

Course	Agricultural Science I
Unit	Introduction to Poultry Production
Lesson	Overview of the Poultry Industry
Estimated Time	50 minutes

Student Outcome


Describe the importance of the poultry industry in Missouri.

Learning Objectives

1. Define terms used in the poultry industry.
2. Explain the economic importance of Missouri's poultry industry.
3. Explain how the poultry industry has evolved.
4. Identify the common breeds and production lines of poultry.
5. Identify the types of poultry enterprises.
6. Identify career opportunities available in the poultry industry.

Grade Level Expectations

Resources, Supplies & Equipment, and Supplemental Information

1. Activity Sheets
 -  AS 1 – Identify Poultry Class Traits
2. *Introduction to Poultry Production (Student Reference)*. University of Missouri-Columbia: Instructional Materials Laboratory, 1999.
3. *Introduction to Poultry Production Curriculum Enhancement*. University of Missouri-Columbia: Instructional Materials Laboratory, 2003.

Supplies & Equipment

- Various poultry products or poultry product packages, such as a carton of eggs, luncheon meat, a whole chicken, etc.

Supplemental Information

1. Internet Sites
 - The American Poultry Association. Accessed August 16, 2007, from <http://www.amerpoultryassn.com/>.
 - "Links in Show Poultry: Clubs." The Poultry Connection. Accessed August 16, 2007, from http://www.poultryconnection.com/links/Show_Poultry/Clubs/.
 - Clark, Edward. "Major Changes in Global Egg Production." WATTPoultry.com. Accessed August 16, 2007, from <http://www.wattpoultry.com/EggIndustry/Article.aspx?id=15040>.
 - "Small Scale Egg Production (Organic and Nonorganic)." Agricultural Alternatives. Cooperative Extension. The Pennsylvania State University. Accessed August 16, 2007, from http://agalternatives.aers.psu.edu/livestock/small_scale_egg/small_scale_egg.pdf.

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- ❑ "Poultry Publications." MU Extension. University of Missouri-Columbia. Accessed August 16, 2007, from <http://extension.missouri.edu/xplor/agguides/poultry/index.htm>.
2. Print
- ❑ *American Standard of Perfection*. American Poultry Association, Inc. Santa Rosa, CA, 2001.
 - ❑ *Missouri Farm Facts*. Columbia: Missouri Agricultural Statistics Service in cooperation with the Missouri Department of Agriculture and the U.S. Department of Agriculture, 2007.
 - ❑ Field, Thomas G., and Robert E. Taylor. *Scientific Farm Animal Production*. 6th ed. Upper Saddle River, N.J.: Prentice-Hall, Inc. 1998.
 - ❑ Gillespie, James R. *Modern Livestock and Poultry Production*. 5th ed. Albany: Delmar, 1997.
 - ❑ Hall, Michelle A., Ed. *Introduction to Avian Bowl*. Clemson University: Clemson, SC, 1997.
 - ❑ Kelly, Debi. Personal Communication. MO Alternative Center: University Extension. University of Missouri, Columbia. 20 March 1998.
 - ❑ Moreng, Robert E. and John S. Avens. *Poultry Science and Production*. Prospect Heights, IL: Waveland Press, 1991.
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Interest Approach

Set out a dozen eggs, a package of turkey meat, a whole chicken and other poultry products (empty boxes will work). Ask students what these products have in common. After discussion begins on these being agricultural products, ask students to tell you how important poultry products are to the agricultural industry.

Communicate the Learning Objectives

1. Define terms used in the poultry industry.
2. Explain the economic importance of Missouri's poultry industry.
3. Explain how the poultry industry has evolved.
4. Identify the common breeds and production lines of poultry.
5. Identify the types of poultry enterprises.
6. Identify career opportunities available in the poultry industry.

Instructor Directions	Content Outline
<p>Objective 1</p> <p><i>Ask students what birds they think should be included in the definition of poultry. Record the responses. Discuss the reasons for including these birds in their definition of poultry.</i></p>	<p>Define terms used in the poultry industry.</p> <p>Poultry is defined as economically important birds used either for food or show (includes chickens, turkeys, quail, ducks, geese, and guineas, and to some extent pheasants, partridges and peafowl).</p> <p>Poultry terms</p> <ol style="list-style-type: none">1. Pullet – a young female chicken2. Hen – a sexually mature female chicken (usually more than 10 months old) that has started to lay eggs3. Chick – a baby chicken of either gender4. Broiler or fryer – a young male or female chicken, tender-meated with flexible breastbone cartilage, marketed at 6 to 8 weeks of age5. Roaster – a young male or female chicken, tender-meated with breastbone cartilage somewhat less flexible than a broiler or fryer, usually marketed at 7 to 10 weeks of age6. Capon – a surgically unsexed male chicken (usually under 8 months old) used for specialty markets7. Cockerel – a male chicken less than one year old8. Rooster – a sexually mature male chicken9. Poult – a male or female baby turkey

Objective 2

Using the most recent copy of Missouri Farm Facts, discuss the economic impact the poultry industry has in Missouri and throughout the country. Determine which states produce the most turkey, broilers, hens, and eggs.

Explain the economic importance of Missouri's poultry industry.

1. Turkey production
 - a. Missouri ranks 5th for turkey production at 20 million head or 7.6 percent of total US production.
 - b. 2006 total value of production equals \$236 million.
 2. Broiler production
 - a. Missouri ranks 10th for broiler production at 250 million head or 3.2 percent of total US production.
 - b. 2006 total value of production equals \$403 million.
 3. Egg production
 - a. Missouri ranks 14th for egg production at 1.9 million or 2.1 percent of total U.S. production.
 - b. 2006 total value of production equals \$85 million.
 4. All chickens (except broilers)
 - a. Missouri ranks 16th for chicken production at 9.4 million head or 2.1 percent of total U.S. production.
 - b. 2006 total value of sales equals \$1.6 million.
 5. Poultry and eggs accounted for 27 percent of total livestock cash receipts in Missouri in 2006.
 6. Meat animals accounted for 60 percent of total livestock cash receipts in Missouri in 2006.
 7. Total pounds of broiler meat produced was 1,075,000 pounds in 2006 in Missouri.
 8. Total pounds of turkey meat produced was 589,600 pounds in 2006 in Missouri.
 9. Provides many people with careers in production and marketing.
 10. Manufacturing companies support enterprises with equipment and facilities.
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Objective 3

Discuss the differences between the poultry industry of the past and the large enterprises that exist today. Ask students how many times a week they eat a poultry product and tie this in with the increase in demand from consumers for poultry products.

Explain how the poultry industry has evolved.

1. Early settlers with small backyard flocks were considered small farm enterprises.
2. In the 1800s farmers began to specialize in poultry production; poultry shows began in the 1850s.
3. The American Poultry Association was founded in 1873. The publication of *American Standards of Perfection* was created in 1874 to establish standards for showing birds.
4. Highly specialized industry with the southeastern and midwestern part of the U.S. being the overall largest producers of poultry.
5. Major types of poultry enterprises
 - a. Egg production
 1. Number of laying hen farms has decreased, but the size of farms and flocks has grown significantly.
 2. Decrease in total number of laying hens, but egg production has been steady due to an increased rate-of-lay per hen.
 3. Decrease in egg consumption per person due to alternative breakfast foods and problems with cholesterol.
 - b. Broiler production and turkey production
 1. Broiler and turkey sales have skyrocketed since the late 1960s.
 2. Increase in consumption due to processing into other products and the small amount of cholesterol found in broilers and turkeys.
 - c. Replacement pullets, broiler chicks, and poults
 1. Broiler chicks and poult production facilities are typically located close to production facility.
 2. Breeder flocks are somewhat isolated from production farms.
 3. Hatcheries incubate fertilized eggs, hatch, and deliver chicks and poults.
 4. Some hatcheries provide vaccinations, egg injections, and beak trimming.
 5. Pullets and turkeys are sexed at the hatchery.

Objective 4


Review common poultry terms used when referring to breeds and production lines. Acquaint the students with common breeds and strains of poultry used for egg-laying, broilers, and turkeys. Point out which breeds and strains produce white eggs and which produce brown eggs.

AS 1 - Identify Poultry Class Traits

Identify the common breeds and production lines of poultry.

1. Poultry is divided into breeds, varieties, types and classes.
 - a. Breed - group of birds that share the same characteristics and have a common origin.
 - b. Variety - a subdivision of a breed that is based on a group of specific traits, such as color or comb shape.
 - c. Type - describes the purpose for which the bird is used, egg-type or meat-type.
 - d. Class - associates the bird with its place of origin; the general classes are Mediterranean, American, English, and Asiatic.
2. Strains are families or breeding populations possessing common traits.
 - a. Strain shows relationship more exacting than for others of similar appearance.
 - b. Strain crossing refers to crossing of different strains of the same variety.
 - c. Many commercial strains exist: Cobb, Hubbard, DeKalb, Hyline, Babcock, and Shaver.
3. *American Standard of Perfection* lists more than 300 different breeds and varieties.
4. Most breeds of poultry are the product of cross mating, crossbreeding, or inbreeding.
 - a. Cross mating involves mating birds within the same breed.
 - b. Crossbreeding is mating birds of different breeds or varieties.
 - c. Inbreeding is mating birds that are closely related to get specific traits.
5. Common egg producing breeds
 - a. The common white, egg-layer hen is Single Comb White Leghorn.
 - b. Smaller flock owners raise dual-purpose brown egg-producing strains.
6. Broilers
 - a. Most common meat producer is a cross between the male Cornish (English class) and the female White Plymouth Rock (American class).
 - b. This cross has a low rate of egg production but it is efficient in meat production.

	<ol style="list-style-type: none"> 7. Strains of turkeys <ol style="list-style-type: none"> a. Typically referred to as their strain name rather than their variety name. b. Common commercial strains are Broad-Breasted Large White, Beltsville Small White, Nicholas, and British United Turkey (BUT).
<p>Objective 5</p> <p><i>Ask students how many birds they would need to raise to be considered a commercial enterprise. What type of enterprise would they be, if they have birds, but are not considered a commercial enterprise?</i></p>	<p>Identify the types of poultry enterprises.</p> <ol style="list-style-type: none"> 1. Commercial enterprises <ol style="list-style-type: none"> a. The three types are egg production, broiler or turkey production, and pullets and poults raised for replacement. b. Vertical integration means that one enterprise owns and controls more than one type of production operation. <ol style="list-style-type: none"> 1. Run by poultry processors or manufacturers who are in charge of most management decisions and problem solving. 2. Almost all meat production and 50 percent of egg production are under this system. 3. Most products are sold under a brand name, such as Tyson, Holly Farms, Cargill, or Con-Agra. c. Commercial broiler fowl, laying hens, and turkeys are produced by genetic companies that own breeding fowl. <ol style="list-style-type: none"> 1. Incubate and hatch layer and broiler chicks. 2. Provide producers with the bird, vaccinations, feeding, lighting, and pullet-growing program. 3. Veterinary and technical field services provided by company. d. Laying hen facilities raise birds in quantities of 100,000 or more. <ol style="list-style-type: none"> 1. Raise hens in cages in environmentally controlled housing. 2. Specific lighting, ventilation, feeding programs, and automated egg collection. 2. Backyard enterprises raise their own birds for eggs and meat. <ol style="list-style-type: none"> a. Requires minimal amount of space and provides fresh eggs and meat.

