

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.
3. *Introduction to Animal Products Curriculum Enhancement*. University of Missouri-Columbia: Instructional Materials Laboratory, 2003.

Supplies & Equipment

- A food sample (for interest approach)

Supplemental Information


1. Internet Sites
 - "Food Safety Education." Food Safety and Inspection Service. United States Department of Agriculture. Accessed on October 9, 2007, from http://www.fsis.usda.gov/Food_Safety_Education/index.asp.
 - Ray, Frederick K. "Meat Inspection and Grading." Oklahoma Cooperative Extension Service. Oklahoma State University. Accessed on October 9, 2007, from <http://pods.dasnr.okstate.edu/docushare/dsweb/Get/Document-1950/ANSI-3972web.pdf>.
2. Print
 - Gillespie, J.R. *Modern Livestock & Poultry*. 7th ed. Clifton Park, NY: Delmar Learning, 2003.
 - Pond, K. and W. Pond. *Introduction to Animal Science*. New York: John Wiley & Sons, 2000.


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.

Instructor Directions	Content Outline
<p>Objective 1</p> <p><i>Ask students how the animal processing industry has evolved. Record the responses. Discuss the legislative acts and the current role of the USDA.</i></p>	<p>Explain how the animal processing industry has evolved.</p> <ol style="list-style-type: none">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.<ol style="list-style-type: none">a. Meat Inspection Act of 1906 – Began federal meat inspection by the USDAb. Packers and Stockyards Act of 1921 – Prevents unfair business dealings of packers/stockyards and initiated scale testing in sale barns and packing facilitiesc. Wholesome Meat Act of 1967 – Makes state inspection similar to federal inspectiond. Today, food inspection is under the USDA’s Food Safety and Inspection Service
<p>Objective 2</p> <p><i>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.</i></p> <p> AS 1 – A Career in the Animal Processing Industry</p>	<p>Identify career opportunities related to animal processing.</p> <ol style="list-style-type: none">1. Livestock buyers – Purchase animals for processing company2. Federal inspectors – Insure that food is safe and wholesome3. USDA meat graders – Assign quality and yield grades to meat carcasses4. Quality control supervisors – Supervise employees and ensure quality finished products5. Butcher – Cut carcasses into retail and wholesale cuts; also process animals

Instructor Directions	Content Outline
<p>Objective 3</p> <p><i>Have students list the dollar amount associated with animal processing.</i></p>	<p>Explain the economic importance of animal processing.</p> <ol style="list-style-type: none"> 1. Over 358 billion dollars worth of meat, dairy, and poultry products sold a year 2. Additional income from animal byproducts
<p>Objective 4</p> <p><i>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.</i></p>	<p>Describe how processing affects the value of the product.</p> <p>The more processing involved, the higher the cost of the end product.</p>
<p>Application</p> <p> AS 1 – A Career in the Animal Processing Industry</p>	<p>Answers to AS 1 Answers will vary.</p> <p>Other activities</p> <ol style="list-style-type: none"> 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.
<p>Closure/Summary</p>	<p>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.</p>
<p>Evaluation: Quiz</p>	<p>Answers:</p> <ol style="list-style-type: none"> 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)

Lesson 1: Importance of Animal Products

Name _____

A Career in the Animal Processing Industry

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:

UNIT-INTRODUCTION TO ANIMAL PRODUCTS

Name _____

Lesson 1: Importance of Animal Products

Date _____

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
2. *Introduction to Animal Products (Student Reference)*. University of Missouri-Columbia: Instructional Materials Laboratory, 1998.
3. *Introduction to Animal Products Curriculum Enhancement*. University of Missouri-Columbia: Instructional Materials Laboratory, 2003.

