Course | Agricultural Science I  
---|---  
Unit | Introduction to Animal Products  
Lesson | Importance of Animal Products  
Estimated Time | 50 minutes  

**Student Outcome**

Describe the importance of animal products.

**Learning Objectives**

1. Explain how the animal processing industry has evolved.  
2. Identify career opportunities related to animal processing.  
3. Explain the economic importance of animal processing.  
4. Describe how processing affects the value of the product.

**Grade Level Expectations**

**Resources, Supplies & Equipment, and Supplemental Information**

**Resources**

1. Activity Sheets
   - AS 1 - A Career in the Animal Processing Industry
2. *Introduction to Animal Products (Student Reference)*. University of Missouri-Columbia: Instructional Materials Laboratory, 1998.  

**Supplies & Equipment**

- A food sample (for interest approach)

**Supplemental Information**

1. Internet Sites

2. Print
### Interest Approach

Show a sample of food, such as an egg, a carton of milk, or a piece of meat. Discuss how the product was made ready for the consumer.

### Communicate the Learning Objectives

1. Explain how the animal processing industry has evolved.
2. Identify career opportunities related to animal processing.
3. Explain the economic importance of animal processing.
4. Describe how processing affects the value of the product.

<table>
<thead>
<tr>
<th>Instructor Directions</th>
<th>Content Outline</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective 1</strong></td>
<td>Explain how the animal processing industry has evolved.</td>
</tr>
</tbody>
</table>
| *Ask students how the animal processing industry has evolved.* Record the responses Discuss the legislative acts and the current role of the USDA. | 1. Evolved into large corporations that utilize the entire animal in some manner.  
2. Animal processing started in small privately-owned facilities.  
3. Legislative acts have helped bring consistency to the animal processing industry.  
   a. Meat Inspection Act of 1906 – Began federal meat inspection by the USDA  
   b. Packers and Stockyards Act of 1921 – Prevents unfair business dealings of packers/stockyards and initiated scale testing in sale barns and packing facilities  
   c. Wholesome Meat Act of 1967 – Makes state inspection similar to federal inspection  
   d. Today, food inspection is under the USDA’s Food Safety and Inspection Service |
| **Objective 2**        | Identify career opportunities related to animal processing. |
| *Ask the class to list careers associated with animal processing.* Have students complete AS 1. Stress that there are countless opportunities for careers in the animal processing field. | 1. Livestock buyers – Purchase animals for processing company  
2. Federal inspectors – Insure that food is safe and wholesome  
3. USDA meat graders – Assign quality and yield grades to meat carcasses  
4. Quality control supervisors – Supervise employees and ensure quality finished products  
5. Butcher – Cut carcasses into retail and wholesale cuts; also process animals |

<table>
<thead>
<tr>
<th>AS 1 – A Career in the Animal Processing Industry</th>
<th>AS 1 – A Career in the Animal Processing Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructor Directions</td>
<td>Content Outline</td>
</tr>
<tr>
<td>------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td><strong>Objective 3</strong></td>
<td>Explain the economic importance of animal processing.</td>
</tr>
</tbody>
</table>
| *Have students list the dollar amount associated with animal processing.* | 1. Over 358 billion dollars worth of meat, dairy, and poultry products sold a year  
2. Additional income from animal byproducts |
| **Objective 4**        | Describe how processing affects the value of the product. |
| *Ask students how food costs are affected by the business structure of the animal processing industry. Discuss convenience food such as microwave-ready products and ready-to-eat products.* | The more processing involved, the higher the cost of the end product. |
| **Application**        | Answers to AS 1  
Answers will vary.  
Other activities  
1. Conduct a more detailed research project on the early history of the animal processing industry.  
2. List the major animal processing companies in America. Research their annual sales figures. |
| **Closure/Summary**    | The animal processing industry is a large, complex multi-billion dollar industry. There are many different careers in the animal processing industry. The more processing the raw product receives, the higher the cost of the end product. |
| **Evaluation: Quiz**   | Answers:  
1. d  
2. b  
3. c  
4. Livestock buyer, federal inspectors, USDA grader, quality control supervisor, food inspector  
5. Any microwave-ready product and ready-to-eat product (e.g. chicken nuggets) |
Objective: Learn more about the animal processing industry by conducting an interview with someone in a career related to the industry.

Interview a person with a career in the animal processing industry. Record his or her name, occupation, and place of employment. Use the questions on this sheet as an aid during the interview. Write down the answers to the questions, as well as any other information that is important. Report about the career to the class.

Name:

Occupation:

Place of Employment:

How long have you worked in your present occupation?

How did you choose this career?

What training was necessary for this job?

What professional skills do you use?
What jobs have you had previously that helped prepare you for this one?

What other jobs have you considered?

What are your career plans for the future?

What advice would you give someone who is considering a career in this area?

Comments:
EVALUATION

Circle the letter that corresponds to the best answer.

1. When was the Meat Inspection Act passed?
   a. 1980
   b. 1967
   c. 1921
   d. 1906

2. Which act made state and federal food inspection similar?
   a. Meat Inspection Act
   b. Wholesome Meat Act
   c. Packers and Stockyards Act
   d. Safe Food Act

3. How many dollars worth of meat, dairy, and poultry products are sold a year?
   a. Over 358 million
   b. Over 100 billion
   c. Over 358 billion
   d. Over 100 trillion

Complete the following short answers questions.

4. List two careers associated with animal processing.

5. List an example of a value-added product.
Course: Agricultural Science I
Unit: Introduction to Animal Products
Lesson: Beef
Estimated Time: 90 minutes or 2 50-minute blocks

Student Outcome
Describe beef carcass fabrication and grading.

Learning Objectives
1. Explain how the quality grade of a beef carcass is determined.
2. Explain how the yield grade of a beef carcass is determined.
3. Identify the wholesale cuts of beef.
4. Identify the retail cuts of beef.

Grade Level Expectations

Resources, Supplies & Equipment, and Supplemental Information

Resources
1. PowerPoint Slides
   - Ppt 1 - Quality Grading
   - Ppt 2 - Wholesale Cuts of Beef

Supplies & Equipment
- Retail cut identification card set or an actual beef retail cut

Supplemental Information
1. Internet Sites


### Instructor Directions

#### Objective 1

Ask students how a beef carcass is quality graded. Explain that the quality grade indicates the palatability of the beef. Describe the difference between maturity and marbling. Use PPt 1 as a guide.

- PPt 1 – Quality Grading

### Content Outline

#### Explain how the quality grade of a beef carcass is determined.

Marbling and muscle firmness are evaluated in the rib eye muscle between the 12th and 13th rib.

1. Marbling is intramuscular fat
2. There are ten degrees of marbling. The first three only apply in carcass evaluation and for other purposes.
   - a. Very abundant
   - b. Abundant
   - c. Moderately abundant
   - d. Slightly abundant
   - e. Moderate
   - f. Modest
   - g. Small
   - h. Slight
   - i. Traces
   - j. Practically devoid
3. Firmness of muscle
   - a. Firmness of muscle ranges from very soft and watery to firm
   - b. Standards spell out what is required for each quality grade

Maturity (age of carcass) is determined.

1. 5 degrees A-E
2. “A” maturity is usually young cattle less than 30 months of age

### Interest Approach

Have students try to identify beef cuts using a retail cut identification card set or actual retail beef cuts.