	<ul style="list-style-type: none"> b. Popular dual-purpose breeds are Rhode Island Red, Plymouth Rock, New Hampshire, Wyandotte, and Orpington. <ol style="list-style-type: none"> 3. Niche market enterprises produce eggs and meat using alternative or organic methods. <ul style="list-style-type: none"> a. Organic refers to products produced free of synthetic chemicals and drugs. b. Standards exist but vary from state to state. c. The USDA Agricultural Marketing Service developed the National Organic Program.
<p>Objective 6</p> <p><i>Ask students to identify different employment opportunities based on what they have already learned about the poultry industry. List these careers.</i></p>	<p>Identify career opportunities available in the poultry industry.</p> <ol style="list-style-type: none"> 1. The poultry industry provides careers from marketing to research. 2. Industry has grown dramatically and systems have become very specialized. 3. Developing technology and research creates employment opportunities and many specialized jobs. 4. Occupations that require training and/or certification are chick sexer, artificial insemination technician, blood tester, and sanitation worker. 5. Occupations that require a college degree are poultry breeding, field service personnel, waste systems manager, personnel officer, and accountant. 6. Occupations that require an advanced degree are poultry scientist, geneticist, and veterinarian.
<p>Application</p> <p> AS 1 – Identify Poultry Class Traits</p>	<p>Answers to AS 1</p> <p>Suggested references used for this activity sheet include: <i>American Standard of Perfection</i> and <i>Introduction to Avian Bow</i>.</p> <p>Class – American</p> <ol style="list-style-type: none"> 1. Color of Skin – Yellow 2. Color of Ear Lobe – Red 3. Feathered Shanks – No 4. Egg Color – Brown <p>Class – Asiatic</p> <ol style="list-style-type: none"> 1. Color of Skin – White and Yellow 2. Color of Ear Lobe – Red 3. Feathered Shanks – Yes 4. Egg Color – Brown <p>Class – English</p> <ol style="list-style-type: none"> 1. Color of Skin – White and Yellow

	<ol style="list-style-type: none"> 2. Color of Ear Lobe - Red 3. Feathered Shanks - No 4. Egg Color - Brown and White <p>Class - Mediterranean</p> <ol style="list-style-type: none"> 1. Color of Skin - White and Yellow 2. Color of Ear Lobe - White 3. Feathered Shanks - No 4. Egg Color - White <p>Other Activities</p> <ol style="list-style-type: none"> 1. Have students research different breeds in the <i>American Standard of Perfection</i> and prepare short oral reports that describe breed characteristics and standards. 2. Have students research and construct a timeline of the development of the poultry industry in the United States and Missouri. 3. One designated student can contact a local poultry producer where they can talk with human resource personnel about the range of jobs available. If there is not a poultry plant in the community, contact The Poultry Federation (TPF). Have the student share this information with the class.
Closure/Summary	<p>The poultry industry has changed dramatically in the last 40 years as consumption of meat products has increased and rate-of-lay has improved. Poultry is a group of birds considered economically important (i.e. layers, broilers, and turkeys). The industry is very important to the economy of Missouri. The three different poultry enterprises are commercial, backyard, and niche market. A common breed in the commercial market is the Single Comb White Leghorn for egg production and a cross of the male Cornish with the female White Plymouth Rock for meat production. The common turkey strain used for meat is the Broad Breasted Large White. There are many employment opportunities in the poultry industry, which is another reason why the industry is so important for Missouri.</p>
Evaluation: Quiz	<p>Answers</p> <ol style="list-style-type: none"> 1. g 2. d 3. f 4. c 5. e

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6. a
 7. i
 8. b
 9. j
 10. h
 11. b
 12. c
 13. a
 14. Poultry is any group of birds that are economically important either for food or show.
 15. Cholesterol awareness or further processing
 16. Egg, broiler, turkey, and replacement pullets
 17. Cross mating, crossbreeding, and inbreeding
 18. Broad-breasted Large White, Beltsville Small White, Nicholas, and British United Turkey
 19. This breed has been bred for superior meat production and has very low egg production. Dual breeds are a better choice and any of the following are appropriate: Rhode Island Red, Plymouth Rock, New Hampshire, Wyandotte, or Orpington.
 20. Any three of the following careers: artificial insemination technician, blood tester, sanitation worker, poultry breeding, field service personnel, waste systems manager, personnel officer, accountant, poultry scientist, geneticist, and veterinarian.
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Lesson 1: Overview of the Poultry Industry

Name _____

Identify Poultry Class Traits

Objective: Student will become familiar with the different traits of poultry classes.

Research the different types of classes or breeds to determine the color of skin, color of the ear lobe, whether the shanks have feathers, and the color of the egg produced. The instructor will suggest references for researching this information.

Class	Color of Skin	Color of Ear Lobe	Feathered Shanks	Egg Color
America				
Asiatic				
English				
Mediterranean				

EVALUATION

Match the terms with the definitions.

- | | | |
|----------|--|----------------|
| 1. ____ | A male or female baby turkey. | a. Breed |
| 2. ____ | A chicken marketed for meat at 6 to 8 weeks. | b. Class |
| 3. ____ | A young female chicken. | c. Cockerel |
| 4. ____ | A male chicken less than one year old. | d. Broiler |
| 5. ____ | A sexually mature female chicken that has started to lay eggs. | e. Hen |
| 6. ____ | Group of birds that share same characteristics and have a common origin. | f. Pullet |
| 7. ____ | Describes the purpose for which the bird is used. | g. Poult |
| 8. ____ | Associates the bird with its place of origin. | h. Rate-of-lay |
| 9. ____ | Based on specific traits such as color or comb shape. | i. Type |
| 10. ____ | Total lifetime egg production of a hen. | j. Variety |

Circle the letter that corresponds to the best answer.

11. Missouri ranks 5th in the United States for production of
- a. Broilers
 - b. Turkeys
 - c. Eggs
 - d. Quail
12. What is the most common commercial white, egg-layer hen?
- a. Rhode Island Red
 - b. Beltsville Small White
 - c. Single Comb White Leghorn
 - d. New Hampshire
13. Families or breeding populations possessing common traits are referred to as a
- a. strain.
 - b. cross mating.
 - c. crossbreeding.
 - d. inbreeding.

Complete the following short answer questions.

14. Describe "poultry" to a person who does not know what types of birds are included in this definition.
15. Name one reason there has been an increase in turkey and broiler meat consumption since the late 1960s.

16. What are the four major commercial enterprises that make up the poultry industry?
 - a.
 - b.
 - c.
 - d.
17. What breeding methods are used for chickens that are bred for meat and eggs?
 - a.
 - b.
 - c.
18. List four common commercial turkey production strains.
 - a.
 - b.
 - c.
 - d.
19. In a backyard, dual-purpose poultry operation, why would it not be wise to use a cross between the male Cornish and the female White Plymouth Rock? List one other option for birds that would be a better choice and describe why you listed that option.

20. Name three jobs or careers in the poultry industry.

a.

b.

c.

Course	Agricultural Science I
Unit	Introduction to Poultry Production
Lesson	Selection and Evaluation
Estimated Time	50 minutes

Student Outcome

Select and evaluate poultry.

Learning Objectives

1. Identify the parts of poultry.
2. Explain the criteria for broiler breeder poultry selection.
3. Explain the criteria for turkey breeder selection.
4. Explain the criteria for selection of commercial layers and pullets.
5. Explain the proper way to handle poultry during evaluation.

Grade Level Expectations

SC/LO/3/B/09-11/a SC/LO/3/E/09-11/a

Resources, Supplies & Equipment, and Supplemental Information

Resources

1. PowerPoint Slides
 - PPt 1 – Parts of a Chicken
 - PPt 2 – Parts of a Turkey
2. Activity Sheets
 - AS 1 – Identify Parts of a Chicken
 - AS 2 – Identify Parts of a Turkey
3. *Introduction to Poultry Production (Student Reference)*. University of Missouri-Columbia: Instructional Materials Laboratory, 1999.
4. *Introduction to Poultry Production Curriculum Enhancement*. University of Missouri-Columbia: Instructional Materials Laboratory, 2003.

Supplies & Equipment

- Two or more live birds of the same breed that show differences in quality (Use pictures if live birds are not available.)

Supplemental Information

1. Internet Sites
 - Wilson, Dave. "Poultry: A Guide to Anatomy and Selected Species." Information Technology and Communication Services Instructional Materials. University of Illinois. Accessed August 17, 2007, from <http://im.itcs.uiuc.edu/ak17supp.pdf>.
 - Smith, Tom W. "4-H Poultry Judging: Contest Classes and Scoring." Cooperative Extension Service. Mississippi State University. Accessed August 17, 2007, from <http://www.msstate.edu/dept/poultry/pub900.htm>.

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- ❑ “Poultry Publications.” MU Extension. University of Missouri-Columbia. Accessed August 17, 2007, from <http://extension.missouri.edu/xplor/agguides/poultry/index.htm>.

2. Print

- ❑ Field, Thomas G., and Robert E. Taylor. *Scientific Farm Animal Production*, 6th ed. Upper Saddle River, N.J. Prentice Hall, 1998.
 - ❑ Gillespie, James R. *Modern Livestock and Poultry Production*, 5th Ed. Albany: Delmar, 1997.
 - ❑ Moreng, Robert E., and John S. Avens. *Poultry Science and Production*. Prospect Heights, Ill. Waverly Press, Inc. 1991.
 - ❑ *National 4-H Avian Bowl Manual*. Cooperative Extension Service, Clemson University. Clemson, NC. 1992.
 - ❑ *National Poultry Judging Manual*. National 4-H Poultry and Egg Conference Extension Committee. Nebraska Cooperative Extension. 1998.
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Interest Approach

Show two or more live birds of the same breed with different health and productivity characteristics. Use pictures if live birds are not available. Have students visually observe the two birds to determine which is a better producer and which appears healthier. Discuss factors that influenced their decision.

Communicate the Learning Objectives

1. Identify the parts of poultry.
2. Explain the criteria for broiler breeder poultry selection.
3. Explain the criteria for turkey breeder selection.
4. Explain the criteria for selection of commercial layers and pullets.
5. Explain the proper way to handle poultry during evaluation.


Instructor Directions	Content Outline
<p>Objective 1</p> <p><i>Familiarize students with terminology used to identify parts of a chicken and parts of a turkey. Many of these terms are used when discussing the selection and evaluation of poultry. Show Ppt 1 and Ppt 2 to the class.</i></p> <p><input type="checkbox"/> Ppt 1 – Parts of a Chicken</p>	<p>Identify the parts of poultry.</p> <p>Parts of a chicken</p> <ol style="list-style-type: none">1. Head2. Comb3. Beak4. Wattle5. Neck6. Neck plumage7. Neck feathers8. Wing front9. Breast10. Wing bow11. Wing coverts12. Thigh13. Lower thigh plumage14. Toenails15. Web16. Toes17. Foot18. Shank19. Rear body feathers20. Primaries21. Secondaries22. Cushion23. Main tail feathers24. Tail coverts25. Back26. Cape27. Ear lobe

Instructor Directions	Content Outline
<p>☐ PPt 2 – Parts of a Turkey</p>	<p>28. Ear</p> <p>Parts of a turkey</p> <ol style="list-style-type: none"> 1. Head 2. Eye 3. Snood 4. Nostril 5. Beak 6. Fleshlike process 7. Wattles 8. Neck 9. Caruncle 10. Breast 11. Secondaries 12. Beard 13. Keel 14. Legs 15. Shank 16. Toes 17. Spur 18. Hock joint 19. Tail 20. Tail coverts 21. Wing coverts 22. Saddle 23. Back 24. Wing Bow 25. Shoulder 26. Cape 27. Ear
<p>Objective 2</p> <p><i>Discuss the economic importance of proper selection and culling of broiler poultry. Focus on breeding, large commercial flocks, and the backyard farm. Review the body parts that are important for evaluation of broiler breeders.</i></p>	<p>Explain the criteria for broiler breeder poultry selection.</p> <p>Broiler breeders are the parent stock used to produce hatching eggs for commercial broiler production.</p> <p>General health refers to indications of disease or abnormalities.</p> <ol style="list-style-type: none"> 1. Healthy bird <ol style="list-style-type: none"> a. Very vocal b. Eyes bright, rounded, and alert c. Comb and wattles bright red, smooth, sturdy, and have a waxy texture

Instructor Directions	Content Outline
	<ul style="list-style-type: none"> d. Feathers around vent (posterior opening, anus) clean and dry e. Body plumage close-fitting and clean <p>2. Unhealthy bird</p> <ul style="list-style-type: none"> a. Sluggish behavior b. Comb and wattles coarse, discolored, darker or lighter than normal c. Feathers around vent dirty and damp d. Feathers disarrayed <p>Body weight of offspring should be similar to the weight of the broilers' parents at seven weeks. Select only the larger birds at the seven-week evaluation.</p> <p>Conformation refers to the general shape of the bird.</p> <p>1. Preferred shape</p> <ul style="list-style-type: none"> a. Crescent-shaped back, broad breast, and upright head b. Feathers should lay well, be close-fitting, smooth, and unbroken c. Pinfeathers present and just coming through or still under the skin <p>2. Poor conformation</p> <ul style="list-style-type: none"> a. Wedge-shaped body, hunched back, crooked breasts, backs, and legs b. Twisted feathers, broken quills, bare spots on the skin c. Too many pinfeathers cause difficult removal during processing <p>3. Fleshing refers to the commercially important muscles</p> <ul style="list-style-type: none"> a. Quality shape bird has thick, rounded breasts, good tone down the length of the vertebrae, and thick meaty legs b. Poor quality bird has inverted breast that comes to a point at the keel, thin legs and back <p>4. Fat cover</p> <ul style="list-style-type: none"> a. When pinching the skin of the abdomen, hardness indicates good fat cover. b. When pinching the abdomen, softness indicates poor fat cover. Shown by thin skin over the abdominal area, where the thigh connects to the breast, or under areas of heavy feathers.