Supplies & Equipment

- Retail cut identification card set or an actual beef retail cut

Supplemental Information

1. Internet Sites
 - Meat Identification Page. University of Nebraska. Accessed on October 9, 2007, from <http://animalscience.unl.edu/meats/id/>.
 - Retail Beef Cuts. Yellowsheet.com. Accessed on October 9, 2007, from <http://www.yellowsheet.com/retail/>.
 - "Beef Cuts." Certified Angus Beef LLC. Accessed on October 9, 2007, from <http://www.certifiedangusbeef.com/chef/cuts.php>.
 - Beef Cuts – Retail Cuts. Beef Information Centre. Accessed on October 9, 2007, from http://www.beefinfo.org/retail_specs.cfm.
 - "Beef Cuts - Where they Come From." Cattlemen's Beef Board. Accessed on October 9, 2007, from http://www.beefitswhatsfordinner.com/aboutbeef/pdf/beef_cuts.PDF.

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- ❑ Meat Grading Publications. Agricultural Marketing Service. United States Department of Agriculture. Accessed on October 9, 2007, from <http://www.ams.usda.gov/lsg/mgc/mgc-pubs.htm>.
 - ❑ ZoBell, D. R., Whittier, D., and Holmgren, Lyle. "Beef Quality and Yield Grading." Extension. Utah State University. Accessed on October 9, 2007, from <http://extension.usu.edu/cyberlivestock/downloads/beef3.pdf>.
2. Print
- ❑ Pond, K. and W. Pond. *Introduction to Animal Science*. New York: John Wiley & Sons, 2000.
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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.

Instructor Directions	Content Outline
<p>Objective 1</p> <p><i>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.</i></p> <p><input type="checkbox"/> Ppt 1 – Quality Grading</p>	<p>Explain how the quality grade of a beef carcass is determined.</p> <p>Marbling and muscle firmness are evaluated in the rib eye muscle between the 12th and 13th rib.</p> <ol style="list-style-type: none">1. Marbling is intramuscular fat2. There are ten degrees of marbling. The first three only apply in carcass evaluation and for other purposes.<ol style="list-style-type: none">a. Very abundantb. Abundantc. Moderately abundantd. Slightly abundante. Moderatef. Modestg. Smallh. Slighti. Tracesj. Practically devoid3. Firmness of muscle<ol style="list-style-type: none">a. Firmness of muscle ranges from very soft and watery to firmb. Standards spell out what is required for each quality grade <p>Maturity (age of carcass) is determined.</p> <ol style="list-style-type: none">1. 5 degrees A-E2. “A” maturity is usually young cattle less than 30 months of age

Instructor Directions	Content Outline
	<p>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.</p> <p>The quality grades for steer and heifer beef are prime, choice, select, standard, commercial, utility, cutter, and canner.</p> <p>The quality grades for cow beef are choice, select, standard, commercial, utility, cutter, and canner.</p> <p>The quality grades for bullock beef are prime, choice, select, standard, commercial, and utility.</p>
<p>Objective 2</p> <p><i>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.</i></p>	<p>Explain how the yield grade of a beef carcass is determined.</p> <p>Yield grades are a numerical score from 1-5</p> <ol style="list-style-type: none"> 1. Yield grade of 1 has the highest percentage of saleable meat. 2. Yield grade of 5 has the lowest percentage of saleable meat. <p>Yield grades are determined by evaluating four factors</p> <ol style="list-style-type: none"> 1. External fat 2. Kidney, pelvic, and heart fat 3. Rib eye area 4. Hot carcass weight
<p>Objective 3</p> <p><i>Discuss with students the difference between a wholesale cut and a retail cut. Use PPT 2 as a guide.</i></p> <p><input type="checkbox"/> PPT 2 – Wholesale Cuts of Beef</p>	<p>Identify the wholesale cuts of beef.</p> <ol style="list-style-type: none"> 1. Chuck 2. Rib 3. Short loin 4. Sirloin 5. Round 6. Flank 7. Short plate 8. Brisket 9. Fore Shank 10. Variety meats

Objective 4

Ask students what retail cuts come from each of the wholesale cuts of beef. Use a retail cut identification card set or actual beef retail cuts as aids.

