Lesson # 1

Introduction to the Poultry Industry

Core Area: Animal Science

Unit: Poultry Industry

Lesson # 1: Introduction to the Poultry Industry

California CTE Standards (Agriculture):

C3.1 Understand how an agricultural commodity moves from producer to consumer.
C4.3 Understand the modern-day use of animals and animal by-products.
C7.2 Compare genetic characteristics among cattle, sheep, swine, and horse breeds.
D4.5 Understand commonly used animal production breeding systems (e.g., purebred compared with crossbred) and reasons for their use.
D5.1 Evaluate a group of animals for desired qualities and discern among them for breeding selection.
D12.1 Understand animal harvest, carcass inspection and grading, and meat processing safety regulations and practices and the removal and disposal of non-edible by-products, such as those outlined in Hazard Analysis and Critical Control Point documents.
D12.4 Understand how non-meat products (such as eggs, wool, pelts, hides, and by-products) are harvested and processed.
D12.5 Understand how meat products and non-meat products are marketed.
FS 8.1 Know major local, district, state, and federal regulatory agencies and entities that affect industry and how they enforce laws and regulations.

California Academic Standards.

Reading Comprehension (Grades 9-10)
2.3 Generate relevant questions about readings on issues that can be researched.

Student Learning Objectives. Instruction in this lesson should result in students achieving the following objectives:

1. List and explain the vertical integrated structure of the modern poultry industry.
2. Identify and describe common meat and layer breeds of chickens.
3. Identify and describe the most common meat breed of turkey.

List of Resources. The following resources may be useful in teaching this lesson:

1. National Chicken Council – http://www.nationalchickencouncil.com
2. Choosing a Chicken Breed: Egg, Meat, or Exhibition – http://www.ces.purdue.edu/extmedia/AS/AS-518.pdf
3. American Poultry Association – http://www.amerpoultryassn.com/

List of Equipment, Tools, Supplies, and Facilities.

- ✓ Ladder
- ✓ Computer and Data Projector
- ✓ Power Point Presentation
- ✓ Copies of Student Handouts
- ✓ Copies of Student Worksheets

Terms. The following terms are presented in this lesson (shown in bold italics):

- ➢ Breeds
- ➢ Breeder
- ➢ Feed Mill
- ➢ Growout Ranch
- ➢ Hatchery
- ➢ Marketing
- ➢ Primary Breeder
- ➢ Processing Plant
- ➢ Transportation

Interest Approach. Use an interest approach that will prepare the students for the lesson.

Use a ladder, or alternatively a drawing of a ladder, to introduce the vertically integrated structure of the poultry industry. Place a picture or actual processed poultry product at the top of the ladder, such as a chicken nugget. Discuss with students the steps that take place in order for that product to get to its final step. You may create note cards with the 8 levels print on them so that the instructor can stick them onto the ladder on their respective steps in the process. Once this introductory activity is complete the instructor can refer to the ladder model throughout the lesson when describing each of the industry components.

SUMMARY OF CONTENT AND TEACHING STRATEGIES

Objective 1: List and explain the vertical integrated structure of the modern poultry industry.

Anticipated Problem: What are the components or levels of the modern poultry industry? What does it mean to be vertically integrated?

(Distribute student note sheet and refer to PowerPoint slides 2-16)

I. There are many segments of the poultry industry. These segments are all interlinked and many times owned by the same company. This type of ownership is called Vertical Integration.

II. Vertical Integration
   a. It is a style of business management that allows for maximum control of the products produced.
   b. It is much like a ladder concept as each segment relies on the segment below them to supply them with what they need, while that segment must produce the product the next segment needs.
   c. It is like a hierarchy of needs that are met within one company.
   d. It allows the poultry industry to develop their product efficiently and to produce a high quality product.

