001)
2. Describe aspects of the immune system of domestic livestock (D002)
3. Describe the diseases of the respiratory system affecting livestock (D003)
4. Describe the diseases of the gastrointestinal tract in livestock (D004)
5. Describe the diseases of the reproductive system in livestock (D005)
6. Describe the major external and internal parasites of livestock (D006)
7. Describe animal health quality assurance programs (D007)

										Animal Science Class/Section:
Students:										
										A. Nutrition
										1. Identify the importance of nutrition to agriculture (A001)
										2. Compare and contrast the digestive systems of livestock (A002)
										3. Describe energy's role in nutrition (A003)
										4. Describe protein's role in nutrition (A004)
										5. Describe minerals' role in nutrition (A005)
										6. Describe vitamins' role in nutrition (A006)
										7. Describe the role of water in nutrition (A007)
										8. Describe environmental effects on nutrition (A008)
										9. Formulate a ration for different classes of livestock (A009)

										B. Genetics
										1. Describe the importance of genetics on agriculture (B001)
										2. Describe the basic building blocks of genetics (B002)
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										6. Describe selection tools for genetic improvement of dairy herds (B006)
										7. Describe selection tools for genetic improvement of sheep (B007)
										8. Describe selection tools for genetic improvement of swine (B008)

										Animal Science (continued) Class/Section:
Students:										
										C. Reproduction
										1. Identify the importance of reproduction in livestock production (C001)
										2. Describe the hormonal system in livestock reproduction (C002)
										3. Describe the reproductive cycle of common production livestock (C003)
										4. Sequence the fetal developmental stages of livestock (C004)
										5. Describe the effects of the environment on the reproductive cycle (C005)
										6. Describe how management and technology are utilized to affect the reproductive cycle (C006)
										D. Animal Health
										1. Identify the importance of animal health in livestock (D001)
										2. Describe aspects of the immune system of domestic livestock (D002)
										3. Describe the diseases of the respiratory system affecting livestock (D003)
										4. Describe the diseases of the gastrointestinal tract in livestock (D004)
										5. Describe the diseases of the reproductive system in livestock (D005)
										6. Describe the major external and internal parasites of livestock (D006)
										7. Describe animal health quality assurance programs (D007)