Instructor Directions	Content Outline
	<ol style="list-style-type: none"> 5. Degree of defects <ol style="list-style-type: none"> a. Defects result in downgrading b. Defects include insect bites, bruises, callouses or blisters on the breast, bare areas, and discolorations c. Can be caused by improper handling 6. General disqualifications <ol style="list-style-type: none"> a. Black feathers found in cockerels b. Green or black pigment found on the shanks c. Crooked toes (greater than 90-degree bend) d. Swollen hock joints e. Infected foot pads <p>Performance data is measured by growth rate.</p> <ol style="list-style-type: none"> 1. Rapid growth reduces time to market and results in feed consumption savings. 2. Positive growth rate reflects good breast width, body depth, and fleshing.
<p>Objective 3</p> <p><i>Discuss how turkey breeder selection is different from broiler breeder selection. Ask students to compare the different birds and their body parts.</i></p>	<p>Explain the criteria for turkey breeder selection.</p> <ol style="list-style-type: none"> 1. Criteria is similar to broiler breeder selection. 2. Conformation is important because turkey carcasses are often marketed whole and at higher weights. 3. Unhealthy turkey may have sagging caruncles. Caruncles are the fleshy protuberances on the naked portions of the head, face, and neck.
<p>Objective 4</p> <p><i>Discuss what a producer might look for in a commercial layer. Compare egg layers and pullets to meat-producing birds. Discuss the differences.</i></p>	<p>Explain the criteria for selection of commercial layers and pullets.</p> <p>Pigmentation is the loss of color and is referred to as bleaching.</p> <ol style="list-style-type: none"> 1. Layers lose yellow pigmentation from the skin and shanks as they lay eggs. 2. Pigmentation loss is a determining factor in the approximate number of eggs laid. 3. Bleaching occurs in this order: vent, eye ring, ear lobe, beak (corner of the mouth toward the tip), bottom of the feet, loss from front, back, and sides of shank, hock, and top of toes.

Instructor Directions	Content Outline
	<p>General health</p> <ol style="list-style-type: none"> 1. Productive hen <ol style="list-style-type: none"> a. Comb and wattles bright red, waxy, smooth, and full b. Bright, round eyes c. Eye lids and eye rings are bleached d. Beak bleached or in process of bleaching e. Supple and moist vent, fully bleached 2. Unproductive hen <ol style="list-style-type: none"> a. Comb and wattles scaly, small, and discolored b. Eyes droopy and sunk in c. Beak yellow d. Vent dry and yellow <p>Conformation determines high rate-of-lay.</p> <ol style="list-style-type: none"> 1. Good conformation <ol style="list-style-type: none"> a. Broad head, smooth face b. Large body capacity c. Soft and flexible abdomen d. Supple skin e. Flat, smooth shanks f. Pubic bone thin, flexible, and spread wide enough to fit two to four fingers between them 2. Poor conformation <ol style="list-style-type: none"> a. Long, crow-shaped head b. Thin back c. Poor body capacity d. Hard abdomen e. Leathery skin f. Round, scaly shanks g. Pubic bones close together and inflexible <p>Pullets are sexually mature chickens less than 22 weeks old.</p> <ol style="list-style-type: none"> 1. Selected by potential for high production in the future 2. Good comb and head development show signs of reaching sexual maturity 3. No sign of disease in healthy pullet 4. Eyes round and prominent with smooth head of a normal color 5. Strong, wide back; broad body; roomy heart girth 6. Smooth feathers with no bare spots 7. Skin color on the shanks normal for breed

Instructor Directions	Content Outline
<p>Objective 5</p> <p><i>Explain the importance of proper handling of birds to avoid defects and injuries. If possible, demonstrate the proper way to handle a live chicken. Discuss why handling is necessary to accurately evaluate the quality of the bird.</i></p>	<p>8. Legs straight and even with no abnormalities in the feet and toes</p> <p>Explain the proper way to handle poultry during evaluation.</p> <p>Provides ability to observe areas of the bird not observable from a standing position.</p> <p>Good control of the bird is necessary to reduce chance of getting away and causing injury.</p> <ol style="list-style-type: none"> 1. Put one hand on the back of the bird and gently pin the bird down. 2. Slide the other hand under the breast and rest in palm. 3. Place hand on back to hold wings down and steady the bird. 4. Place index finger between hocks. 5. Place thumb around one leg and fingers around the other leg. 6. Gently lift bird while keeping hand on back. 7. Hold the head down with back resting against examiner's stomach. <ol style="list-style-type: none"> a. Allows observation of the vent, abdominal capacity, and bleaching of feet and shanks. b. Pubic bones and softness of abdomen can be felt. c. Place fingers between keel bone and pubic bones to measure capacity. d. To check for molting, tuck hen under elbow and gently open the wing and count the feathers. 8. Return the bird to the coop with the breast in the palm and fingers holding the legs. 9. Place the bird in head first. 10. Be sure both feet are completely on the floor before releasing.
<p>Application</p> <p> AS 1 – Identify Parts of a Chicken</p>	<p>Answers to AS 1</p> <ol style="list-style-type: none"> 1. Head 2. Comb 3. Beak 4. Wattle 5. Neck 6. Neck plumage 7. Neck feathers

Instructor Directions	Content Outline
<p data-bbox="180 1087 584 1171">📄 AS 2 – Identify Parts of a Turkey</p>	<ol style="list-style-type: none"> 8. Wing front 9. Breast 10. Wing bow 11. Wing coverts 12. Thigh 13. Lower thigh plumage 14. Toenails 15. Web 16. Toes 17. Foot 18. Shank 19. Rear body feathers 20. Primaries 21. Secondaries 22. Cushion 23. Main tail feathers 24. Tail coverts 25. Back 26. Cape 27. Ear lobe 28. Ear <p data-bbox="662 1087 893 1119">Answers to AS 2</p> <ol style="list-style-type: none"> 1. Head 2. Eye 3. Snood 4. Nostril 5. Beak 6. Fleshlike process 7. Wattles 8. Neck 9. Caruncle 10. Breast 11. Secondaries 12. Beard 13. Keel 14. Legs 15. Shank 16. Toes 17. Spur 18. Hock joint 19. Tail 20. Tail coverts

Instructor Directions	Content Outline
	<p>21. Wing coverts 22. Saddle 23. Back 24. Wing Bow 25. Shoulder 26. Cape 27. Ear</p> <p>Other activities</p> <ol style="list-style-type: none"> 1. Practice handling birds according to guildines. 2. Let students select and evaluate birds from live birds, if available, or pictures.
Closure/Summary	<p>Selection is very important to improving flocks. Criteria for selecting broiler breeders and turkeys are general health, body weight, conformation, and performance data. Criteria for selecting commercial layers are pigmentation, general health, and conformation. Criteria for selecting pullets are their potential to be highly productive laying hens, general health, and conformation. Handling techniques are very important to avoid injury and potential defects.</p>
Evaluation: Quiz	<p>Answers</p> <ol style="list-style-type: none"> 1. d 2. a 3. f 4. b 5. g 6. c 7. e 8. Any of the following three: general health, body weight, conformation, and performance data. 9. Conformation is most important because the turkey carcasses are often marketed whole and at higher weights. 10. Bleaching is the loss of pigment or color. By observing the amount of pigment in certain areas, one can determine whether the hen is productive. 11. The bird should be held facing the examiner with the head under the elbow. 12. The bird should be released head first with both feet completely on the floor before release.

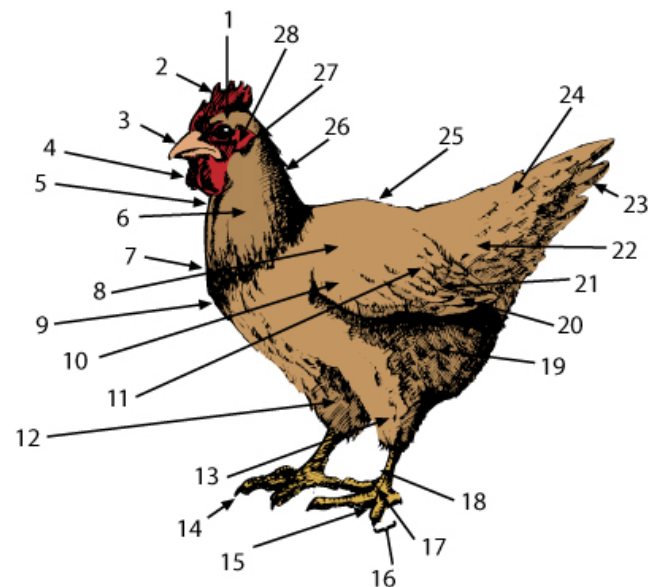
Identify Parts of a Chicken

Objective: Identify the parts of a chicken.

Label the following picture with the corresponding body parts for a chicken.

- 1. _____
- 2. _____
- 3. _____
- 4. _____
- 5. _____
- 6. _____
- 7. _____
- 8. _____
- 9. _____
- 10. _____
- 11. _____
- 12. _____
- 13. _____
- 14. _____
- 15. _____
- 16. _____
- 17. _____
- 18. _____

- 19. _____
- 20. _____
- 21. _____
- 22. _____
- 23. _____
- 24. _____
- 25. _____
- 26. _____
- 27. _____
- 28. _____



Lesson 2: Selection and Evaluation

Name _____

Identify Parts of a Turkey

Objective: Identify the parts of a turkey.

Label the following picture with the corresponding body parts for a turkey.

1. _____

19. _____

2. _____

20. _____

3. _____

21. _____

4. _____

22. _____

5. _____

23. _____

6. _____

24. _____

7. _____

25. _____

8. _____

26. _____

9. _____

27. _____

10. _____

11. _____

12. _____

13. _____

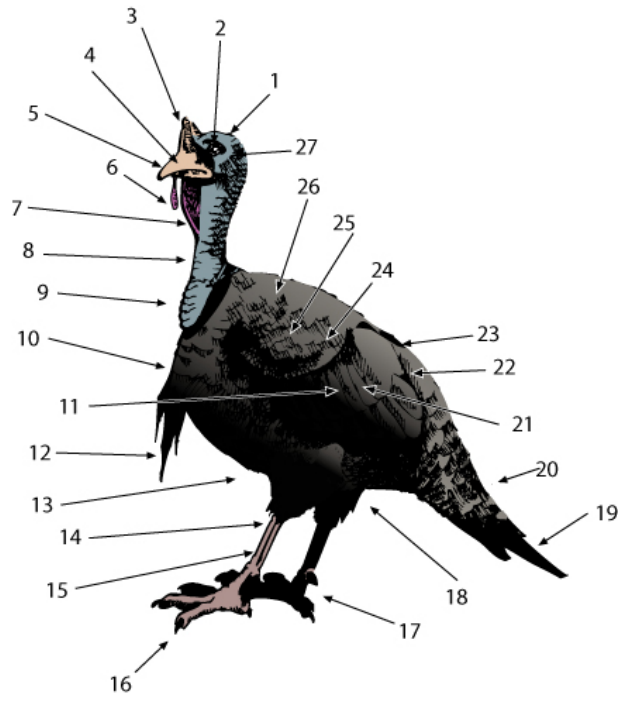
14. _____

15. _____

16. _____

17. _____

18. _____



EVALUATION

Match the terms with the definitions.