III. The Structure
   a. This ladder consists of 8 steps
      i. Primary Breeders
      ii. Feed Mill
      iii. Breeders
      iv. Hatchery
      v. Growout Ranches
      vi. Processing Plants
      vii. Further Processing
      viii. Transportation and Marketing
   b. Primary Breeders
      i. Their responsibility is to develop and reproduce strains of chicken that meet the requirements of chicken producer/processing companies.
      ii. Through development and reproduction they aim to achieve desirable characteristics such as abundant white meat and efficient feed conversion.
      iii. Breeder chicks with the appropriate mix of desirable characteristics are then sold to integrated chicken firms.
   c. Feed Mill
      i. Chicken companies own ***feed mills*** that convert raw materials into finished feed according to very specific formulas developed by poultry nutritionists.
      ii. They produce about 4-5 different formulas to feed all of the different nutrition stages of chickens.

d. Breeders
    i. Operated by contract growers who raise the breeder chicks to adult birds.
    ii. Breeding hens and roosters are kept under tight biosecurity on breeder farms to produce fertile hatching eggs.
    iii. The offspring of breeder parents will then be raised to become broilers for the market.
e. Hatchery
    i. Is a specialized facility designed to hatch fertile eggs received from breeder farms.
    ii. Fertile eggs are placed in incubators and carefully monitored to ensure that correct temperature and humidity levels are maintained throughout the entire incubation period.
    iii. Towards the end of incubation, the eggs are placed in hatching trays where the chicks hatch out by pecking their way through the large end of the egg.
f. Growout Ranches
    i. The newly hatched chicks are transported to ***growout farms*** where independent farmers raise them to market weight under contract with the company.
    ii. The company provides the chicks, feed, and any necessary pharmaceuticals.
    iii. The farmer provides the growout house, water, bedding ("litter"), electricity, and his own management skill.
    iv. The chickens reach market weight of approximately five pounds in six or seven weeks and are collected to be taken to the processing plant.
g. Processing Plants
    i. The ***processing plant*** harvests the birds by humane standards and are inspected by the USDA for any disease or defects.
    ii. The carcasses are then chilled in ice-cold water to limit the growth of bacteria.
    iii. Following chilling, they are packaged for distribution or cut into parts.
h. Further Processing
    i. They are specialized operations or plants that receive whole chicken or cut-up parts and perform a variety of further processing steps.
    ii. These steps include cooking, breading, or marinating.
i. Transportation and Marketing
    i. Chicken products are ***transported*** in refrigerated trucks from the processing plant, further processing plants, and then to the grocery stores.

IV. Value to the Economy
a. Vertical integration within the poultry industry gives producers greater control over the production of quality products that successfully meet consumer wants and needs in an attractive, timely, and efficient manner.
b. It has shown to be more cost effective for the company as well.

Activity/Teacher Notes: *Using the ladder model, conduct a review by asking students to describe each level of the poultry industry and what occurs during each phase of the process discussed in class. Have students complete Worksheet #1 to reinforce this information.*

Objective 2: Identify and describe the common meat and layer breeds of chickens.

Anticipated Problem: What are the common breeds of meat and laying chickens?

(Ask students to continue using student note sheet and refer to PowerPoint Slides 17-23)

I. The Chicken Industry has well over fifty ***breeds*** that are recognized by the American Poultry Association. These breeds are broken down by classifications and use. The use of these animals would be layers, meat, and dual use.

II. Meat Breeds
   a. They are not really breeds.
   b. Instead, they are hybrid varieties or combinations of many different breeds.
   c. These varieties are developed for specific characteristics:
      i. grow faster and larger
      ii. larger breast meat yield
      iii. more efficient feed conversion
      iv. more disease resistance
   d. These varieties are used by broiler producing companies that commercially produce broilers sold in supermarkets.
   e. Weakness of these varieties
      i. They do not lay as many eggs as the layer breeds.

III. Specific Variety Used in Industry
   a. Cornish Cross
      i. White Cornish x White Plymouth Rock
         1. Their fast growth allows them to reach 4-5 lbs in 6 weeks and 6-10 lbs in 8-12 weeks.
      ii. White Cornish
         1. They are part of the English Class.
         2. They have a very broad and meaty body.
      iii. White Plymouth Rock
         1. They are part of the American Class.
         2. They tend to be docile and fairly good dual-purpose breed.