### Communicate the Learning Objectives

1. Explain how the quality grade of a beef carcass is determined.
2. Explain how the yield grade of a beef carcass is determined.
3. Identify the wholesale cuts of beef.
4. Identify the retail cuts of beef.
Marbling, muscle firmness, and maturity interact to determine the quality grade. It is assumed that when using the USDA quality grade table that firmness of lean is comparably developed with the degree of marbling. The quality grades for steer and heifer beef are prime, choice, select, standard, commercial, utility, cutter, and canner. The quality grades for cow beef are choice, select, standard, commercial, utility, cutter, and canner. The quality grades for bullock beef are prime, choice, select, standard, commercial, and utility.

**Objective 2**

*Ask students to define a yield grade.* Yield grades identify the amount of saleable meat obtained from the carcass as boneless trimmed retail cuts from the round, loin, rib, and chuck. Then, have students list the factors that influence yield grade. Describe how a yield grade is determined.

**Objective 3**

*Discuss with students the difference between a wholesale cut and a retail cut. Use PPt 2 as a guide.*

<table>
<thead>
<tr>
<th>PPt 2 – Wholesale Cuts of Beef</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Chuck</td>
</tr>
<tr>
<td>2. Rib</td>
</tr>
<tr>
<td>3. Short loin</td>
</tr>
<tr>
<td>4. Sirloin</td>
</tr>
<tr>
<td>5. Round</td>
</tr>
<tr>
<td>6. Flank</td>
</tr>
<tr>
<td>7. Short plate</td>
</tr>
<tr>
<td>8. Brisket</td>
</tr>
<tr>
<td>9. Fore Shank</td>
</tr>
<tr>
<td>10. Variety meats</td>
</tr>
</tbody>
</table>
Objective 4

Identify the retail cuts of beef.

1. Chuck
   a. Arm pot roast
   b. Blade pot roast
   c. Cross rib pot roast
   d. Chuck eye roast
   e. Seven bone roast
   f. Flanken-style ribs
   g. Under plate pot roast
   h. Short ribs
   i. Mock tender
   j. Boneless shoulder pot roast
   k. Boneless top blade steak

2. Rib
   a. Rib roast large end
   b. Rib roast small end
   c. Rib steak
   d. Rib eye steak
   e. Rib eye roast
   f. Back ribs

3. Short loin
   a. Porterhouse steak
   b. T-bone steak
   c. Boneless top loin steak
   d. Tenderloin steak and roast

4. Sirloin
   a. Sirloin steak, round bone
   b. Sirloin steak, flat bone
   c. Top sirloin steak

5. Round
   a. Round steak
   b. Top round steak and roast
   c. Bottom round roast
   d. Eye round roast
   e. Tip roast, cap off
   f. Tip steak
   g. Boneless rump roast

6. Flank
   a. Flank steak
   b. Flank steak rolls

7. Short plate
   a. Skirt steak
8. Brisket  
   a. Brisket whole  
   b. Brisket flat half  
   c. Corned brisket, point half  
9. Fore Shank  
   a. Shank cross cuts  
10. Other cuts  
   a. Beef for stew  
   b. Cubes for kabobs  
   c. Cubed steak  
   d. Ground beef  
11. Variety meats  
   a. Heart  
   b. Tongue  
   c. Liver  
   d. Kidney  
   e. Tripe  
   f. Brains  
   g. Sweetbreads

<table>
<thead>
<tr>
<th>Application</th>
<th>Other activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Visit a local grocery store or meat locker. Look at the various wholesale and retail cuts that are available.</td>
<td></td>
</tr>
<tr>
<td>2. Schedule a visit to a beef processor. Watch a carcass being cut into wholesale and retail cuts.</td>
<td></td>
</tr>
</tbody>
</table>

| Closure/Summary | Beef carcasses are graded for quality and yield. Wholesale cuts of beef are cut into retail cuts that are sold to consumers. Some retail cuts come from more than one wholesale cut or from other areas of the beef. |

<table>
<thead>
<tr>
<th>Evaluation: Quiz</th>
<th>Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. c</td>
<td></td>
</tr>
<tr>
<td>2. d</td>
<td></td>
</tr>
<tr>
<td>3. a</td>
<td></td>
</tr>
<tr>
<td>4. a</td>
<td></td>
</tr>
<tr>
<td>5. c</td>
<td></td>
</tr>
<tr>
<td>6. Intramuscular</td>
<td></td>
</tr>
<tr>
<td>7. External fat thickness; hot carcass weight; amount of kidney, pelvic, and heart fat; and rib eye area</td>
<td></td>
</tr>
</tbody>
</table>
UNIT - INTRODUCTION TO ANIMAL PRODUCTS

Lesson 2: Beef

EVALUATION

Circle the letter that corresponds to the best answer.

1. Marbling, muscle firmness, and ________ determines beef quality grade.
   a. Hot carcass weight
   b. Internal fat
   c. Maturity
   d. Rib eye area

2. Porterhouse steak comes from which wholesale cut?
   a. Chuck
   b. Flank
   c. Fore shank
   d. Short loin

3. Which of the following is not a wholesale cut of beef?
   a. T-bone
   b. Sirloin
   c. Round
   d. Short plate

4. Which of the following retail cuts comes from the chuck?
   a. Arm roast
   b. Round roast
   c. Rib eye steak
   d. Sirloin steak

5. The beef cow is not eligible for which quality grade?
   a. Canner
   b. Choice
   c. Prime
   d. Standard
Complete the following short answer questions.

6. What type of fat is marbling?

7. List the factors that determine the yield grade of a beef carcass.
Calculating Percent Muscle

Calculate the percent muscle for the carcasses. Use the following formula and round to nearest tenth. Use the space provided to show your work.

\[
\frac{88.307 - (0.036 \times HCW) - (18.574 \times 10^{th} \ text{rib backfat}) + (3.734 \times LMA)}{170} \times 100 = \% \text{ muscle}
\]

HCW = Hot carcass weight (pounds)
LMA = Loin muscle area (square inches)

<table>
<thead>
<tr>
<th></th>
<th>HCW</th>
<th>10th Rib Backfat Measurement</th>
<th>LMA</th>
<th>Percent Muscle</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>167</td>
<td>.8</td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>166</td>
<td>.7</td>
<td>4.8</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>187</td>
<td>.9</td>
<td>7.5</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>194</td>
<td>1.1</td>
<td>6.8</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>184</td>
<td>.6</td>
<td>5.5</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>179</td>
<td>.5</td>
<td>7.0</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>173</td>
<td>.9</td>
<td>8.7</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>174</td>
<td>1.2</td>
<td>6.0</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>172</td>
<td>1.0</td>
<td>4.3</td>
<td></td>
</tr>
<tr>
<td>1.0</td>
<td>198</td>
<td>.9</td>
<td>9.0</td>
<td></td>
</tr>
</tbody>
</table>
EVALUATION

Circle the letter that corresponds to the best answer.

1. Which retail cut is from the shoulder butt?
   a. Boneless blade roast
   b. Canadian-style bacon
   c. Leg cutlets
   d. Smoked picnic

2. From which wholesale cut of pork is a rib chop cut?
   a. Shoulder butt
   b. Leg
   c. Loin
   d. Side

3. The back ribs come from which wholesale cut of pork?
   a. Leg
   b. Loin
   c. Shoulder picnic
   d. Side

4. Which retail cut is from the side?
   a. Back ribs
   b. Canadian-style bacon
   c. Sirloin roast
   d. Spareribs

5. Where are the backfat and loin muscle area measurements taken for percent muscle calculations?
   a. 10th rib
   b. 12th rib
   c. Front shoulder
   d. Loin
6. Backfat measurement and loin muscle area are two of the factors in the percent muscle equation. What is the third factor?

a. Depth of ribeye
b. Hot carcass weight
c. Market weight
d. Sex of animal

7. What factors are considered in evaluating the quality of a pork carcass?

a. Maturity, marbling, flank streakings, and other tissue conditions
b. Maturity, muscle firmness, muscle color, and loin muscle area
c. Marbling, muscle color, other tissue conditions, and loin muscle area
d. Marbling, muscle color, muscle firmness, and other tissue conditions
Student Outcome

Describe ovine carcass fabrication and grading.