- | | |
|--|---------------------|
| ___ 1. Evaluated at seven weeks | a. Conformation |
| ___ 2. The general shape of the bird | b. General health |
| ___ 3. Commercially important muscles | c. Defects |
| ___ 4. Indications of disease or abnormalities | d. Body weight |
| ___ 5. Measured by the growth rate | e. Pigmentation |
| ___ 6. Result in downgrading of the meat | f. Fleshing |
| ___ 7. Determines whether hen is productive | g. Performance data |

8. Name three factors important in selecting a quality broiler breeder.

- a.
- b.
- c.

9. Which criteria for turkey selection is more important than in broiler breeder selection? Why?

10. What is bleaching and why is it important in determining past production of laying hens?

11. When handling a bird for evaluation, how should the bird be positioned when measuring the abdominal width?

12. How should the bird be released?

Course	Agricultural Science I
Unit	Introduction to Poultry Production
Lesson	Production
Estimated Time	50 minutes

Student Outcome

Describe poultry production and management practices.

Learning Objectives

1. Identify the different types of commercial poultry production systems.
2. Explain the facilities and equipment required for poultry production systems.
3. Explain the nutritional requirements of poultry.
4. Explain how poultry production wastes and byproducts are utilized and managed.

Grade Level Expectations

SC/LO/1/B/09-11/b	SC/ST/1/B/09-11/a	SC/ST/1/C/09-11/a
SC/ST/3/B/09-11/a	SC/ST/3/B/09-11/b	SC/ST/3/B/09-11/c
SC/ST/3/D/09-11/a		

Resources, Supplies & Equipment, and Supplemental Information

Resources

1. *Introduction to Poultry Production (Student Reference)*. University of Missouri-Columbia: Instructional Materials Laboratory, 1999.
2. *Introduction to Poultry Production Curriculum Enhancement*. University of Missouri-Columbia: Instructional Materials Laboratory, 2003.

Supplemental Information

1. Internet Sites

- Animal Science Publications. MU Extension. University of Missouri-Columbia. Accessed September 12, 2007, from <http://extension.missouri.edu/explore/agguides/ansci/>.
- Commercial Poultry Production Resources. Cooperative Extension. The Pennsylvania State University. Accessed September 12, 2007, from <http://poultryextension.psu.edu/Comproduction.html>.
- Poultry: Small Flock Management. Cooperative Extension Service. Mississippi State University. Accessed September 12, 2007, from <http://msucare.com/poultry/management/index.html>.
- "Poultry Waste Management Handbook." Texas Extension Service. The Texas A & M University System. Accessed September 12, 2007, from <http://gallus.tamu.edu/Extension%20publications/Waste/tableofcontents.htm>.

2. Print

- Ensminger, M.E., *Poultry Science*. 3rd ed. Danville, IL: Interstate Publishers, Inc., 1992.

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- ❑ Field, Thomas G. and Robert E. Taylor. *Scientific Farm Animal Production*. 6th ed. Upper Saddle River, NJ: Prentice-Hall, Inc. 1998.
 - ❑ Gillespie, James R., *Animal Science*. Albany: Delmar Publishers, 1998.
 - ❑ Gillespie, James R., *Modern Livestock and Poultry Production*. 5th ed. Albany: Delmar Publishers, 1997.
 - ❑ Moreng, Robert E. and John S. Avens. *Poultry Science and Production*. Prospect Heights, IL: Waveland Press, 1991.
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Interest Approach

Ask students to brainstorm ideas about what factors they think are important in poultry production systems. They should include facility layout, equipment, nutritional needs, and waste management. Record the ideas. Students that have small poultry operations at home can suggest things that are used in small operations. Ask how this compares to large commercial operations.

Communicate the Learning Objectives

1. Identify the different types of commercial poultry production systems.
2. Explain the facilities and equipment required for poultry production systems.
3. Explain the nutritional requirements of poultry.
4. Explain how poultry production wastes and byproducts are utilized and managed.

Instructor Directions	Content Outline
<p>Objective 1</p> <p><i>Discuss the four major commercial enterprises: broiler production, turkey production, egg production, and pullet production for replacement purposes. Generally, they all have integrated or contract operations. Discuss vertical integration systems and how each production process fits into this system.</i></p>	<p>Identify the different types of commercial poultry production systems.</p> <ol style="list-style-type: none">1. Vertical integration - Two or more stages of the production, processing, and distribution are controlled by a single firm.2. Broiler production<ol style="list-style-type: none">a. Well-suited to assembly line techniquesb. Integrated system is typical with 99 percent of broilers produced under contract<ol style="list-style-type: none">1. Integrated contractor - Provides chicks, feed, processing, vaccinations, supervision, and transportation2. Producer/grower - Provides housing, grow-out equipment (feeders, waterers, and brooder houses), utilities, labor, and managementc. Highly automated for feeding, watering, lighting, and ventilationd. Slaughter operations regulated by state and federal inspections3. Turkey production<ol style="list-style-type: none">a. Trend of fewer but larger farms and processing plantsb. Traditionally range raisedc. Trend towards confinement rearing with highly automated feeding and watering systemsd. Typically grown under contract

Instructor Directions	Content Outline
	<ol style="list-style-type: none"> 4. Layers for egg production <ol style="list-style-type: none"> a. Fewer but larger flocks; maximum egg production at minimum costs b. High-producing strains average 285 to 310 eggs over 12- to 14-month laying cycle c. Produced primarily on integrated or contract arrangement 5. Replacement pullets <ol style="list-style-type: none"> a. Raised by egg producers or purchased from hatcheries b. Raised on floors, in cages, or a combination c. Sanitation very important to avoid diseases d. Should not mix ages and strains in same house
<p>Objective 2</p> <p><i>Discuss the facilities and equipment needed in each of the major commercial production systems. Include temperature, moisture, ventilation, and lighting needs for each type of production area.</i></p>	<p>Explain the facilities and equipment required for poultry production systems.</p> <ol style="list-style-type: none"> 1. Small chicks start out in brooder houses. <ol style="list-style-type: none"> a. Special heating equipment needed to keep chicks warm until well-feathered b. Small, trough-type feeding and watering equipment suitable for day-old chicks c. No drafts on floor d. Lighting provided by heating equipment or room lights 2. Pullets <ol style="list-style-type: none"> a. Raised in same house used for brooding or moved to separate housing b. Grown in partial cage system or complete cage system <ol style="list-style-type: none"> 1. Partial cage system - Starts pullets on floor first 6 to 10 weeks, then moved to cages 2. Complete cage system - Grows pullet completely in cage c. Lighting regulated because it affects sexual maturity rate of pullet d. Feeders and waterers placed in convenient locations 3. Layers <ol style="list-style-type: none"> a. Housed in caged systems, open- or slat-floor systems <ol style="list-style-type: none"> 1. Cage systems - Typically multiple-bird cages that hold 5 to 10 birds

Instructor Directions	Content Outline
	<ul style="list-style-type: none"> 2. Open-or slat-floor systems - Result in dirty or broken eggs, stress to hens competing for food, extra cost for litter, and more labor to collect eggs by hand b. Adequate temperature and ventilation required c. Fresh, clean food and water provided automatically or by hand d. Lighting closely regulated e. Egg room needed to hold eggs for market 4. Broilers <ul style="list-style-type: none"> a. Typically raised in large confinement facilities <ul style="list-style-type: none"> 1. Single houses may hold 20,000 to 28,000 birds 2. .75 or .8 square feet allowed per bird b. Partial house brooding utilized with one end restricted until chick is three weeks old <ul style="list-style-type: none"> 1. Maintains and monitors heat available while chicks are young 2. Allowed full range of house when older c. Automated feed and water d. Natural and artificial lighting 5. Turkey poults <ul style="list-style-type: none"> a. Raised in clear-span, metal-roofed buildings b. Provide brooding, growing, finishing or a combination c. Dirt floors covered with absorbent litter material
<p>Objective 3</p> <p><i>Discuss why nutritional needs of poultry are vital to their growth and energy maintenance compared to other farm animals. Review the nutritional needs of poultry and what feed additives may be added to their diet.</i></p>	<p>Explain the nutritional requirements of poultry.</p> <ul style="list-style-type: none"> 1. Birds use nutrients every hour of the day. <ul style="list-style-type: none"> a. Digestion system very rapid b. Respiration and circulation fast c. Grow at a rapid rate d. More sensitive to environmental influences e. Body temperature higher than other farm animals f. Mature at an earlier age 2. Birds are fed complex rations for maximum meat or egg production, fertility, and body maintenance. 3. Feed system is composed of five nutrient classes. <ul style="list-style-type: none"> a. Energy (carbohydrates and fats) <ul style="list-style-type: none"> 1. Provided by carbohydrates 2. Powers the movement of muscles and produces body heat 3. Extra energy stored in the body as fat

Instructor Directions	Content Outline
	<ul style="list-style-type: none"> 4. Sources include animal products (fats) and plant products (grains and vegetable oils) b. Protein provides amino acids, which are the building blocks for cell growth. c. Vitamins are made up of fat- or water-soluble organic substances. <ul style="list-style-type: none"> 1. Aid in digestion, absorption, and metabolism 2. Regulate formation and development of new cells d. Minerals are inorganic elements that help develop bones and eggshells. e. Water helps to absorb nutrients from the digestive tract and aids in metabolic reactions.
<p>Objective 4</p> <p><i>Discuss what is included in wastes and byproducts of poultry. Review management and disposal options and uses for wastes and byproducts.</i></p>	<p>Explain how poultry production wastes and byproducts are utilized and managed.</p> <ul style="list-style-type: none"> 1. Manure, carcasses, and eggs are examples of wastes and byproducts. <ul style="list-style-type: none"> a. 30,000 laying hens can produce 40 tons of manure a month or nearly 500 tons a year. b. Proper handling, storage, and application can protect water resources and increase profits of bird and crop enterprises. c. Animal wastes are a source of plant nutrients for crop production. d. Dried and processed manure is used as animal feed for other livestock. 2. Typical housing systems include cages above dry or liquid pits, floors with litter, and outdoor ranges. <ul style="list-style-type: none"> a. Cages above dry or liquid pits <ul style="list-style-type: none"> 1. Allows manure to fall to a pit or be scraped from boards below cages. 2. Deep pit systems develop into solid manure if kept dry. 3. Manure is scraped or flushed with water from pits directly into spreader or storage. b. Floors with litter <ul style="list-style-type: none"> 1. Remove caked manure from around waterers. 2. Stir to increase drying. 3. Add new litter. 4. Tractor loaders remove manure-litter mixture periodically and pens cleaned and disinfected.

Instructor Directions	Content Outline
Application:	<p>Other activities</p> <ol style="list-style-type: none"> 1. Take a field trip or show a video on a commercial laying house and a broiler house. Compare the similarities and differences. 2. Take a field trip to an older broiler house or laying house. Have students compare the two facilities.
Closure/Summary	<p>Vertical integration and contract systems have made commercial poultry production systems very specialized. Facilities and equipment are also highly specialized with specific requirements for each production system. Nutritional requirements consisting of protein, energy, vitamins, minerals, and water are part of mixed rations for poultry. Waste and byproducts are an important source of nutrients for crop production and provide a means of disposing of the waste.</p>
Evaluation: Quiz	<p>Answers</p> <ol style="list-style-type: none"> 1. When two or more stages of the production, processing, and distribution are controlled by a single firm. 2. Temperature, moisture, ventilation, and lighting 3. Caged systems and open- or slat-floor systems. Cage systems are the most common. Open- or slat-floor systems result in dirty or broken eggs, competition for food, extra cost of litter, and more labor to collect eggs. 4. Any three of the following: rapid digestion, fast respiration and circulation, grow at a rapid rate, more sensitive to environmental influences, body temperature is high, and mature at an early age. 5. 6, 10 6. .75, .8 7. Turkey poults 8. Plant nutrients 9. Cages above dry or liquid pits, floors with litter, outdoor ranges 10. c 11. b 12. f 13. e 14. d

UNIT - INTRODUCTION TO POULTRY PRODUCTION Name _____

Lesson 3: Production

Date _____

EVALUATION

Complete the following short answer questions.

