Lesson # 1

Introduction to the Poultry Industry

Core Area: Animal Science

Unit: Poultry Industry

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National Agriculture, Food and Natural Resources (AFNR) Career Cluster Content Standards:

ABS.06.03 Develop strategies for marketing plan implementation.
ABS.06.04 Develop specific tactics to market AFNR products and services.
AS.01.01 Evaluate the development and implications of animal origin, domestication and distribution.
AS.05.03 Apply scientific principles in the selection and breeding of animals.
AS.05.02 Evaluate animals for breeding readiness and soundness.
AS.06.02 Implement procedures to ensure that animal products are safe.
AS.07.02 Comply with government regulations and safety standards for facilities used in animal production.
FPP.01.02 Work effectively with industry organizations, groups and regulatory agencies affecting the food products and processing industry.
FPP.02.02 Implement Hazard Analysis and Critical Control Point (HACCP) procedures to establish operating parameters.
FPP.02.03 Apply safety and sanitation procedures in the handling, processing and storing of food products.
FPP.02.04 Demonstrate worker safety procedures with food product and processing equipment and facilities.
FPP.04.01 Utilize harvesting, selection and inspection techniques to obtain quality food products for processing.

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:


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 Farms
➢ 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 printed 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.
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 it to supply it with what it needs, 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 its 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 Farms
      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 Farms
   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 barn, water, bedding ("litter"), electricity,
      and his own management skill.
   iv. The chickens reach market weight 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 with air chillers or cold water chillers 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
      and further processing plants to grocery stores, restaurants and other
      customers.

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.
   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 a 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 farms
C  7. Feed mill
B  8. Breeder
A  9. Breeds

Part Two: Hierarchy

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

Part Three: T / F

1. T  8. F
2. F  9. T
3. T  10. T
4. T  11. F
5. T  12. F
6. F  13. T
7. T
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 Farms
  - _____________________________
  - Further Processing
  - Transportation and Marketing
- Vertical integration provides____________________ 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 Farms
- 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 barn, __________, ________________ (“litter”), electricity, and his own management skill.
- The chickens reach market in approximately ____ or ______ 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 or air chillers 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 and further processing plants, and then to the grocery stores, restaurants and other customers.

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.
- 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 integration 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 by the USDA.
8. Breeding hens and roosters are kept to produce fertile hatching eggs.