Learning Objectives

1. Explain how the quality grade of an ovine carcass is determined.
2. Explain how the yield grade of an ovine carcass is determined.
3. Identify the wholesale cuts of lamb and mutton.
4. Identify the retail cuts of lamb and mutton.

Grade Level Expectations

Resources, Supplies & Equipment, and Supplemental Information

Resources

1. PowerPoint Slides
   - Ppt 1 – Quality Grading
   - Ppt 2 – Wholesale Cuts of Lamb
2. Activity Sheets
   - AS 1 – Yield Grading

Supplies & Equipment

Retail cut identification card set (National Meat Board) or actual retail lamb cuts

Supplemental Information

1. Internet Sites

2. Print
### Instructor Directions

**Objective 1**

*Ask students what determines the quality grade of an ovine carcass.*

*Use PPT 1 as a guide. Explain the differences in maturity and flank streakings.*

- **PPT 1 – Quality Grading**

### Content Outline

**Explain how the quality grade of an ovine carcass is determined.**

**Maturity (Age)**

1. **Lamb** (young lamb and older lamb)
   - Have break points on at least one front shank
   - Slightly wide and moderately flat ribs; wider as lamb ages
   - Dark pink to light red lean; fine-textured lean

2. **Yearling mutton**
   - Either break or spool joints on their front shanks
   - Wider and flatter ribs
   - Slightly dark red lean; slightly coarse-textured

3. **Mutton**
   - Spool joints on their front shanks
   - Wide, flat rib bones
   - Dark red lean; course textured

**Flank streaking – Amount of fat streaks within and upon the inside of the flank of the carcass**

1. As flank streaking increases, palatability also increases
2. Ten degrees of flank streaking

**Final quality grade is determined by combining maturity and degree of flank streaking**

1. **Prime**
2. **Choice**
3. **Good**
4. **Utility**
5. **Cull (mutton only)**

### Interest Approach

Have students try to identify lamb cuts using a retail cut identification card set or actual retail lamb cuts.

### Communicate the Learning Objectives

1. Explain how the quality grade of an ovine carcass is determined.
2. Explain how the yield grade of an ovine carcass is determined.
3. Identify the wholesale cuts of lamb and mutton.
4. Identify the retail cuts of lamb and mutton.
Objective 2

Ask students how the yield grade of an ovine carcass is determined. Show the formula. Explain that yield grades are based primarily on the amount of backfat or external fat the ovine carcass has. Have students complete AS 1.

AS 1 – Yield Grading

Objective 3

Ask students to list the wholesale cuts of lamb and mutton. Use Ppt 2 as a guide.

Ppt 2 – Wholesale Cuts of Lamb

Objective 4

Ask students which retail cuts of lamb and mutton come from each wholesale cut. Use a retail cut identification card set or actual retail lamb cuts as aids.

Identify the wholesale cuts of pork.

1. Shoulder
2. Rib/rack
3. Loin
4. Leg
5. Foreshank/breast

Identify the retail cuts of pork.

1. Leg
   a. French style leg
   b. American style leg
   c. Leg steak
   d. Lamb leg, sirloin half
   e. Sirloin chops
2. Loin
   a. Loin roast
   b. Loin chops
   c. Double loin chops
3. Rib/rack
   a. Rib roast
   b. Rib chops
   c. Rack of lamb
4. Shoulder
   a. Square cut shoulder
   b. Rolled shoulder
   c. Arm chop
   d. Blade chop
   e. Arm roast

Explain how the yield grade of an ovine carcass is determined.

Yield grades of ovine carcasses are based on external fat
1. The primary factor is fat thickness over the center ribeye muscle between the 12th and 13th ribs
2. Unusual fat distribution adjusts the measurement upward or downward

The formula for yield grade is:

\[ YG = 0.4 + (10 \times \text{adjusted fat thickness in inches}) \]

Yield grades range from 1 to 5.
5. Foreshank/breast  
   a. Breast  
   b. Riblets  
   c. Foreshank  
6. Variety meats  
   a. Patties  
   b. Liver  
   c. Kidney  
   d. Heart

Other activities  
1. Visit a local meat processor to observe an ovine carcass being cut into retail and wholesale cuts.  
2. Research Kosher regulations for ovine slaughter.

Ovine carcasses are quality graded using maturity and degree of flank streakings. Ovine yield grades are calculated using adjusted external fat measurements. Ovine carcasses are then cut into wholesale and retail cuts.

Evaluation: Quiz  
Answers  
1. c  
2. a  
3. d  
4. a  
5. d  
6. b  
7. Flank streaking and maturity
Yield Grading

Objective: Determine the yield grades of ovine carcasses given the necessary parameters.

Calculate the yield grades of the following ovine carcasses.

Formula: \(0.4 + (10 \times \text{adjusted fat measurement}) = \text{yield grade}\)

<table>
<thead>
<tr>
<th>Carcass #</th>
<th>Adjusted Fat Measurement</th>
<th>Yield Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0.25</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>0.15</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>0.22</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>0.31</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>0.16</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>0.12</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>0.18</td>
<td></td>
</tr>
</tbody>
</table>
UNIT - INTRODUCTION TO ANIMAL PRODUCTS

Lesson 4: Lamb and Mutton

EVALUATION

Circle the letter that corresponds to the best answer.

1. What is the correct yield grade for an ovine carcass with an adjusted fat measurement of .24 inch?
   a. 1.24  
   b. 2.4  
   c. 2.8  
   d. 6.4

2. What is the correct yield grade for an ovine carcass with an adjusted fat measurement of .1 inch?
   a. 1.4  
   b. 1.5  
   c. 2.0  
   d. 3.4

3. Which of the following are found on mutton carcasses?
   a. Break joints  
   b. Light red lean  
   c. Narrow ribs  
   d. Spool joints

4. Which of the following is NOT a wholesale cut of lamb?
   a. Chuck  
   b. Foreshank/breast  
   c. Leg  
   d. Loin
5. Which of the following retail cuts comes from the leg?
   a. Blade chop
   b. Foreshank
   c. Loin chops
   d. Sirloin chops

6. What are characteristics of the lean in lamb carcasses?
   a. A light red coarse-textured lean
   b. A light red fine-textured lean
   c. A dark red coarse-textured lean
   d. A dark red fine-textured lean

Complete the following short answer question.

7. What factors are used to determine the quality grade of an ovine carcass?
Course: Agricultural Science I
Unit: Introduction to Animal Products
Lesson: Poultry Products
Estimated Time: 90 minutes or 2-50 minute blocks

Student Outcome

- Identify and grade poultry products.

Learning Objectives

1. Identify the edible parts of poultry.
2. Explain how ready-to-cook poultry is graded.
3. Identify the quality factors that influence egg grading.