IV. Layers Breeds
   a. They have been genetically selected for high egg productivity.
   b. They tend to be small bodied so they are undesirable for meat production.
      i. These small bodies allow the bird to put more nutrients toward egg production instead of body size.
   c. They are divided into two types
      i. Those that lay white or brown eggs.
      ii. Chicken breeds with white ear lobes lay white eggs, whereas chickens with red ear lobes lay brown eggs.

V. Specific Breeds Used in Industry
   a. White Leghorns
      i. They are part of the Mediterranean Class.
      ii. Very good layer of white eggs.
      iii. Basis of commercial egg industry.

b. Rhode Island Red
    i. They are part of the American Class.
    ii. They lay brown eggs.
    iii. Production-bred strains lay very well.

Activity/Teacher Notes: *Lead students in a review of chicken breeds in order to reinforce the information presented and to assess student learning. Ask students to name the common breeds and describe their attributes.*

Objective 3: Identify and describe the common meat breed of turkeys?

Anticipated Problem: What is the common meat breed used in the commercial turkey industry?

(Ask students to continue using student note sheet and refer to PowerPoint Slides 24-26)

I. There are currently eight breeds of turkeys that are recognized by the American Poultry Association. There are several breeds that are not officially recognized as a breed but these are the varieties that are commercially used by the industry. These breeds are predominately used for meat.
II. Meat Breed
    a. Broad Breasted White
        i. Commercially the most widely-used breed of domesticated turkey.
        ii. They have shorter breast bones and legs than “standard” turkeys.
            1. They are unable to breed naturally and require assistance from humans.
        iii. Produce more breast meat and their pin feathers are less visible when the carcass is dressed due to their white color.

Activity/Teacher Notes: *Lead students in a review of turkey breeds in order to reinforce the information presented and to assess student learning. Ask students to name the common breeds and describe their attributes.*

Review/Summary. Focus the review of the lesson around the student learning objectives. Ask students to explain the content associated with each objective. Use their responses as the basis for determining any areas that need to be covered again.

Application. Application can involve student activity with the provided labs.

Evaluation. Evaluation should focus on student achievement of the objectives for the lesson. Various techniques can be used, such as a written test. A sample test is attached.

Answers to Sample Test:

Part One: Matching

D	1. Transportation
E	2. Processing plant
F	3. Primary breeder
G	4. Marketing
H	5. Hatchery
I	6. Growout ranch
C	7. Feed mill
B	8. Breeder
A	9. Breeds

Part Two: Hierarchy

Primary Breeders
Feed Mill
Breeders
Hatchery
Growout Ranches
Processing Plant
Further Processing
Transportation and Marketing

Part Three: T / F

1. T
2. F
3. T
4. T
5. T
6. F
7. T
8. F
9. T
10. T
11. F
12. F
13. T

Poultry Industry Student Note Sheet

- There are many _____ of the poultry industry. These segments are all _____ and many times owned by the same company. This type of ownership is called _____.

- Vertical Integration
  - It is a style of business _____ that allows for _____ control of the products produced.
  - It is much like a _____ _____ as each segment relies on the segment below them to supply them with what they need while that segment must produce the product the next segment needs.
  - It is like a _____ of needs that are met within one company
  - It allows the poultry industry to develop their product _____ and to produce a high _____ product.

- The Structure
  - This ladder consists of 8 steps
    - Primary Breeders
    - _____ _____
    - Breeders
    - Hatchery
    - Growout Ranches
    - _____ _____
    - Further Processing
    - Transportation and Marketing
    - _____to the Economy

  - Primary Breeders
    - Their responsibility is to _____and reproduce strains of chicken that meet the requirements of chicken producer/processing companies.
    - Through development and reproduction they aim to _____desirable characteristics such as abundant white meat and efficient feed conversion.
    - Breeder chicks with the appropriate mix of desirable characteristics are then _____to integrated chicken firms.

  - Feed Mill
    - Chicken companies _____ feed mills that convert raw materials into finished feed according to very _____formulas developed by poultry nutritionists.
    - They produce about _____different formulas to feed all of the different nutrition stages of chickens.