1. Explain vertical integrations systems for the poultry industry.

2. What are the four major factors to consider in facility planning?
 - a.
 - b.
 - c.
 - d.

3. What are two types of housing systems used for layers? Which is the most common and why?
 - a.
 - b.

4. List three reasons poultry use more nutrients than other farm animals.
 - a.
 - b.
 - c.

Fill in the blank in the following statements.

5. The partial cage system starts the pullets out on the floor for the first ____ to ____ weeks and then they are moved to cages.
6. Broilers are typically raised in large confinement facilities with ____ to ____ square feet allowed per bird.
7. _____ are raised in clear-span, metal-roofed buildings.
8. Animal wastes are an important source of _____ for crop production.
9. To manage waste, typical housing systems include _____, _____, and _____.

Match the terms in the left column with the statements in the right column.

- | | | | |
|-----------|---|----|----------|
| _____ 10. | Powers movement of muscles and produces body heat | a. | Water |
| _____ 11. | Aids in digestion, absorption, and metabolism | b. | Vitamins |
| _____ 12. | Develops bones and eggshells | c. | Energy |
| _____ 13. | Absorbs nutrients from digestive tract and aids in metabolic reactions. | d. | Protein |
| _____ 14. | Provides amino acids for cell growth. | e. | Water |
| | | f. | Minerals |

Course	Agricultural Science I
Unit	Introduction to Poultry Production
Lesson	Reproduction
Estimated Time	50 minutes

Student Outcome

Explain poultry reproductive processes.

Learning Objectives


1. Identify the parts of the male reproductive tract and explain their functions.
2. Identify the parts of the female reproductive tract and explain their functions for developing an egg.
3. Describe the parts of an egg.
4. Explain how an embryo develops from a fertile egg.
5. Explain how the reproductive process in poultry differs from other livestock.

Grade Level Expectations

SC/LO/3/B/09-11/d SC/LO/3/E/09-11/a

Resources, Supplies & Equipment, and Supplemental Information

Resources

1. PowerPoint Slides
 - PPt 1 – Parts of a Male Reproductive Tract
 - PPt 2 – Parts of a Female Reproductive Tract
 - PPt 3 – Parts of an Egg
 - PPt 4 – Chick Embryo
2. Activity Sheets
 -  AS 1 – Female Reproductive System and Egg Development
3. *Introduction to Poultry Production (Student Reference)*. University of Missouri-Columbia: Instructional Materials Laboratory, 1999.
4. *Introduction to Animal Reproduction (Student Reference)*. University of Missouri-Columbia: Instructional Materials Laboratory, 1996.
5. *Introduction to Poultry Production Curriculum Enhancement*. University of Missouri-Columbia: Instructional Materials Laboratory, 2003.

Supplies & Equipment

- Raw egg and hard-boiled egg
- Plate and dissection materials

Supplemental Information

1. Internet Sites
 - “Animal Science Publications.” MU Extension. University of Missouri-Columbia. Accessed September 13, 2007, from <http://extension.missouri.edu/explore/agguides/ansci/>.

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- ❑ "Poultry Anatomy." Purdue University. Accessed September 13, 2007, from <http://ag.ansc.purdue.edu/poultry/slides/anatomy/>.
 - ❑ "Poultry Reproduction." Florida Cooperative Extension Service. Institute of Food and Agricultural Sciences. University of Florida Accessed September 13, 2007, from http://edis.ifas.ufl.edu/TOPIc_Poultry_Reproduction.
 - ❑ "Unit 3: Poultry Reproduction." Purdue University. Accessed September 13, 2007, from <http://ag.ansc.purdue.edu/nielsen/www245/lecnotes/avianrepro.html>.
 - ❑ "Poultry: Reproduction and Incubation." MSUcares. Mississippi State University. Accessed September 13, 2007, from <http://msucares.com/poultry/reproductions/index.html>.
2. Print
- ❑ Ensminger, M.E., *Poultry Science*. 3rd ed. Danville, IL: Interstate Publishers, Inc., 1992.
 - ❑ Gillespie, James R., *Modern Livestock and Poultry Production*, 5th ed. Albany: Delmar Publishers. 1997.
 - ❑ Moreng, Robert E. and John S. Avens. *Poultry Science and Production*. Prospect Heights, IL: Waverly Press, Inc. 1991.
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Interest Approach

Dissect a raw and a hard-boiled egg. Discuss the different layers and their functions. Explain their purpose in the reproduction cycle of a bird.


Communicate the Learning Objectives

1. Identify the parts of the male reproductive tract and explain their functions.
2. Identify the parts of the female reproductive tract and explain their functions for developing an egg.
3. Describe the parts of an egg.
4. Explain how an embryo develops from a fertile egg.
5. Explain how the reproductive process in poultry differs from other livestock.

Instructor Directions	Content Outline
<p>Objective 1</p> <p><i>Familiarize students with the parts of the reproductive system of male poultry. Ppt 1 is a diagram of the parts of a male reproductive tract.</i></p> <p><input type="checkbox"/> Ppt 1 – Parts of a Male Reproductive Tract</p>	<p>Identify the parts of the male reproductive tract and explain their functions.</p> <ol style="list-style-type: none">1. Testicles<ol style="list-style-type: none">a. Located along backbone within the abdominal cavityb. Two testicles made up of ducts that produce and secrete semenc. Connected to the vas deferens2. Vas deferens – tube that transfers semen to the cloaca3. Cloaca<ol style="list-style-type: none">a. Common area where reproductive and digestive systems meetb. Holds the papillae within the folds of the wall4. Papillae – transports the sperm to the female reproductive tract during mating5. Vent – opening of the cloaca that releases the reproductive and digestive products
<p>Objective 2</p> <p><i>Familiarize students with the female reproductive tract and how each part contributes to the development of the egg. Ppt 2 is a diagram of the parts of a female reproductive tract. Complete AS 1.</i></p> <p><input type="checkbox"/> Ppt 2 – Parts of a Female Reproductive Tract</p>	<p>Identify the parts of the female reproductive tract and explain their functions for developing an egg.</p> <ol style="list-style-type: none">1. Female reproductive tract made up of the ovary and the oviduct2. Ovary<ol style="list-style-type: none">a. Produces the ova, or "yolk", female reproductive cellb. Only left ovary is functionalc. Located in the body cavity near the backbone3. Oviduct<ol style="list-style-type: none">a. Long tube made up of sections where remaining

Instructor Directions	Content Outline
<p>AS 1 - Female Reproductive System and Egg Development</p>	<p>membranes are added to form egg</p> <p>b. Consists of the infundibulum, magnum, isthmus, uterus, and vagina</p> <ol style="list-style-type: none"> 1. Infundibulum - Funnel-shaped upper portion that receives the mature yolk from the ovary; site where yolk becomes fertilized 2. Magnum - Albumen secreted to form various layers of egg white 3. Isthmus - Adds shell membranes that represent the final shape of the egg 4. Uterus - Adds a thin, white shell where water is added to develop the albumin 5. Vagina - Passageway to the cloaca 6. Cloaca - Held briefly while it rotates into position 7. Vent - Egg passes from the body
<p>Objective 3</p> <p><i>Familiarize students with the parts of the egg. Ppt 3 is a diagram of the parts of an egg.</i></p> <p>Ppt 3 - Parts of an Egg</p>	<p>Describe the parts of an egg.</p> <ol style="list-style-type: none"> 1. Shell consists of three layers. <ol style="list-style-type: none"> a. Inner mammillary layer consists of sponge-like, calcium crystals. b. Outer shell layer is made up of hard calcium crystals. c. Cuticle is a protective layer that prevents microorganisms from entering egg. 2. Membranes are made of protein fibers that exist inside the shell. <ol style="list-style-type: none"> a. Inner membrane holds contents of egg tightly together. b. Outer membrane is connected to the shell. c. Acts as a barrier to outside contaminants. d. Reduces evaporation of egg contents. e. Air cell forms at large end of shell where two membranes separate. 3. Albumen (egg white) consists of four layers. <ol style="list-style-type: none"> a. Chalaziferous layer surrounds the yolk and extends into the chalazae. b. Chalazae are two twisted cords extending from opposite ends of the yolk and help to keep yolk in place.

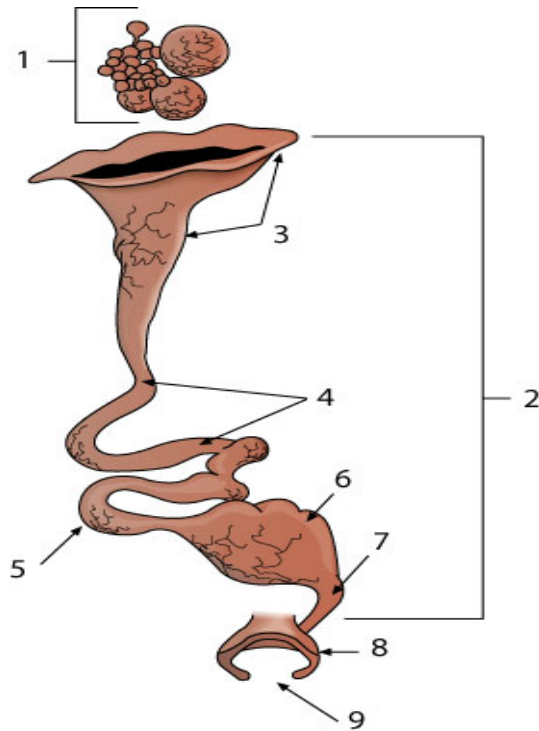
Instructor Directions	Content Outline
	<ul style="list-style-type: none"> c. Liquid inner thin layer, firm dense white layer, and outer thin layer surround the chalaziferous layer. 4. Yolk (ovum) contains the germ spot (female reproductive cell). <ul style="list-style-type: none"> a. Made up of layers that are a record of daily growth. b. Orange-yellow colored layer comes from carotene, which is found in feed. c. Lighter colored layers reflect growth while hen is not eating during the night. d. Darker colored layers indicate daylight hours when hen is eating and has high levels of carotene. e. Yolk is surrounded by membrane that helps to maintain spherical shape.
<p>Objective 4</p> <p><i>Familiarize students with the development of the chick from fertilization to hatching. PPT 4 is a diagram of a chick embryo at approximately 10 days.</i></p> <p><input type="checkbox"/> PPT 4 - Chick Embryo</p>	<p>Explain how an embryo develops from a fertile egg.</p> <ul style="list-style-type: none"> 1. Embryonic development in the chick occurs in 21 days. 2. Cell division process starts as the egg passes through the warm oviduct of the hen. 3. Blastoderm divides into two cells three hours after fertilization. 4. Blastoderm divides further into two layers, the ectoderm and the entoderm. <ul style="list-style-type: none"> a. Ectoderm forms skin, feathers, beak, claws, nervous system, lens and retina, lining of the mouth, and lining of the vent. b. Entoderm forms lining of digestive tract, respiratory tract, and other secondary organs. 5. Mesoderm forms an additional layer and develops into bones, muscles, blood, respiratory organs, and excretory organs. 6. Embryo supports itself with membranes that help to utilize food material. <ul style="list-style-type: none"> a. Allantois serves as circulatory system. <ul style="list-style-type: none"> 1. Absorbs oxygen. 2. Oxygenates the blood. 3. Removes carbon dioxide. 4. Removes wastes from kidneys. 5. Aids in digestion of albumen. 6. Absorbs calcium from eggshell.