Grade Level Expectations

Resources, Supplies & Equipment, and Supplemental Information

Resources

1. PowerPoint Slides
   - PPT 1 – Main Parts of an Egg
2. Handouts
   - HO 1 – Ready-to-Cook Poultry – A Quality
   - HO 2 – Ready-to-Cook Poultry – B Quality
   - HO 3 – Ready-to-Cook Poultry – C Quality
   - HO 4 – Summary of U.S. Standards for Quality of Individual Shell Eggs
3. Activity Sheets
   - AS 1 – Poultry Grading (Instructor)
   - AS 1 – Poultry Grading (Student)

Supplies & Equipment

- Chicken carcass, cutting board, and knife
- Four poultry carcasses
- Candling light
- Farm eggs stored for one week at room temperature
- Fresh farm eggs
Supplemental Information

1. Internet Sites

2. Print
Instructor Directions

Objective 1

Have students list the edible parts of a chicken or turkey carcass. If available, refer to the Poultry Science Manual for National FFA Career Development Events for reference pictures.

Identify the edible parts of poultry.

1. Half
2. Breast quarter with or without wing
3. Breast with or without ribs
4. Boneless, skinless breast
5. Breast tenderloin
6. Wishbone
7. Leg quarter
8. Leg
9. Drumstick
10. Thigh
11. Wing
12. Drumette
13. Back
14. Liver, gizzard, heart, neck

(Note: Unless otherwise stated, skin remains attached to the parts.)

Objective 2

Ask students how poultry carcasses are graded. Use HO 1, HO 2, and HO 3 for discussion.

Describe how ready-to-cook poultry is graded.

USDA Grades
1. A
2. B
3. C

Quality factors
1. Conformation
2. Fleshing
3. Fat covering
4. Defeathering
5. Exposed flesh

Communicate the Learning Objectives

1. Identify the edible parts of poultry.
2. Explain how ready-to-cook poultry is graded.
3. Identify the quality factors that influence egg grading.
<table>
<thead>
<tr>
<th>Instructor Directions</th>
<th>Content Outline</th>
</tr>
</thead>
</table>
| Explain the possible defects. Point out that if a carcass or part does not meet all the minimum standards for a grade, it will be graded at the next lowest grade. Prepare four poultry carcasses as presented in AS 1 (Instructor). Then have students evaluate the carcasses using AS 1 (Student). | 6. Discoloration  
7. Disjointed and broken bones  
8. Missing parts  
9. Freezing defects |

- AS 1 – Poultry Grading (Instructor)  
- AS 1 – Poultry Grading (Student)  

**Objective 3**

Ask students how eggs are graded. Explain that the air cell, white, and yolk are evaluated using a candling light. If time permits, let students practice egg grading using a candling light and farm eggs (all store eggs should be similar grades). Store a few eggs at room temperature for one week to compare their internal quality with those of freshly laid farm eggs. Use Ppt 1 and HO 4.

- Ppt 1 – Main Parts of an Egg  
- HO 4 – Summary of U.S. Standards for Quality of Individual Shell Eggs  

Describe the quality factors that influence egg grading.

1. Shell  
2. Air cell  
3. White  
4. Yolk
<table>
<thead>
<tr>
<th>Application:</th>
<th>Answers to AS 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS 1 — Poultry Grading (Student)</td>
<td>Answers are at the Instructor’s Discretion.</td>
</tr>
<tr>
<td>Other activities:</td>
<td></td>
</tr>
<tr>
<td>1. Purchase table eggs from a local store and have students bring in farm fresh eggs, if available. Assign egg grades using HO 4 as a reference. The USDA has slides showing the principles of egg grading and sizing.</td>
<td></td>
</tr>
</tbody>
</table>

| Closure/Summary | The majority of poultry purchased by consumers has been precut into various parts. Both poultry parts and carcasses can be federally graded before being sold to consumers. Eggs are graded on the quality of the shell, air cell, white, and yolk. |

<table>
<thead>
<tr>
<th>Evaluation: Quiz</th>
<th>Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. d</td>
<td></td>
</tr>
<tr>
<td>2. a</td>
<td></td>
</tr>
<tr>
<td>3. b</td>
<td></td>
</tr>
<tr>
<td>4. a</td>
<td></td>
</tr>
<tr>
<td>5. air cell, white, and yolk</td>
<td></td>
</tr>
</tbody>
</table>
Ready-to-Cook Poultry - A Quality
Summary of Specifications for Standards of Quality for Individual Carcasses and Parts
Effective April 29, 1998 (Not All Inclusive -- Minimum Requirements and Maximum Defects Permitted)

<table>
<thead>
<tr>
<th>Conformation:</th>
<th>A Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breastbone</td>
<td>Normal</td>
</tr>
<tr>
<td>Back</td>
<td>Slight curve or dent</td>
</tr>
<tr>
<td>Legs and Wings</td>
<td>Slight curve</td>
</tr>
<tr>
<td></td>
<td>Normal</td>
</tr>
<tr>
<td>Fleshing:</td>
<td>Well fleshed, considering kind and class</td>
</tr>
<tr>
<td>Fat Covering:</td>
<td>Well developed layer -- especially between heavy feathers tracts</td>
</tr>
<tr>
<td>Defathering:</td>
<td>Free of protruding feathers and hairs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Exposed Flesh:</th>
<th>Turkeys (feathers less than 3/4 in.)</th>
<th>Ducks and Geese¹ (feathers less than 1/2 in.)</th>
<th>All Other Poultry (feathers less than 1/2 in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Carcass Parts</td>
<td>Carcass Parts</td>
<td>Carcass Parts</td>
</tr>
<tr>
<td>Minimum</td>
<td>Maximum</td>
<td>Minimum</td>
<td>Maximum</td>
</tr>
<tr>
<td>None</td>
<td>2 lbs.</td>
<td>1/4 in.</td>
<td>1/4 in.</td>
</tr>
<tr>
<td>Over 2 lbs.</td>
<td>6 lbs.</td>
<td>1/4 in.</td>
<td>1/4 in.</td>
</tr>
<tr>
<td>Over 6 lbs.</td>
<td>16 lbs.</td>
<td>1/2 in.</td>
<td>3/4 in.</td>
</tr>
<tr>
<td>Over 16 lbs.</td>
<td>None</td>
<td>3 in.</td>
<td>1/2 in.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Discolorations:</th>
<th>Lightly Shaded</th>
<th>Moderately Shaded ²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carcass</td>
<td>Breast and Legs</td>
<td>Elsewhere</td>
</tr>
<tr>
<td>None</td>
<td>2 lbs.</td>
<td>3/4 in.</td>
</tr>
<tr>
<td>Over 2 lbs.</td>
<td>6 lbs.</td>
<td>1 in.</td>
</tr>
<tr>
<td>Over 6 lbs.</td>
<td>16 lbs.</td>
<td>1 1/2 in.</td>
</tr>
<tr>
<td>Over 16 lbs.</td>
<td>None</td>
<td>2 in.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Large Carcass Parts ³ (halves, front and rear halves)</th>
<th>Lightly Shaded</th>
<th>Moderately Shaded ²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast and Legs</td>
<td>Elsewhere</td>
<td>Hock of leg</td>
</tr>
<tr>
<td>None</td>
<td>2 lbs.</td>
<td>1/2 in.</td>
</tr>
<tr>
<td>Over 2 lbs.</td>
<td>6 lbs.</td>
<td>3/4 in.</td>
</tr>
<tr>
<td>Over 6 lbs.</td>
<td>16 lbs.</td>
<td>1 in.</td>
</tr>
<tr>
<td>Over 16 lbs.</td>
<td>None</td>
<td>1 1/4 in.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other Parts</th>
<th>Lightly Shaded</th>
<th>Moderately Shaded ²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast and Legs</td>
<td>Elsewhere</td>
<td>Hock of leg</td>
</tr>
<tr>
<td>None</td>
<td>2 lbs.</td>
<td>1/2 in.</td>
</tr>
<tr>
<td>Over 2 lbs.</td>
<td>6 lbs.</td>
<td>3/4 in.</td>
</tr>
<tr>
<td>Over 6 lbs.</td>
<td>16 lbs.</td>
<td>1 in.</td>
</tr>
<tr>
<td>Over 16 lbs.</td>
<td>None</td>
<td>1 1/4 in.</td>
</tr>
</tbody>
</table>