- Breeders
  - Operated by _____ _____who raise the breeder chicks to adult birds.
  - Breeding hens and roosters are kept under tight _____on breeder farms to produce fertile hatching eggs.
  - The offspring of breeder parents will then be raised to become _____for the market.

- Hatchery
  - Is a specialized facility designed to hatch fertile eggs received from _____ _____
  - Fertile eggs are placed in _____and carefully monitored to ensure that correct temperature and humidity levels are maintained throughout the entire incubation period.
  - Towards the end of incubation, the eggs are placed in _____trays where the chicks hatch out by pecking their way through the large end of the egg.

- Growout Ranches
  - The newly hatched chicks are _____to growout farms where independent farmers raise them to market weight under contract with the company.
  - The company provides the _____, _____, and any necessary pharmaceuticals
  - The farmer provides the growout house, _____, _____("litter"), electricity, and his own management skill.
  - The chickens reach market weight of approximately _____pounds in six or seven weeks and are collected to be taken to the processing plant.

- Processing Plants
  - The processing plant harvests the birds by _____standards and are inspected by the _____ for any disease or defects.
  - The carcasses are then chilled in _____water to limit the growth of bacteria.
  - Following chilling they are packaged for _____or cut into parts.

- Further Processing
  - They are specialized operations or plants that receive whole chicken or cut-up parts and perform a variety of further processing steps
  - These steps include _____, _____, or marinating.

- Transportation and Marketing
  - Chicken products are transported in _____ trucks from the processing plant, further processing plants, and then to the grocery stores.

- Value to the Economy
  - Vertical integration within the poultry industry gives producers greater _____over the production of quality products that successfully meet consumer wants and needs in an _____, timely, and efficient manner.
  - It has shown to be more _____effective for the company as well.

- Chicken Breeds
  - The Chicken Industry has well over _____ breeds that are recognized by the American Poultry Association. These breeds are broken down by classifications and use. The use of these animals would be _____, meat, and dual use.
  - Meat Breeds
    - They are _____ really breeds.
    - Instead, they are hybrid _____or combinations of many different breeds.
    - These varieties are developed for specific characteristics:
      - Grow _____ and larger
      - Larger breast meat _____
      - More _____ feed conversion
      - _____ disease resistance
    - These varieties are used by _____producing companies that commercially produce broilers sold in supermarkets.
    - Weakness of these varieties
      - They do _____lay as many eggs as the layer breeds
  - Specific Variety Used in Industry
    - Cornish Cross
      - *White* _____ *x White* _____*Rock*
        - Their fast _____ allows them to reach 4-5 lbs in 6 weeks and 6-10 lbs in 8-12 weeks.
      - White Cornish
        - They are part of the _____ Class
        - They have a very _____ and meaty body.
      - White Plymouth Rock
        - They are part of the _____ Class
        - They tend to be docile and fairly good _____-purpose breed