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
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	<ol style="list-style-type: none"> 8. Brisket <ol style="list-style-type: none"> a. Brisket whole b. Brisket flat half c. Corned brisket, point half 9. Fore Shank <ol style="list-style-type: none"> a. Shank cross cuts 10. Other cuts <ol style="list-style-type: none"> a. Beef for stew b. Cubes for kabobs c. Cubed steak d. Ground beef 11. Variety meats <ol style="list-style-type: none"> a. Heart b. Tongue c. Liver d. Kidney e. Tripe f. Brains g. Sweetbreads
Application	<p>Other activities</p> <ol style="list-style-type: none"> 1. Visit a local grocery store or meat locker. Look at the various wholesale and retail cuts that are available. 2. Schedule a visit to a beef processor. Watch a carcass being cut into wholesale and retail cuts.
Closure/Summary	<p>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.</p>
Evaluation: Quiz	<p>Answers</p> <ol style="list-style-type: none"> 1. c 2. d 3. a 4. a 5. c 6. Intramuscular 7. External fat thickness; hot carcass weight; amount of kidney, pelvic, and heart fat; and rib eye area

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.

Lesson 3: Pork

Name _____

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.

$$\frac{88.307 - (.036 \times HCW) - (18.574 \times 10^{th} \text{ rib backfat}) + (3.734 \times LMA)}{170} \times 100 = \% \text{ muscle}$$

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

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

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

Course	Agricultural Science I
Unit	Introduction to Animal Products
Lesson	Lamb and Mutton
Estimated Time	90 minutes or 2 50-minute blocks

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
3. *Introduction to Animal Products (Student Reference)*. University of Missouri-Columbia: Instructional Materials Laboratory, 1998.
4. *Introduction to Animal Products Curriculum Enhancement*. University of Missouri-Columbia: Instructional Materials Laboratory, 2003.

Supplies & Equipment

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

Supplemental Information

1. Internet Sites
 - “United States Standards for Grades of Lamb, Yearling Mutton, and Mutton Carcasses.” Agricultural Marketing Service. United States Department of Agriculture. Accessed on October 9, 2007 from <http://www.ams.usda.gov/lsg/stand/standards/lamb-car.pdf>.
 - American Lamb Board. Accessed on October 9, 2007, from <http://americanlambboard.org/>.
 - Epley, Richard J. “Retail Meat Cut Selection and Storage.” Extension. University of Minnesota. Accessed on October 9, 2007, from <http://www.extension.umn.edu/distribution/nutrition/DJ1944.html>.
 - Meat Identification Page. University of Nebraska. Accessed on October 9, 2007, from <http://animalscience.unl.edu/meats/id/>.

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- ❑ “How to Buy Meat.” *Home and Garden Bulletin Number 265*. Agricultural Marketing Service. United States Department of Agriculture. Accessed on October 9, 2007, from <http://www.ams.usda.gov/howtobuy/meat.htm>.
2. Print
- ❑ North American Meat Processors Association. *The Meat Buyers Guide: Meat, Lamb, Veal, Pork, and Poultry*. Hoboken, NJ: John Wiley & Sons, Inc., 2006.
 - ❑ Pond, K. and W. Pond. *Introduction to Animal Science*. New York: John Wiley & Sons, 2000.
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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.

Instructor Directions	Content Outline
<p>Objective 1</p> <p><i>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.</i></p> <p><input type="checkbox"/> PPT 1 – Quality Grading</p>	<p>Explain how the quality grade of an ovine carcass is determined.</p> <p>Maturity (Age)</p> <ol style="list-style-type: none">1. Lamb (young lamb and older lamb)<ol style="list-style-type: none">a. Have break points on at least one front shankb. Slightly wide and moderately flat ribs; wider as lamb agesc. Dark pink to light red lean; fine-textured lean2. Yearling mutton<ol style="list-style-type: none">a. Either break or spool joints on their front shanksb. Wider and flatter ribsc. Slightly dark red lean; slightly coarse-textured3. Mutton<ol style="list-style-type: none">a. Spool joints on their front shanksb. Wide, flat rib bonesc. Dark red lean; course textured <p>Flank streaking – Amount of fat streaks within and upon the inside of the flank of the carcass</p> <ol style="list-style-type: none">1. As flank streaking increases, palatability also increases2. Ten degrees of flank streaking <p>Final quality grade is determined by combining maturity and degree of flank streaking</p> <ol style="list-style-type: none">1. Prime2. Choice3. Good4. Utility5. Cull (mutton only)