| Disjointed and Broken Bones: | Carcass--1 disjointed and no broken bones. Parts--Thighs with back portion, legs, or leg quarters may have femur disjointed from the hip joint. Other parts--none. |
| Missing Parts: | Wing tips and tail. In ducks and geese, the parts of the wing beyond the second joint may be removed if removed at the joint and both wings are so treated. Tail may be removed at the base. |

| Freezing Defects: | Slight darkening on back and drumstick. Overall bright appearance. Occasional pochmarks due to drying. Occasional small areas of clear, pinkish, or reddish-colored ice. |

¹ Hair or down is permitted on the carcass or part, provided the hair or down is less than 3/16 inch in length, and is scattered so that the carcass or part has a clean appearance, especially on the breast and legs.

² Maximum aggregate area of all exposed flesh. In addition, the carcass or part may have cuts or tears that do not expand or significantly expose flesh, provided the aggregate length of all such cuts and tears does not exceed a length tolerance equal to the permitted dimensions listed above.

³ For all parts, trimming of skin along the edge is allowed, provided at least 75 percent of the normal skin cover associated with the part remains attached, and the remaining skin uniformly covers the outer surface and does not detract from the appearance of the part.

⁴ Moderately shaded discolorations and discolorations due to flesh bruising are free of clots and limited to areas other than the breast and legs except for the area adjacent to the hock.

### Ready-to-Cook Poultry - B Quality

Summary of Specifications for Standards of Quality for Individual Carcasses and Parts  
Effective April 29, 1998  
(Not All Inclusive --Minimum Requirements and Maximum Defects Permitted)

<table>
<thead>
<tr>
<th>B Quality</th>
<th>Turkeys (feathers less than 3/4 in.)</th>
<th>Ducks and Geese¹ (feathers less than 1/2 in.)</th>
<th>All Other Poultry (feathers less than 1/2 in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Carcass</strong></td>
<td><strong>Parts</strong></td>
<td><strong>Carcass</strong></td>
<td><strong>Parts</strong></td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Exposed Flesh:

- **Weight Range**
  - **Minimum:**
  - **Maximum:**
  - **None:**
  - **2 lbs.**
  - **6 lbs.**
  - **Over 6 lbs.**
  - **16 lbs.**

- **None:**
- **2 lbs.**
- **Over 2 lbs.**
- **Over 6 lbs.**
- **Over 16 lbs.**

- **None:**
- **2 lbs.**
- **Over 2 lbs.**
- **Over 6 lbs.**
- **Over 16 lbs.**

- **None:**
- **2 lbs.**
- **Over 2 lbs.**
- **Over 6 lbs.**
- **Over 16 lbs.**

- **None:**
- **2 lbs.**
- **Over 2 lbs.**
- **Over 6 lbs.**
- **Over 16 lbs.**

- **None:**
- **2 lbs.**
- **Over 2 lbs.**
- **Over 6 lbs.**
- **Over 16 lbs.**

- **None:**
- **2 lbs.**
- **Over 2 lbs.**
- **Over 6 lbs.**
- **Over 16 lbs.**

- **None:**
- **2 lbs.**
- **Over 2 lbs.**
- **Over 6 lbs.**
- **Over 16 lbs.**

- **None:**
- **2 lbs.**
- **Over 2 lbs.**
- **Over 6 lbs.**
- **Over 16 lbs.**

- **None:**
- **2 lbs.**
- **Over 2 lbs.**
- **Over 6 lbs.**
- **Over 16 lbs.**

- **None:**
- **2 lbs.**
- **Over 2 lbs.**
- **Over 6 lbs.**
- **Over 16 lbs.**

- **None:**
- **2 lbs.**
- **Over 2 lbs.**
- **Over 6 lbs.**
- **Over 16 lbs.**

- **None:**
- **2 lbs.**
- **Over 2 lbs.**
- **Over 6 lbs.**
- **Over 16 lbs.**

- **None:**
- **2 lbs.**
- **Over 2 lbs.**
- **Over 6 lbs.**
- **Over 16 lbs.**

- **None:**
- **2 lbs.**
- **Over 2 lbs.**
- **Over 6 lbs.**
- **Over 16 lbs.**

- **None:**
- **2 lbs.**
- **Over 2 lbs.**
- **Over 6 lbs.**
- **Over 16 lbs.**

- **None:**
- **2 lbs.**
- **Over 2 lbs.**
- **Over 6 lbs.**
- **Over 16 lbs.**

- **None:**
- **2 lbs.**
- **Over 2 lbs.**
- **Over 6 lbs.**
- **Over 16 lbs.**

#### Discolorations²:

<table>
<thead>
<tr>
<th>Large Carcass Parts (halves, front and rear halves)</th>
<th>Lightly or Moderately Shaded Discolorations</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>Breast and Legs</td>
</tr>
<tr>
<td>None</td>
<td>2 lbs.</td>
</tr>
<tr>
<td>Over 2 lbs.</td>
<td>6 lbs.</td>
</tr>
<tr>
<td>Over 6 lbs.</td>
<td>16 lbs.</td>
</tr>
<tr>
<td>Over 16 lbs.</td>
<td>None</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other Parts</th>
<th>Lightly or Moderately Shaded Discolorations</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>Breasts, Legs, and Parts</td>
</tr>
<tr>
<td>None</td>
<td>2 lbs.</td>
</tr>
<tr>
<td>Over 2 lbs.</td>
<td>6 lbs.</td>
</tr>
<tr>
<td>Over 6 lbs.</td>
<td>16 lbs.</td>
</tr>
<tr>
<td>Over 16 lbs.</td>
<td>None</td>
</tr>
</tbody>
</table>

#### Disjointed and Broken Bones:

| Carcass-2 disjointed and no broken bones, or 1 disjointed and 1 non-protruding broken bone. Parts--may be disjointed, no broken bones; wing beyond second joint may be removed at a joint. |

#### Missing Parts:

- Wing tips, 2nd wing joint, and tail.

#### Trimming:

- Slight trimming of the carcass is permitted provided the meat yield of any part on the carcass is not appreciably affected. The back may be trimmed in an area not wider than the base of the tail to the area halfway between the base of the tail and the hip joints.

- A moderate amount of meat may be trimmed around the edge of a part to remove defects.

#### Freezing Defects:

- May lack brightness. Few pockmarks due to drying. Moderate areas showing a layer of clear, pinkish, or reddish colored ice.

¹ Hair or down is permitted on the carcass or part, provided the hair or down is less than 3/16 inch in length, and is scattered so that the carcass or part has a clean appearance, especially on the breast and legs.

² Discolorations due to flesh bruising shall be free of clots and may not exceed one-half the total aggregate area of permitted discoloration.