Instructor Directions	Content Outline
	<ul style="list-style-type: none"> b. Amnion is filled with fluid and protects embryo during development. c. Yolk sac surrounds yolk and provides nourishment for the embryo to grow. <ul style="list-style-type: none"> 1. Drawn into body cavity just before hatching. 2. Serves as temporary nutrition for newly hatched chick. d. Chorion fuses with inner shell membrane and forms a protective layer around allantois while it completes metabolic functions.
<p>Objective 5</p> <p><i>Review the reproductive processes of other livestock that students have studied and compare to the poultry reproductive process.</i></p>	<p>Explain how the reproductive process in poultry differs from other livestock.</p> <ul style="list-style-type: none"> 1. Primary difference is that poultry reproductive process occurs more rapidly. <ul style="list-style-type: none"> a. Length of time from fertilization to birth for cattle is 281 days, swine is 114 days. b. Average incubation period for chickens is 21 days and 28 days for turkeys. 2. Majority of embryonic growth and development occurs outside mother's body. <ul style="list-style-type: none"> a. Hen prepares egg but is expelled from body in about 24 hours. b. Reproductive process in other livestock occurs inside the mother. 3. Parts of reproductive system differ <ul style="list-style-type: none"> a. Testes of poultry located within body cavity along backbone. b. Testes of other livestock located in scrotum which hangs from the body. c. Only one of two ovaries are functional in poultry. d. Both ovaries are functional in other mammals.
<p>Application</p> <p> AS 1 – Female Reproductive System and Egg Development</p>	<p>Answers to AS 1</p> <ul style="list-style-type: none"> 1. Ovary – Produces the ovum or yolk. 2. Oviduct – Remaining membranes are added to form the rest of the egg. 3. Infundibulum – Receives the mature yolk from the ovary. 4. Magnum – Albumen is secreted and forms various layers of egg white.

Instructor Directions	Content Outline
	<ol style="list-style-type: none"> 5. Isthmus – Adds inner and outer shell membrane that represents the final shape of the egg. 6. Uterus – Adds a thin, white shell. 7. Vagina – Serves as a passageway. 8. Cloaca – Egg is held briefly as it rotates so the large end is expelled first. 9. Vent – Egg passes from body. <p>Other activity</p> <ol style="list-style-type: none"> 1. Obtain pictures or a video showing a poultry embryo at different stages of development. Observe the different membrane layers and how they change and adjust as the embryo grows.
Closure/Summary	<p>Reproduction of poultry is different than that of other livestock in many ways. The location of the male and female reproductive parts is different than other livestock. In poultry, the development of the embryo takes place outside of the mother's. The length of time from fertilization to birth is much shorter in poultry than in other livestock.</p>
Evaluation: Quiz	<p>Answers</p> <ol style="list-style-type: none"> 1. d 2. c 3. c 4. f 5. g 6. a 7. d 8. b 9. e 10. Shell, membrane, albumen, and yolk 11. Ectoderm, entoderm, and mesoderm 12. c 13. b 14. d 15. Occurs more rapidly, growth and development takes place outside mothers's body, testes are located within the body cavity along the backbone, and only one of the two ovaries is functional.

Female Reproductive System and Egg Development

Objective: Label the correct term for each part of the female reproductive system and explain what occurs at this point in the egg development process.



1.

2.

3.

4.

5.

6.

7.

8.

9.

EVALUATION

Circle the letter that corresponds to the best answer.

1. What part of the male reproductive system is located along the backbone within the abdominal cavity?
 - a. Vent
 - b. Papillae
 - c. Vas deferens
 - d. Testicles

2. What part of the male reproductive system transfers semen to the cloaca?
 - a. Vent
 - b. Papillae
 - c. Vas deferens
 - d. Testicles

Match the terms for the female reproductive system with the appropriate definition.

- | | |
|---|-----------------|
| ___3. Funnel-shaped portion that receives the mature yolk | a. Ovary |
| ___4. A thin, white shell is added | b. Oviduct |
| ___5. Egg rotates so large end is expelled first | c. Infundibulum |
| ___6. Produces the ovum | d. Magnum |
| ___7. Albumen is secreted and layers of egg white formed | e. Isthmus |
| ___8. Long tube made up of sections where membranes are added to form egg | f. Uterus |
| ___9. Inner and outer shell membranes added | g. Cloaca |

Complete the following short answer questions.

10. What are the four primary parts of a newly formed egg?

- a.
- b.
- c.
- d.

11. During embryo development, what are the three layers that develop when the cells divide after fertilization?

- a.
- b.
- c.

Circle the letter that corresponds to the best answer.

12. During embryo development, what serves as the circulatory system?

- a. Chorion
- b. Amnion
- c. Allantois
- d. Yolk sac

13. What serves to protect the embryo during development?

- a. Chorion
- b. Amnion
- c. Allantois
- d. Yolk sac

14. What provides nourishment to the embryo to grow?

- a. Chorion
- b. Amnion
- c. Allantois
- d. Yolk sac

Complete the following short answer question.

15. List four differences in the reproductive systems of poultry from other livestock.

- a.
- b.
- c.
- d.

Course	Agricultural Science I
Unit	Introduction to Poultry Production
Lesson	Health Issues
Estimated Time	50 minutes

Student Outcome

Identify poultry flock health issues.

Learning Objectives

1. Explain the requirements for maintaining a healthy poultry flock.
2. Describe how common viral diseases are prevented and controlled in poultry.
3. Describe how common bacterial diseases are prevented and controlled in poultry.
4. Describe how common internal and external parasites are prevented and controlled in poultry.
5. Explain the importance of biosecurity.

Grade Level Expectations

SC/ST/3/B/09-11/a


SC/ST/3/B/09-11/b

SC/ST/3/B/09-11/c

SC/ST/3/D/09-11/a

Resources, Supplies & Equipment, and Supplemental Information

Resources

1. Activity Sheets
 -  AS 1 - Symptoms, Treatment, and Prevention of Disease
2. *Introduction to Poultry Production (Student Reference)*. University of Missouri-Columbia: Instructional Materials Laboratory, 1999.
3. *Introduction to Poultry Production Curriculum Enhancement*. University of Missouri-Columbia: Instructional Materials Laboratory, 2003.

Supplies & Equipment

- Preserved tapeworms, lice, or other parasites

Supplemental Information

1. Internet Sites
 - "Animal Science Publications." MU Extension. University of Missouri-Columbia. Accessed September 14, 2007, from <http://extension.missouri.edu/explore/agguides/ansci/>.
 - "Internal Poultry Parasites." MSUcares. Mississippi State University Extension Service. Accessed September 14, 2007, 2007 from http://msucares.com/poultry/management/poultry_parasites.html.
 - "Parasite Diseases-Internal." Mississippi State University. Accessed September 14, 2007, from <http://www.msstate.edu/dept/poultry/disparas.htm>.
 - "Poultry Parasites." Florida Cooperative Extension Service. Institute of Food and Agricultural Sciences. University of Florida Accessed September 14, 2007, from http://edis.ifas.ufl.edu/TOPIC_Poultry_Parasites.

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- ❑ “Treatments for Poultry Parasites.” MSUcares. Mississippi State University Extension Service. Accessed September 14, 2007, from http://msucares.com/poultry/management/poultry_external_parasites.html.
2. Print
- ❑ Ensminger, M.E., *Poultry Science*. 3rd ed. Danville, IL: Interstate Publishers, Inc., 1992.
 - ❑ Gillespie, James R., *Modern Livestock and Poultry Production*, 5th ed. Albany: Delmar Publishers. 1997.
 - ❑ Moreng, Robert E. and John S. Avens. *Poultry Science and Production*. Prospect Heights, IL: Waverly Press, Inc. 1991.
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Interest Approach

Show students tapeworms, lice, or other parasites preserved in a jar. Discuss how these parasites can affect the health of poultry and how they can spread to other birds.

Communicate the Learning Objectives

1. Explain the requirements for maintaining a healthy poultry flock.
2. Describe how common viral diseases are prevented and controlled in poultry.
3. Describe how common bacterial diseases are prevented and controlled in poultry.
4. Describe how common internal and external parasites are prevented and controlled in poultry.
5. Explain the importance of biosecurity.

Instructor Directions	Content Outline
<p>Objective 1</p> <p><i>Ask students why it is important to maintain a healthy poultry flock. Discuss where they think diseases come from and how they could manage their flocks to prevent contamination of diseases.</i></p>	<p>Explain the requirements for maintaining a healthy poultry flock.</p> <ol style="list-style-type: none">1. Good management requirements<ol style="list-style-type: none">a. Preventive maintenance reduces stress and prevents disease.b. Check daily for signs of disease.c. Observe changes in feed and water consumption.2. Strict sanitation guidelines<ol style="list-style-type: none">a. Thoroughly clean housing and equipment between new flocks.b. Isolate flocks used for different production purposes.c. Only caretaker of flock should enter housing area.d. Free of parasites, lice, mites, and rodents.e. Clean, fresh water and food kept easily accessible.f. Adequate ventilation to reduce moisture and buildup of noxious gas.g. Vaccination program to reduce disease outbreak.h. Dispose of dead birds according to the United States Environmental Protection Agency and Missouri Department of Natural Resources guidelines.

Objective 2

Ask students what types of viruses they get as humans. Discuss what a virus is and how we protect ourselves. Apply this to poultry.

Describe how common viral diseases are prevented and controlled in poultry.

Viral diseases are microorganisms that live in cells and spread the virus by duplication.

1. Passed through contaminated equipment, feed, clothing, air, and other animals.
2. Resistance to sanitation products makes them difficult to control and prevent.
3. Enter an animal's system through body openings (eye, mouth, vent, skin, nose, pores of an egg).

Common viral diseases

1. Marek's disease (also range paralysis or acute leukosis)
 - a. Affects many different birds but common in chickens.
 - b. Concentrated in the feather follicles and shed in the dander.
 - c. Internal lesions cause massive internal tumors and can result in death.
 - d. Symptoms include significant weight loss, diarrhea, and paralysis in the legs, wings, and neck.
 - e. Affects birds between the ages of 6 to 16 weeks.
 - f. Found worldwide and once transmitted there is no treatment.
 - g. Vaccinate day-old chicks at the hatchery.
2. Newcastle disease
 - a. Affects several species of birds including turkeys and chickens.
 - b. Highly contagious and can infect a whole flock in three to four days.
 - c. Symptoms in young birds include respiratory problems and nervous disorders.
 - d. Respiratory symptoms in adult chickens are more evident along with reduction in egg production and shell quality.
 - e. Symptoms in turkeys are usually mild and may be unnoticed unless nervous disorders develop.
 - f. Vaccinate for successful treatment.
3. Avian influenza
 - a. Affects the respiratory and nervous systems of both turkeys and chickens.

- b. Symptoms include coughing, wheezing, gasping for air, diarrhea, and nervous problems.
- c. Laying hens may produce fewer or misshapen eggs.
- d. Death rate is low.
- e. No vaccine but antibiotics are helpful.

4. Fowl pox

- a. Affects chickens, turkeys, and other birds.
- b. Infection spread by mosquitos and direct and indirect contact among fowl.
- c. Symptoms include scabbing around the comb, wattles, ear lobes, and eyes.
- d. Yellow sores found in mouth and respiratory tract.
- e. Younger birds will grow slowly.
- f. Laying hens will produce fewer eggs.
- g. No treatment but can be prevented by vaccination.

5. Infectious bronchitis

- a. Only chickens are susceptible.
- b. Spread through the air and contact with clothing, crates, and equipment.
- c. Symptoms confined to respiratory system.
- d. Death rates high in chicks less than three weeks old.
- e. Laying hens have drop in egg production and produce soft-shelled eggs.
- f. Vaccinate laying hens.
- g. No effective treatment except ideal environmental conditions.

6. Laryngotracheitis

- a. Mainly affects older chickens.
- b. Symptoms include coughing, sneezing, gasping, and weepy eyes.
- c. Death rate is high.
- d. Laying hens have reduction in egg production and soft-shelled eggs.
- e. Vaccination is available.
- f. No effective drug treatment.

Objective 3

Explain bacteria and how infection can be spread. Compare it to humans and how bacteria can be spread easily by contact and through the air. Discuss how this process can occur in poultry.

Describe how common bacterial diseases are prevented and controlled in poultry.

Bacterial diseases are caused by single-celled, microscopic organisms.

1. Requires certain environmental temperature, moisture, and nutrition to multiply.
2. Some bacteria beneficial for proper food digestion.
3. Easily transmitted by air, contaminated feed, clothing, equipment, soil, and other diseased animals.
4. Vaccines prevent hazardous bacteria from multiplying.
5. Sanitary environment must be maintained.