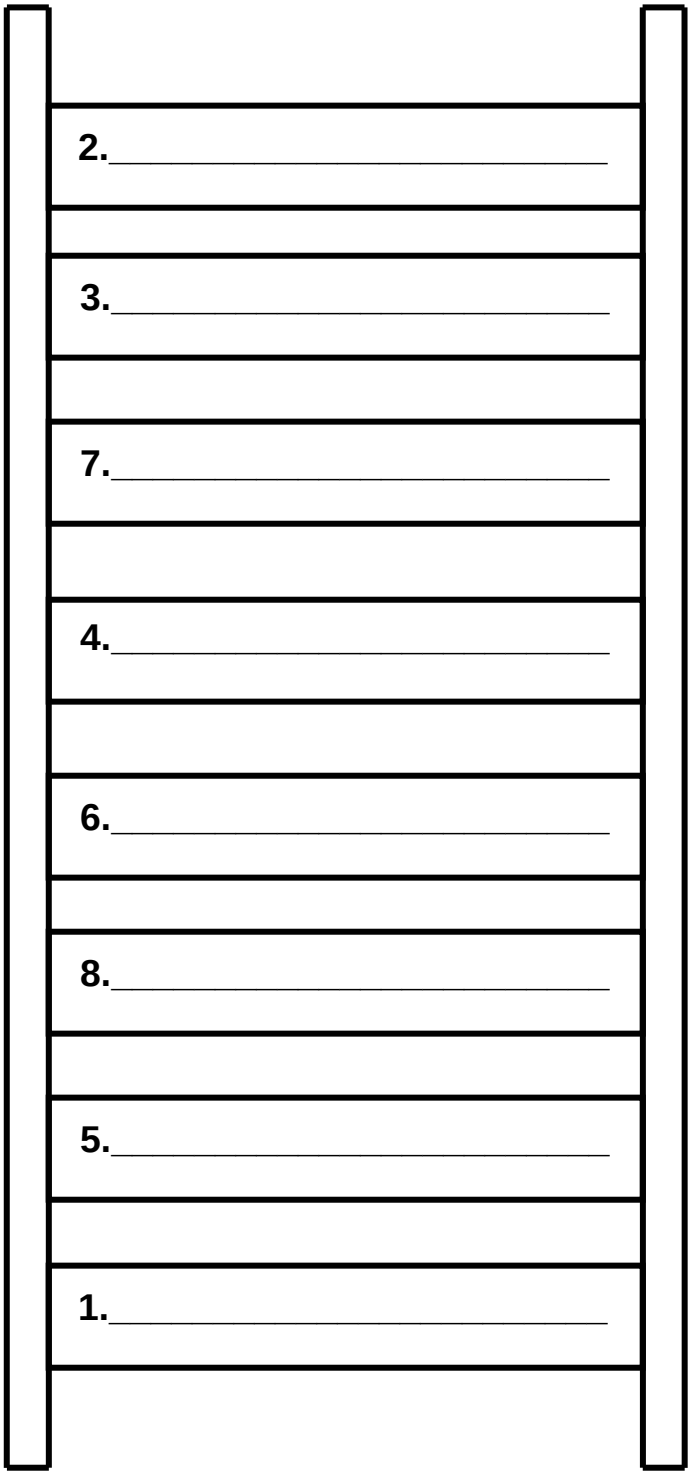
- Layers Breeds
  - They have been genetically selected for high egg _____
  - They tend to be _____ bodied so they are undesirable for meat production.
    - These small bodies allow the bird to put more _____toward egg production instead of body size.
  - They are divided into two types
    - Those that lay _____or _____eggs
    - Chicken breeds with _____ ear lobes lay white eggs, whereas chickens with _____ear lobes lay brown eggs.

  - Specific Breeds Used in Industry
    - White Leghorns
      - They are part of the _____ Class
      - Very good layer of _____ eggs
      - Basis of commercial egg industry
    - Rhode Island Red
      - They are part of the _____ Class
      - They lay _____ eggs
      - Production-bred strains lay very well

- Turkey Breeds
  - There are currently _____ breeds of turkeys that are recognized by the American Poultry Association. There are several breeds that are_____ officially recognized as a breed but these are the varieties that are commercially used by the industry. These breeds are predominately used for _____.
  - Meat Breed
    - Broad Breasted White
      - Commercially, the _____ widely-used breed of domesticated turkey.
      - They have _____ breast bones and legs than “standard” turkeys.
        - They are _____ to breed naturally and require assistance from humans.
      - Produce _____ breast meat and their pin feathers are less visible when the carcass is dressed due to their white color.

Poultry Industry Vertical Integration Worksheet

Directions: Fill in the ladder with the appropriate “steps” in the Poultry Industry’s vertical integrated model. Use the clues on the right to help you fill in the corresponding numbered step on the ladder below.



1. Develop and reproduce strains of chickens.
2. Product is moved by a refrigerator truck.
3. Where cooking and breading take place.
4. Where chickens reach market weight.
5. Produce specialized formulas by poultry nutritionists.
6. Fertile eggs are placed in incubators.
7. Harvest birds and is inspected b the USDA.
8. Breeding hens and roosters are kept to produce fertile hatching eggs.