Credit: United States Department of Agriculture, Agricultural Marketing Services, Poultry Programs, United States Classes, Standards, and Grades for Poultry (AMS 70.200 et seq.).
Ready-to-Cook Poultry - C Quality
Summary of Specifications for Standards of Quality for Individual Carcasses and Parts
Effective April 26, 1998 (Not All Inclusive) (Minimum Requirements and Maximum Defects Permitted)

<table>
<thead>
<tr>
<th>Conformation:</th>
<th>Carcass</th>
<th>Parts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breastbone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Back</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legs and Wings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fleshing:</td>
<td>Poorly fleshed</td>
<td></td>
</tr>
<tr>
<td>Fat Covering:</td>
<td>Lacking in fat covering over all parts of carcass</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Defleshing: Scattering of protruding feathers and hairs</th>
<th>Turkeys (feathers less than 3/4 in.)</th>
<th>Ducks and Geese ¹ (feathers less than 1/2 in.)</th>
<th>All Other Poultry (feathers less than 1/2 in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carcass</td>
<td>8</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>Parts</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Exposed Flesh: Weight Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum</td>
</tr>
<tr>
<td>None</td>
</tr>
<tr>
<td>Over 2 lbs.</td>
</tr>
<tr>
<td>Over 6 lbs.</td>
</tr>
<tr>
<td>Over 16 lbs. None</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Discolorations: Carcass</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
</tr>
<tr>
<td>Over 2 lbs.</td>
</tr>
<tr>
<td>Over 6 lbs.</td>
</tr>
<tr>
<td>Over 16 lbs. None</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Discolorations: Parts (includes large carcass parts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
</tr>
<tr>
<td>Over 2 lbs.</td>
</tr>
<tr>
<td>Over 6 lbs.</td>
</tr>
<tr>
<td>Over 16 lbs. None</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Disjointed and Broken Bones:</th>
</tr>
</thead>
<tbody>
<tr>
<td>No limit</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Missing Parts:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wing tips, wings, and tails.</td>
</tr>
<tr>
<td>Backs shall include all meat and skin from pelvic bones, except that the meat contained in the ilium (oyster) may be removed.</td>
</tr>
<tr>
<td>The vertebral ribs and scapula with meat and skin and the backbone located anterior (forward) of ilia bones may also be removed (front half of back).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Trimming:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carcass</td>
</tr>
<tr>
<td>Parts</td>
</tr>
<tr>
<td>Trimming of the breast and legs is permitted, but not to the extent that the normal meat yield is materially affected.</td>
</tr>
<tr>
<td>The back may be trimmed in an area not wider than the base of the tail and extending from the tail to the area between the hip joints.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Freezing Defects:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numerous pockmarks and large dried areas.</td>
</tr>
</tbody>
</table>

¹ Hair or down is permitted on the carcass or part, provided the hair or down is less than 3/16 inch in length, and is scattered so that the carcass or part has a clean appearance, especially on the breast and legs.

<table>
<thead>
<tr>
<th>Quality Factor</th>
<th>AA Quality</th>
<th>A Quality</th>
<th>B Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Cell</td>
<td>1/8 inch or less in depth. Unlimited movement and free or bubbly.</td>
<td>3/16 inch or less in depth. Unlimited movement and free or bubbly.</td>
<td>Over 3/16 inch in depth. Unlimited movement and free or bubbly.</td>
</tr>
</tbody>
</table>

For eggs with dirty or broken shells, the standards of quality provide two additional qualities. They are:

<table>
<thead>
<tr>
<th>Dirty</th>
<th>Check</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unbroken. Adhering dirt or foreign material, prominent stains, moderate stained areas in excess of B quality.</td>
<td>Broken or cracked shell but membranes intact, not leaking.***</td>
</tr>
</tbody>
</table>

* Moderately stained areas permitted (1/32 of surface if localized, or 1/16 if scattered). ** If they are small (aggregating not more than 1/8 inch in diameter). *** Leaker has broken or cracked shell membranes, and contents leaking or free to leak.

Poultry Grading

Objective: Grade poultry carcass for quality.

Directions:

1. The instructor will provide four poultry carcasses for you to grade based on the quality factors presented in the Introduction to Animal Products Student Reference.

2. Closely evaluate each carcass. Complete the chart as you evaluate each carcass. Make sure you record the carcass number in the top of each column.

3. Determine the quality grade for each carcass. Record your grade in the table.

<table>
<thead>
<tr>
<th>Quality Factors</th>
<th>Carcass # ___</th>
<th>Carcass # ___</th>
<th>Carcass # ___</th>
<th>Carcass # ___</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conformation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Breastbone, Back, Legs and Wings)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fleshing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fat covering</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Defeathering</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exposed flesh</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discolorations</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disjointed and broken bones</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Missing parts</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freezing defects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality grade</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE: If you touch the poultry carcasses, wash your hands thoroughly.
Poultry Grading

**Objective:** The student will become familiar with USDA quality grades of poultry.

**Instructor Directions:**

Obtain four whole chicken carcasses from a local store. Hang the carcasses with their feet pointing up and their necks pointing down. Using the USDA quality grade tables, prepare one A grade, two B grades, and one C grade from the four birds. Assign each bird a three digit number and allow students to practice grading the birds. Have students refer to the *Introduction to Animal Products Student Reference* for the quality grading tables and descriptive information.

To prepare the various grades, follow these recommendations.

- **A grade** – Use the chicken straight from the package.

- **B grade** – On one chicken, remove wings at second joint. On the second chicken, cut the skin on the breast up to 1 ¼ inches along the breast. Do not cut into the meat.

- **C grade** – On this chicken, remove an entire wing.
UNIT - INTRODUCTION TO ANIMAL PRODUCTS

Lesson 5: Poultry Products

EVALUATION

Circle the letter that corresponds to the best answer.

1. Which poultry quality factor evaluates the shape of the carcass or part?
   a. Fleshing
   b. Fat covering
   c. Discoloration
   d. Conformation

2. Which of the following is not a USDA grade for poultry carcasses?
   a. AA
   b. A
   c. B
   d. C

3. What is the correct name for the largest individual part of the wing?
   a. Drumstick
   b. Drumette
   c. Leg
   d. Wing

4. Which of the following is the highest grade for eggs?
   a. AA
   b. A
   c. B
   d. C

Complete the following short answer question.

5. When eggs are graded using a candling light, what factors are being evaluated?
### Estimated Time
90 minutes or 2-50 minute blocks

### Student Outcome
Identify and describe types of dairy products.

### Learning Objectives
1. Identify which consumer products are eligible to be made from which grades of milk.
2. Identify the major processes or treatments given to fluid milk.
3. Explain how flavor defects affect milk quality.
4. Describe the identifying characteristics of cheeses.

### Grade Level Expectations

### Resources, Supplies & Equipment, and Supplemental Information

#### Resources
1. Activity Sheets
   - AS 1 – Comparing Dairy Products
   - AS 2 – Comparing Different Cheeses for Nutritional Value
2. *Introduction to Animal Products (Student Reference)*. University of Missouri-Columbia: Instructional Materials Laboratory, 1998.

#### Supplies & Equipment
- For Interest Approach – A variety of cheese samples
- For AS 1 - Samples of butter, margarine, whipped cream, nondairy topping, half and half, coffee whitener, real cheese, and imitation cheese
- For AS 2 - Samples in original packaging of blue, brick, brie/camembert, cheddar, colby, cottage, cream, gouda/edam, monterey jack, mozzarella, munster (muenster), pasteurized process american (real not imitation), provolone, swiss, and processed cheese food (imitation). Not all samples must be used.