Common bacterial diseases

1. Pullorum disease
 - a. Affects both chickens and turkeys. Other fowl can be infected.
 - b. Hen passes bacteria to chicks via the egg.
 - c. Spread by contaminated chicks from one to another.
 - d. Outbreaks occur in chicks less than three weeks old.
 - e. Symptoms include ruffled feathers, labored breathing, huddling together for warmth, and white diarrhea.
 - f. High losses in production due to death of chicks and contamination by survivors to unaffected birds.
 - g. Perform blood tests and cull birds with bacteria.
 - h. Treat with antibiotics and maintain sanitary facilities.
2. Colibacillosis (coliform infections)
 - a. Caused by strains of *Escherichia coli* organism.
 - b. *E. coli* bacteria common in intestinal tracts and common in the birds' environment.
 - c. Infections range in severity from mild to severe.
 - d. Result in respiratory disease, blood disease, intestinal infection, or combination of any or all conditions.
 - e. Symptoms include fever, ruffled feathers, diarrhea, and labored breathing.
 - f. Death may occur suddenly in severe cases and spread through flock quickly.

	<ul style="list-style-type: none"> g. Isolate infected birds quickly. h. Sanitation and management practices reduce organisms. <p>3. Fowl cholera</p> <ul style="list-style-type: none"> a. Most hazardous infectious disease of turkeys but also infects chickens and other birds. b. Enters tissues of the mouth and upper respiratory tract. c. Other animals can be carriers of the disease. d. Symptoms include loss of appetite, rapid weight loss, lameness, swollen wattles, difficult breathing, yellowish or green diarrhea, and purple-colored comb. e. Medicine exists but is not always successful; recovered birds are carriers. f. Rigid sanitation program must be followed. <p>4. Infectious coryza</p> <ul style="list-style-type: none"> a. Respiratory disease that affects many older chickens. b. Outbreaks usually occur from introduction of infected or carrier birds into a flock. c. Symptoms include swollen face around eyes and wattles, nasal discharge, and sneezing. d. Results in decreased feed and water consumption and reduced egg production. e. Antibiotics are helpful but culling is best way to combat disease. d. Cleaning and disinfecting will eliminate the disease.
<p>Objective 4</p> <p><i>Discuss the differences between internal and external parasites. Show samples of parasites for students to examine and identify their traits.</i></p>	<p>Describe how common internal and external parasites are prevented and controlled in poultry.</p> <p>Parasites are organisms that live in or on other animals (hosts) and consume nutrients from the host needed to maintain health.</p> <ul style="list-style-type: none"> 1. May eventually cause death of host. 2. Can survive in hot/ humid conditions or cold and dry conditions. 3. Transmitted through contaminated feed, equipment, clothing, and other animals. <p>External parasites</p> <ul style="list-style-type: none"> 1. Can cause weight loss and reduce egg production.

	<ol style="list-style-type: none"> 2. High mortality can occur in young poults in severe cases. 3. Most serious categories of external parasites are lice and mites. <ol style="list-style-type: none"> a. Lice - flat, wingless, fast-moving insect that bites or sucks their prey; symptoms are frequent picking, pale head and legs, and loss of weight. b. Mites - blood-sucking insects that transmit diseases and cause scabbing; symptoms include reduced egg production, slow growth, damaged feathers, and possible death. c. Periodic inspections of birds will help prevent mites and lice. d. Effective treatment administered via dusts and sprays. <p>Internal parasites</p> <ol style="list-style-type: none"> 1. Worms are most common and primarily affect birds raised on the range. 2. Varieties are tapeworm, large roundworm, and gapeworm. 3. Live in the intestines and linings. 4. Cause slow growth and lower production. 5. Specific treatments for each type of worm. 6. Check flock periodically for presence of worms. 7. Rotate flocks on the range and maintain strict sanitary environment.
<p>Objective 5</p> <p><i>Explain what biosecurity is and why it is so important to maintain the health of the flock. Discuss ways that the poultry facility can reduce flock contamination from outside sources.</i></p>	<p>Explain the importance of biosecurity.</p> <ol style="list-style-type: none"> 1. Biosecurity involves practices designed to prevent the introduction of diseases or parasites into the poultry operation. 2. Reduce risk of outside sources of biological organisms, such as viruses, bacteria, and parasites from contaminating the flock. 3. Major components are isolation, traffic control, and sanitation. <ol style="list-style-type: none"> a. Isolation separates the birds by age group. <ol style="list-style-type: none"> 1. All-in, all-out system brings birds in at same time and age. 2. Birds marketed at same time with thorough cleaning, sanitization before next flock brought in.

	<ol style="list-style-type: none"> 3. Keeps out unwanted animals that carry disease. b. Traffic control includes both traffic onto and within the farm. <ol style="list-style-type: none"> 1. Only authorized personnel should be allowed in or around facilities. 2. Vehicle traffic kept to minimum with necessary traffic cleaned and sanitized as needed. c. Sanitation disinfects materials and equipment and ensures cleanliness of personnel.
<p>Application</p> <p>📄 AS 1 – Symptoms, Treatment, and Prevention of Disease</p>	<p>Answers to AS 1</p> <ol style="list-style-type: none"> 1. Internal lesions, significant weight loss, diarrhea, and paralysis in legs, wings, and neck 2. No treatment 3. Vaccinate day-old chicks at the hatchery 4. Newcastle disease 5. Viral 6. No treatment 7. Vaccination 8. Viral 9. Coughing, wheezing, gasping for air, diarrhea, and nervous problems 10. Good management 11. Fowl pox 12. Viral 13. Viral 14. Respiratory system including difficulty breathing, gasping, sneezing, and watery nasal discharge 15. No treatment 16. Ideal environmental conditions. 17. Pullorum disease 18. Ruffled feathers, labored breathing, chilled appearance, and white diarrhea 19. Antibiotics and sanitary facilities 20. Bacterial 21. Fever, ruffled feathers, diarrhea, and labored breathing 22. Good sanitation and management practices 23. Fowl cholera 24. Bacterial 25. Sanitation program 26. Bacterial

	<p>27. Swollen face around eyes and wattles, nasal discharge, and sneezing</p> <p>28. Good management and sanitation</p> <p>29. Viral</p> <p>30. Coughing, sneezing, gasping, and weepy eyes</p> <p>Other activities</p> <ol style="list-style-type: none"> 1. Have students research poultry diseases and parasites and create a disease and parasite identification chart. 2. Research vaccination treatments for viruses and bacterial infestations. Familiarize students with the information contained on the container labels.
Closure/Summary	<p>Poultry health is extremely dependent on the maintenance of ideal environmental conditions. Sanitation and disinfection practices are of utmost importance in the reduction and prevention of disease and parasite contamination. Effective biosecurity measures must be observed by everyone involved in the production process.</p>
Evaluation: Quiz	<p>Answers</p> <ol style="list-style-type: none"> 1. Daily 2. Isolated 3. Visitors 4. Viral 5. Bacterial 6. a 7. b 8. a 9. b 10. a 11. Answers will vary but may include: good management, sanitation, cleaning, disinfecting, and vaccination 12. Internal - lice or mites; External - tapeworm, large roundworm, and gapeworm 13. Isolation, traffic control, and sanitation

Symptoms, Treatment, and Prevention of Disease

Objective: Complete the chart to become familiar with the symptoms, treatment and prevention of poultry diseases.

Disease	Type	Symptoms	Treatment	Prevention
Marek's disease	Viral	1.	2.	3.
4.	5.	Respiratory problems (i.e., difficulty breathing, sneezing, and gasping) and nervous disorders (i.e., paralysis and tremors)	6.	7.
Avian influenza	8.	9.	No vaccine. Antibiotics may help reduce infection	10.
11.	12.	Scabbing around comb, wattles, ear lobes, and eyes. Yellow sores in mouth and respiratory tract.	No cure	Vaccine
Infectious bronchitis	13.	14.	15.	16.

17.	Bacterial	18.	19.	Blood tests of breeder flocks. Cull birds that carry bacteria.
Colibacillosis	20.	21.	Infected birds are culled.	22.
23.	24.	Loss of appetite, rapid weight loss, lameness, swollen wattles, difficult breathing, yellowish/green diarrhea, and purple-colored comb	Use medicine to lessen disease.	25.
Infectious coryza	26.	27.	Antibiotics and cull all carriers.	28.
Laryngotracheitis	29.	30.	No treatment	Vaccination

EVALUATION

Complete the following statements by filling in the blank.

1. The poultry flock should be checked _____ for any signs of disease.
2. Flocks used for different production purposes should be _____ from each other.
3. To avoid bringing in contamination, _____ should be kept to a minimum inside production facilities.
4. Microorganisms that need to live in a host to duplicate themselves can cause _____ diseases.
5. Single-celled, microscopic organisms that require certain temperatures and moisture to survive can cause a _____ disease.

Indicate whether the following diseases are considered viral diseases or bacterial diseases.

- | | |
|-------------------------|----------------------|
| ___6. Fowl pox | a. Viral disease |
| ___7. Pullorum disease | b. Bacterial disease |
| ___8. Newcastle disease | |
| ___9. Colibacillosis | |
| ___10. Marek's disease | |

Complete the following short answer questions.

11. Give two examples of ways to prevent and control disease in poultry.
 - a.
 - b.

12. What are two types of parasites? Give an example of each.

a.

b.

13. What are the three major components of biosecurity?

a.

b.

c.

Course	Agricultural Science I
Unit	Introduction to Poultry Production
Lesson	Processing and Marketing
Estimated Time	50 minutes
Student Outcome	

Identify procedures involved in processing poultry products.

Learning Objectives

1. Explain the steps in processing poultry for meat.
2. Describe how the poultry industry has added value to its products.
3. Identify the common sanitation and inspection concerns.
4. Identify the steps in egg processing.
5. Explain how eggs are marketed.

Grade Level Expectations

Resources, Supplies & Equipment, and Supplemental Information

Resources

1. *Introduction to Poultry Production (Student Reference)*. University of Missouri-Columbia: Instructional Materials Laboratory, 1999.
2. *Introduction to Poultry Production Curriculum Enhancement*. University of Missouri-Columbia: Instructional Materials Laboratory, 2003.

Supplemental Information

1. Internet Sites
 - ❑ "Animal Science Publications." MU Extension. University of Missouri-Columbia. Accessed October 2, 2007, from <http://extension.missouri.edu/explore/agguides/ansci/>.
 - ❑ "Egg Grading Manual." *Agricultural Handbook Number 75*. Agricultural Marketing Service. United States Department of Agriculture. Accessed October 2, 2007, from <http://www.ams.usda.gov/Poultry/pdfs/EggGrading%20manual.pdf>.
 - ❑ "Poultry Products Safety and Quality Peak of Excellence Program." College of Agriculture: Department of Poultry Science. Auburn University. Accessed October 2, 2007, from <http://www.ag.auburn.edu/poul/peakwelcome.html>.
 - ❑ "Poultry Programs." Agricultural Marketing Service. United States Department of Agriculture. Accessed October 2, 2007, from <http://www.ams.usda.gov/poultry>.
 - ❑ "USDA Poultry Grading Manual." *Agriculture Handbook Number 31*. Agricultural Marketing Service. United States Department of Agriculture. Accessed October 2, 2007, from <http://www.ams.usda.gov/poultry/resources/PYGradingManual.pdf>.
2. Print
 - ❑ Ensminger, M.E., *Poultry Science*. 3rd ed. Danville, IL: Interstate Publishers, Inc., 1992. Gillespie, James R., *Modern Livestock and Poultry Production*, 5th ed. Albany: Delmar Publishers. 1997.

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- ❑ *Introduction to Animal Reproduction (Student Reference)*. University of Missouri-Columbia: Instructional Materials Laboratory, 1996.
 - ❑ Moreng, Robert E. and John S. Avens. *Poultry Science and Production*. Prospect Heights, IL: Waverly Press, Inc. 1991.
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Interest Approach

Have students call or visit a grocery store to talk with the manager or employees in the meat department. Student should ask the following:

- Where is the meat from? Is the meat a local product? Is the meat from in the state or from out-of-state?
- In what form does the meat come into the store?
- How it is handled and displayed for sale after arrival?

Communicate the Learning Objectives

1. Explain the steps in processing poultry for meat.
2. Describe how the poultry industry has added value to its products.
3. Identify the common sanitation and inspection concerns.
4. Identify the steps in egg processing.
5. Explain how eggs are marketed.