#### Supplemental Information
1. Internet Sites

2. Print
Interest Approach

Show students several different types of cheeses. See if they can determine the difference between them by taste and look alone. If available, have students sample goat cheese.

Communicate the Learning Objectives

1. Identify which consumer products are eligible to be made from which grades of milk.
2. Identify the major processes or treatments given to fluid milk.
3. Explain how flavor defects affect milk quality.
4. Describe the identifying characteristics of cheeses.

<table>
<thead>
<tr>
<th>Instructor Directions</th>
<th>Content Outline</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective 1</strong></td>
<td>Identify which consumer products are eligible to be made from which grades of milk.</td>
</tr>
<tr>
<td>Ask students what the two grades of milk are. Make columns on the board and list the products that can be made from each grade. Butter, dry milk products, cheeses (except cottage in some markets), and frozen desserts (in most markets) may be made from milk of manufacturing grade. Have students bring in a milk carton or jug and find the grade stamp on the package. Have students complete AS 1.</td>
<td>Milk can be either grade A or manufacturing grade A. Grade A milk originates from grade A dairies. Fluid milk products must be made from only grade A milk. Other dairy foods may be made from grade A milk. B. Manufacturing grade milk can only be used for “manufactured” dairy products, including butter, dry milk products, cheeses (except cottage in some markets), and frozen desserts (in most markets).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AS 1 — Comparing Dairy Products</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Objective 2</strong></th>
<th>Identify the major processes or treatments given to fluid milk.</th>
</tr>
</thead>
</table>
| Ask students how raw milk is processed. Discuss the difference between pasteurization and homogenization. | Pasteurization  
1. Heating to 161°F and above  
2. Over 15 seconds  
3. Kills bacteria and other disease-causing microorganisms  
Homogenization  
1. Milk is passed through a fine orifice (opening) under high pressure to break fat globules into smaller sizes.  
2. This treatment prevents milk from separating into cream and skim milk. |
<table>
<thead>
<tr>
<th>Instructor Directions</th>
<th>Content Outline</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective 3</strong></td>
<td></td>
</tr>
<tr>
<td><em>Ask students how defects might affect the suitability of milk for consumption in the fluid or manufactured form. List the various taste defects. If time permits, prepare off flavors for students to smell or taste.</em></td>
<td><strong>Explain how flavor defects affect milk quality.</strong></td>
</tr>
<tr>
<td></td>
<td>1. Milk is naturally sweet and bland-tasting</td>
</tr>
<tr>
<td></td>
<td>2. Off flavors of milk and their effect on milk saleability</td>
</tr>
<tr>
<td></td>
<td>a. Bitter — not saleable</td>
</tr>
<tr>
<td></td>
<td>b. Feed — reduces flavor appeal</td>
</tr>
<tr>
<td></td>
<td>c. Flat/watery — reduces flavor appeal</td>
</tr>
<tr>
<td></td>
<td>d. Foreign — not saleable</td>
</tr>
<tr>
<td></td>
<td>e. Malty — will probably make the milk unsaleable</td>
</tr>
<tr>
<td></td>
<td>f. Oxidized — will usually make the milk unsaleable</td>
</tr>
<tr>
<td></td>
<td>g. Rancid — not saleable</td>
</tr>
<tr>
<td></td>
<td>h. Salty — reduces flavor appeal</td>
</tr>
<tr>
<td></td>
<td>i. Sour — not saleable</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Objective 4</th>
<th>Describe the identifying characteristics of cheeses.</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Ask students for the names of cheeses they have eaten or seen at the grocery store. Record their responses. List characteristics of various cheeses and show samples of cheese. Have students complete AS 2.</em></td>
<td>1. Cheese varies in color, taste, and texture (solid to porous, soft to firm, and smooth to grainy)</td>
</tr>
<tr>
<td></td>
<td>2. Types of cheeses</td>
</tr>
<tr>
<td></td>
<td>a. Blue — white, blue mold running through the cheese, peppery taste, semisoft</td>
</tr>
<tr>
<td></td>
<td>b. Brick — yellow, small openings, mild- to medium-strong flavor, smooth and waxy, semisoft</td>
</tr>
<tr>
<td></td>
<td>c. Brie/Camembert — mild to pungent flavor, very soft but with a thin crust</td>
</tr>
<tr>
<td></td>
<td>d. Cheddar — yellow, nut-like flavor, can be mild to sharp in flavor, firm but smooth texture</td>
</tr>
<tr>
<td></td>
<td>e. Colby — yellow, many irregular openings, mild and slightly sour, softer than Cheddar</td>
</tr>
<tr>
<td></td>
<td>f. Cottage — made from skim milk, soft, curds are cut into cubes</td>
</tr>
<tr>
<td></td>
<td>g. Cream — soft, white, spreadable cheese, unripened, nut-like and slightly sour flavor</td>
</tr>
<tr>
<td></td>
<td>h. Gouda/Edam — similar to Cheddar in taste, but is less sour, nutty flavor, round openings throughout</td>
</tr>
</tbody>
</table>
Instructor Directions

<table>
<thead>
<tr>
<th>Content Outline</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. Monterey Jack — white to light yellow, small holes throughout the cheese</td>
</tr>
<tr>
<td>j. Mozzarella — white, stringy pizza cheese, bland flavor</td>
</tr>
<tr>
<td>k. Munster (Muenster) — yellow to white, mild to mellow butternut flavor, semisoft</td>
</tr>
<tr>
<td>l. Pasteurized Process American — yellow to white, heated mixture of cheeses</td>
</tr>
<tr>
<td>m. Provolone — yellow to white color with a smokey and/or salty flavor, hard</td>
</tr>
<tr>
<td>n. Swiss — yellow to white, large gas holes, sweet, nut-like flavor, firm</td>
</tr>
</tbody>
</table>

Application

AS 1 — Comparing Dairy Products

<table>
<thead>
<tr>
<th>Product</th>
<th>Texture</th>
<th>Color</th>
<th>Flavor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Butter</td>
<td>Both smooth when left at room temperature. Butter is very hard when refrigerated.</td>
<td>Yellow, depending on added coloring</td>
<td>Creamy</td>
</tr>
<tr>
<td>Margarine</td>
<td></td>
<td></td>
<td>Nutty to oily</td>
</tr>
<tr>
<td>Whipped Cream</td>
<td>Light, fluffy</td>
<td>White</td>
<td>Milk to cream</td>
</tr>
<tr>
<td>Nondairy topping</td>
<td>Light, fluffy</td>
<td>White</td>
<td>Virtually none unless vanilla is added</td>
</tr>
<tr>
<td>Half &amp; Half Coffee whitener</td>
<td>Liquid</td>
<td>White</td>
<td>Cream</td>
</tr>
<tr>
<td>Liquid</td>
<td>White</td>
<td>Artificial milk</td>
<td></td>
</tr>
<tr>
<td>Real cheese</td>
<td>Firm and smooth</td>
<td>Light yellow</td>
<td>Cheese-like</td>
</tr>
<tr>
<td>Imitation cheese</td>
<td>Very firm, grainy</td>
<td>Unnatural color</td>
<td>Oily</td>
</tr>
</tbody>
</table>

AS 2 — Comparing Different Cheeses for Nutritional Value

Answers to AS 1

Answers will vary.

Other activities
1. Obtain samples of various cheeses and work with students to determine the differences among them.
2. Prepare various flavors of milk and let students experience the difference between high-quality milk and milk with flavor defects.
All pasteurized fluid milk is from grade A dairies. Milk for drinking is pasteurized and homogenized, and vitamins are added during processing. Off flavors can be caused by exposure to contaminants, by being poorly cooled, and by exposure to sunlight or fluorescent light. Cheeses can be identified by taste, smell, and appearance.

<table>
<thead>
<tr>
<th>Instructor Directions</th>
<th>Content Outline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closure/Summary</td>
<td>All pasteurized fluid milk is from grade A dairies. Milk for drinking is pasteurized and homogenized, and vitamins are added during processing. Off flavors can be caused by exposure to contaminants, by being poorly cooled, and by exposure to sunlight or fluorescent light. Cheeses can be identified by taste, smell, and appearance.</td>
</tr>
<tr>
<td>Evaluation: Quiz</td>
<td>Answers</td>
</tr>
<tr>
<td></td>
<td>1. a</td>
</tr>
<tr>
<td></td>
<td>2. c</td>
</tr>
<tr>
<td></td>
<td>3. b</td>
</tr>
<tr>
<td></td>
<td>4. d</td>
</tr>
<tr>
<td></td>
<td>5. To kill bacteria and other disease-causing microorganisms in the milk</td>
</tr>
</tbody>
</table>
Comparing Dairy Products

**Objective:** Compare real versus imitation dairy products for texture, color, and flavor.

Using samples of butter, margarine, whipped cream, nondairy topping, half and half, coffee whitener, real cheese, and imitation cheese, compare the products as paired in the following chart. Record your observations.

<table>
<thead>
<tr>
<th>Product</th>
<th>Texture</th>
<th>Color</th>
<th>Flavor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Butter</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Margarine</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whipped cream</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nondairy topping</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Half and half</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coffee whitener</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Real cheese</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Imitation cheese</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Lesson 6: Dairy Products

Comparing Different Cheeses for Nutritional Value

Objective: Compare the nutritional value for different varieties of cheese.

Materials:

NOTE: Use as many of the cheeses as possible. The cheeses need to be in a store package that contains the original label including the nutrition information.

Blue
Brick
Brie/Camembert
Cheddar
Colby
Cottage
Cream
Gouda/Edam
Monterey Jack
Mozzarella
Munster (Meunster)
Pasteurized Process American (real not imitation)
Provolone
Swiss
Processed Cheese Food (imitation)

Direction:

1. Complete the table on the back of this page. If the cost of the cheese is not on the label, check with your instructor for pricing information.
2. Answer the following questions.

a. From a nutrient standpoint, which cheese is the “best buy”? Explain your answer.

b. What relationship is there between firmness/softness and percent protein? Percent fat?
<table>
<thead>
<tr>
<th>Cheese type</th>
<th>Serving size by weight</th>
<th>Calories per serving (grams)</th>
<th>Fat per serving (grams)</th>
<th>Protein per serving (grams)</th>
<th>Calcium per serving (mg)</th>
<th>Number of servings per package</th>
<th>Cost of package</th>
<th>Cost per serving</th>
<th>Cost per gram of protein</th>
<th>Cost per gram of fat</th>
<th>Rank from Softest (1) to Firmest (15)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brick</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brie/Camembert</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cheddar</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colby</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cottage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cream</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gouda/Edam</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monterey Jack</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mozzarella</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Munster</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pasterized Process American</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provolone</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swiss</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Processed Cheese Food</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
EVALUATION

Circle the letter that corresponds to the best answer.

1. Fluid milk comes from which grade of dairy farm?
   a. A  
b. B  
c. C  
d. D

2. Which of the following processes breaks down the fat globules of milk into smaller droplets?
   a. Grading  
b. Pasteurization  
c. Homogenization  
d. Adding vitamins

3. If the taste of milk is similar to the odor of silage, which of the following defects is present?
   a. Foreign  
b. Feed  
c. Flat  
d. High acid

4. Which variety of cheese has colored mold running throughout and a peppery taste?
   a. Cream  
b. American  
c. Swiss  
d. Blue

Complete the following short answer question.

5. Why is milk pasteurized?
Agricultural Science I

Curriculum Guide: *Introduction to Animal Products*

Unit Objective: Students will demonstrate their knowledge of animal products by naming the species (beef, pork, or lamb), wholesale cuts, and retail cuts of meat.

Show-Me Standards: 1.8, CA4

References:


Students will use additional outside sources to complete this activity.

Instructional Strategies/Activities:
- Students will engage in study questions in lessons 1 through 6.
- Additional activities that relate to the unit objective can be found under the heading “Other Activities” in the following locations: p. 14 and p. 39.

Performance-Based Assessment:
Students will be asked to identify the species and wholesale and retail name for 40 different cuts of beef, pork, and lamb. The cuts may be fresh or pictures on a poster or flash cards.

Students will be assessed based on the score they receive on the identification of retail cuts of meat.
Introduction to Animal Products
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. Have students study cuts of meat to prepare for an evaluation in which they will be asked to identify 40 different cuts of beef, pork, and lamb. The evaluation will be modeled after the Meats Evaluation CDE.

2. Students will use material found in the unit and additional outside material.
   a. A helpful web site for researching cuts of meat is [http://aggiemeat.tamu.edu/judging/meatjudging.html](http://aggiemeat.tamu.edu/judging/meatjudging.html).
   b. To obtain rules for the event, the meat identification card, and the meat identification letters and numbers, access the Meats Evaluation CDE document at [http://www.dese.state.mo.us/divvoced/ag_cde_guidelines.htm](http://www.dese.state.mo.us/divvoced/ag_cde_guidelines.htm).
   c. Students will print the meat identification card for use during the evaluation.

3. For the evaluation, number the 40 different cuts and display them for students.
   a. Cuts can be placed in groups on different tables to prevent crowding of students.
   b. Students will have approximately 1 to 1 ½ minutes per cut to identify it and move to the next cut.
   c. When students are finished, collect the meat identification cards for grading.

4. Assessment will be based on the score the students receive on the evaluation.
Introduction to Animal Products
Student Handout

1. You will study cuts of meat to prepare for an evaluation in which you will be asked to identify 40 different cuts of beef, pork, and lamb. The evaluation will be modeled after the Meat Evaluation CDE.

2. You will use material found in the unit and additional outside material.
   a. A helpful web site for researching cuts of meat is http://aggiemeat.tamu.edu/judging/meatjudging.html.
   b. To obtain the meat identification card and the meat identification letters and numbers, access the Meats Evaluation CDE document at http://www.dese.state.mo.us/divvoced/ag_cde_guidelines.htm.
   c. Print the meat identification card for use during the evaluation.

3. For the evaluation, your instructor will number the 40 different cuts and display them.
   a. Cuts may be placed in groups on different tables to prevent crowding of students.
   b. You will have approximately 1 to 1 ½ minutes per cut to identify it and move to the next cut.
   c. When you are finished, give the completed meat identification card to your instructor.

4. Assessment will be based on the score you receive on the evaluation.
## Assessment Area

| Identification of 40 Different Cuts of Beef, Pork, and Lamb |

### Criterion

Note: Score the cuts in the same manner as in the actual CDE (240 total points). Multiply the total score by the weight to determine the actual score.

<table>
<thead>
<tr>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>X .3125</td>
</tr>
</tbody>
</table>

### Final Assessment Total

Final Assessment Total _____/100 pts.

### Comments:

- Page 7