Instructor Directions	Content Outline
<p>Objective 1</p> <p><i>Considering the interest approach, ask students what is important to the consumer. What do students think is done in the processing plant to prepare a bird?</i></p>	<p>Explain the steps in processing poultry for meat.</p> <p>Remove food (but not water) from the poultry house in preparation for processing</p> <ol style="list-style-type: none">1. 8 to 10 hours before taking birds to processing plant.2. Minimizes amount of food in the intestine to avoid contamination during evisceration. <p>Major steps in processing</p> <ol style="list-style-type: none">1. Stunning by electrical shock to render bird unconscious.2. Bleeding to allow blood to drain completely to avoid discoloration.3. Scalding submerges carcass into hot water for 1.5 to 2 minutes. Relaxes muscles that hold feathers making it easier to remove feathers.4. Picking removes feathers from the bird by machine that has rotating rubber fingers.<ol style="list-style-type: none">a. Remaining feathers burned off.b. Rinse with water to remove foreign matter, blood, and feathers from the carcass.5. Evisceration removes organs of abdominal cavity, lungs, and heart. Feet, head, and oil gland also removed at this time.6. Rapidly chilled in ice water, graded, packaged, and labeled.

Instructor Directions	Content Outline
	<p>Mark as ice-packed, dry chill-packed, or vacuum-packed frozen</p> <ol style="list-style-type: none"> 1. Ice packing places processed poultry into waxed boxes filled with crushed ice or CO₂ (Dry Ice). 2. Dry, chill-packed poultry is placed on small trays with absorbent paper, wrapped in plastic wrap, then passed through a blast freezer to chill meat. 3. Vacuum-packed frozen poultry wrapped in plastic bags, and then frozen in blast freezer.
<p>Objective 2</p> <p><i>Ask students what poultry products they eat or have seen available at their local grocery stores and fast-food restaurants. Discuss how these processed poultry items have added to consumer demand for poultry products.</i></p>	<p>Describe how the poultry industry has added value to its products.</p> <ol style="list-style-type: none"> 1. USDA grading system and further processing of product has added value to poultry. 2. Grading system enables sale of top grade meat at a higher price than non-graded meat. 3. Further processing of meat and eggs offers convenience to the consumer and increases sales. 4. Industry sells traditional whole, oven-ready carcasses and now offers a variety of poultry items that are easy to prepare. 5. Small percentage of broilers sold as whole carcasses. Most are sold as cut-up parts, cooked, or further processed.
<p>Objective 3</p> <p><i>Ask students what they think an inspector should look for in a processing plant. Ask students if they see the value of doing scientific testing for bacteria in processing plants. Why or why not?</i></p>	<p>Identify the common sanitation and inspection concerns.</p> <ol style="list-style-type: none"> 1. The poultry industry is responsible for maintaining strict sanitation regulations as set by the government. 2. Only producers who subscribe to the USDA grading system and pass strict regulations for facility and carcass sanitation and quality standards may use the USDA symbol. 3. USDA inspectors make inspections of live birds to look for symptoms of disease or problems that would make product unsuitable for human consumption. 4. USDA inspects bird carcasses to look for unusual body conditions that make the carcass unfit to be consumed by humans. 5. Carcasses graded by USDA-trained graders.

Instructor Directions	Content Outline
	<ol style="list-style-type: none"> 6. USDA inspectors monitor facilities, employees, plant grounds, and equipment to meet strict sanitation standards. 7. In 1996, HACCP (Hazard Analysis and Critical Control Points) legislation implemented scientific testing for bacteria. <ol style="list-style-type: none"> a. Every plant must adopt a HACCP plan to deal with specific and potential hazards of the product; kept in check by USDA inspectors from the Food Safety and Inspection Service. b. Every slaughter facility must have regular carcass testing for <i>E. coli</i> bacteria. c. All plants that produce ground-up products must have routine Salmonella testing. d. Every plant must write out and perform a sanitation Standard Operation Procedure (SOP) for meeting sanitation responsibilities.
<p>Objective 4</p> <p><i>Ask students what processing procedures they think are involved in egg production. As a consumer how would they choose eggs in the grocery store.</i></p>	<p>Identify the steps in egg processing.</p> <ol style="list-style-type: none"> 1. Naturally prepackaged food. 2. Eggs washed to remove any manure or foreign matter stuck to the shell. 3. Wash eggs in water warmer than the eggs. Avoids shrinking slightly and creating a vacuum that sucks in impurities and bacteria. 4. Air dry eggs after washing. 5. Oil eggs with paraffin-based mineral oil to replace washed away protective layer. 6. Candle eggs looking for unsuitable eggs. <ol style="list-style-type: none"> a. Air cell size b. Yolk shadow position c. Presence of blood or meat spots d. Presence or lack of germ development 7. Cull unsuitable eggs. 8. Refrigerate eggs. 9. Weighed, graded, and packaged for retail.

<p>Objective 5</p> <p><i>Discuss ways that students have been aware of marketing of eggs on television or in print ads. What have they heard about the nutritional value of eggs? What was the source of this information?</i></p>	<p>Explain how eggs are marketed.</p> <ol style="list-style-type: none"> 1. Value added to product by wise marketing and use of further processing. 2. Fast food restaurants use egg products for breakfast foods. 3. American Egg Board advertising campaigns promote versatility and nutritional benefits. 4. Quality ensured by egg grading. USDA standards can sell an egg with high grade symbol at a higher price.
<p>Application</p>	<p>Other activities</p> <ol style="list-style-type: none"> 1. Examine an egg under a bright light, as in candling, to observe any shapes or forms in the egg. 2. Cut up a chicken and identify the parts. 3. Compare processed cold cuts such as smoked turkey slices, turkey ham, and turkey bologna.
<p>Closure/Summary</p>	<p>Poultry and egg production processing is highly regulated to provide a quality product to the consumer. Standards established by the USDA and HAACP guidelines regulate the industry to maintain sanitary and safe conditions for the consumer and the worker. Added value with additional processing has increased demand for poultry products. Marketing campaigns have helped to maintain and improve the image of the poultry industry.</p>
<p>Evaluation: Quiz</p>	<p>Answers</p> <ol style="list-style-type: none"> 1. Reduces food in the intestine that can cause contamination during evisceration. 2. Stunned, bled, scalded, picked, eviscerated, chilled, graded, packaged, and labeled. 3. Answers will vary but should include: USDA grading system allowing top-grade meat to be sold at a higher price; convenience products add increased sales to the poultry industry. Examples of further processed products are breast fillets, nuggets, hot dogs, cold cuts, ground meat, sausages, and frozen dinners. 4. Routine scientific testing for hazardous bacteria 5. To replace the washed away protective layer 6. Examine the egg in front of light to observe internal characteristics to determine if egg is edible or hatchable.

	7. Eggs with USDA grade symbol can be sold at a higher price.
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EVALUATION

Complete the following short answer questions.

1. Why is it important to remove food from chickens before being processed?

2. List the steps in processing poultry meat.

a.

b.

c.

d.

e.

f.

g.

h.

i.

3. The poultry industry has added value to its products by further processing. What does this mean? Give three examples of further processed products of the poultry industry.

4. What important new element has the HACCP legislation added to poultry and meat processing plant inspections?

5. Why are eggs oiled during egg processing?

6. Explain what it means to “candle” the egg.

7. When marketing eggs, why is it important that eggs be marked with the USDA grade symbol?

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Curriculum Guide: *Introduction to Poultry Production*

Unit Objective:

Students will apply principles of poultry production to design, organize, and participate in a mini Poultry Career Development Event.

Show-Me Standards: 1.8, CA6

References:

Introduction to Poultry Production. University of Missouri-Columbia, Instructional Materials Laboratory, 1999.

Missouri CDE Handbook. Accessed January 7, 2003, from http://www.dese.state.mo.us/divvoced/ag_cde_guidelines.htm.

Instructional Strategies/Activities:

- Students will engage in study questions in lessons 1 through 6.
- Students will complete AS 1.1, Identify Poultry Class Traits; AS 2.1, Identify Parts of a Chicken; and AS 2.2, Identify Parts of a Turkey.
- Additional activities that relate to the unit objective can be found under the heading “Other Activities” in the following locations: p. 6 (1, 4), p. 18 (1, 2), and p. 73 (1, 2, 3).

Performance-Based Assessment:

Students will work in groups to design, organize, and participate in a mini Poultry Career Development Event. Each group will be responsible for one class of poultry or poultry products in the event and will also compete as a team in the whole event.

Assessment will be based on the overall content and presentation of the class of poultry or products and performance in the contest. At the instructor’s discretion, students will contribute to the assessment process by providing a brief evaluation of their teammates’ performance in designing and setting up their poultry class display.

Introduction to Poultry Production 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 students into groups and assign each group to organize a class of poultry or poultry products in a mini Poultry Career Development Event.
 - a. Each group will also compete in the whole event as a team.
 - b. The event will follow the format and guidelines of a larger contest but will be scaled to the size and time constraints available for the project.
2. Explain or review event format, guidelines, and scoring as needed. Refer to the *Missouri CDE Handbook* for guidelines regarding Poultry 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/divvoted/ag_cde_guidelines.htm.
3. Students will be responsible for the content of the information in their display, the items to be identified or graded by the contestants, and overall presentation.
 - a. Sample classes could include, but are not limited to, breed identification and evaluation and grading carcasses, eggs, and poultry products.
 - b. For event classes in which cost or availability of materials could be prohibitive for students, such as locating unsuitable carcasses or eggs, the students may consult the instructor for assistance, but the students must be responsible for the overall design and presentation of their class of poultry or products.
4. If desired, have students contribute to the assessment process by completing a short evaluation of their teammates' performance in helping to design and set up their portion of the Poultry Career Development Event. 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.

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- 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.
5. The final assessment score will be a combination of the student's poultry class display score, contestant score, and final peer evaluation score.
6. To mirror contest format, an appropriate award may be given to the high-scoring team and individual.

**Introduction to Poultry Production
Student Handout**

1. The instructor will divide the class into groups.
2. Your group will organize a class of poultry or poultry products in a mini Poultry Career Development Event.
3. Your group will also compete in the whole event as a team.
4. The contest will follow the format and guidelines of a full-scale Poultry Career Development Event.
5. You will be responsible for the content of the information in your display, the items to be identified or graded by the contestants, and the overall presentation.
6. For poultry or product classes in which cost or availability of materials could be prohibitive, you may consult the instructor for assistance, but you will be responsible for the overall design and presentation of your class of poultry or products.
7. If requested, you will contribute to the assessment process by completing a short evaluation of your teammates' performance in helping to design and set up your display.
 - a. Following the event, fill out the peer evaluation score sheet.
 - b. Give the completed score sheet to your instructor.
8. Your final assessment score will be a combination of your poultry class display score, your contestant score, and your final peer evaluation score.

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Introduction to Poultry Production Scoring Guide

Name _____

Assessment Area	Criteria	0 Points	1 Point	2 Points	3 Points	4 Points	Weight	Total
Information and Content of Poultry Career Development Event Project	<input type="checkbox"/> Information is complete <input type="checkbox"/> Facts are accurate <input type="checkbox"/> Provides useful information about poultry and poultry management <input type="checkbox"/> Prepares participants for larger Career Development Events	0 criteria met	1 criterion met	2 criteria met	3 criteria met	All 4 criteria met	X 10	
Presentation of Poultry Career Development Project Display	<input type="checkbox"/> Well organized <input type="checkbox"/> Eye appealing <input type="checkbox"/> No spelling, grammar, or punctuation errors <input type="checkbox"/> Supports information and content	0 criteria met	1 criterion met	2 criteria met	3 criteria met	All 4 criteria met	X 2.5	
TOTAL								/50 pts.

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Assessment Area	Breed Identification 0-11 Points	Ready-To-Cook Carcasses 0-11 Points	Cartoned Eggs 0-11 Points	Further-Processed Poultry Meat Products 0-11 Points	Total
Poultry Career Development Event					
Peer Evaluation				6 pts. maximum	
TOTAL					/50 pts.

Final Assessment Total _____/100 pts.

Comments:

**Introduction to Poultry Production
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.)