<p>Objective 2</p> <p><i>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.</i></p> <p> AS 1 - Yield Grading</p>	<p>Explain how the yield grade of an ovine carcass is determined.</p> <p>Yield grades of ovine carcasses are based on external fat</p> <ol style="list-style-type: none"> 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 <p>The formula for yield grade is: $YG = 0.4 + (10 \times \text{adjusted fat thickness in inches})$</p> <p>Yield grades range from 1 to 5.</p>
<p>Objective 3</p> <p><i>Ask students to list the wholesale cuts of lamb and mutton. Use PPT 2 as a guide.</i></p> <p> PPT 2 - Wholesale Cuts of Lamb</p>	<p>Identify the wholesale cuts of pork.</p> <ol style="list-style-type: none"> 1. Shoulder 2. Rib/rack 3. Loin 4. Leg 5. Foreshank/breast
<p>Objective 4</p> <p><i>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.</i></p>	<p>Identify the retail cuts of pork.</p> <ol style="list-style-type: none"> 1. Leg <ol style="list-style-type: none"> a. French style leg b. American style leg c. Leg steak d. Lamb leg, sirloin half e. Sirloin chops 2. Loin <ol style="list-style-type: none"> a. Loin roast b. Loin chops c. Double loin chops 3. Rib/rack <ol style="list-style-type: none"> a. Rib roast b. Rib chops c. Rack of lamb 4. Shoulder <ol style="list-style-type: none"> a. Square cut shoulder b. Rolled shoulder c. Arm chop d. Blade chop e. Arm roast

	<ul style="list-style-type: none"> f. Blade roast 5. Foreshank/breast <ul style="list-style-type: none"> a. Breast b. Riblets c. Foreshank 6. Variety meats <ul style="list-style-type: none"> a. Patties b. Liver c. Kidney d. Heart 																																	
<p>Application</p> <p>📄 AS 1 – Calculating Percent Muscle</p>	<p>Answers to AS 1</p> <table border="1" data-bbox="638 646 1474 1098"> <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>4.4</td></tr> <tr><td>2</td><td>0.25</td><td>2.9</td></tr> <tr><td>3</td><td>0.1</td><td>1.4</td></tr> <tr><td>4</td><td>0.15</td><td>1.9</td></tr> <tr><td>5</td><td>0.22</td><td>2.6</td></tr> <tr><td>6</td><td>0.31</td><td>3.5</td></tr> <tr><td>7</td><td>0.5</td><td>5.4</td></tr> <tr><td>8</td><td>0.16</td><td>2.0</td></tr> <tr><td>9</td><td>0.12</td><td>1.6</td></tr> <tr><td>10</td><td>0.18</td><td>2.2</td></tr> </tbody> </table> <p>Other activities</p> <ol style="list-style-type: none"> 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. 	Carcass #	Adjusted Fat Measurement	Yield Grade	1	0.4	4.4	2	0.25	2.9	3	0.1	1.4	4	0.15	1.9	5	0.22	2.6	6	0.31	3.5	7	0.5	5.4	8	0.16	2.0	9	0.12	1.6	10	0.18	2.2
Carcass #	Adjusted Fat Measurement	Yield Grade																																
1	0.4	4.4																																
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10	0.18	2.2																																
<p>Closure/Summary</p>	<p>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.</p>																																	
<p>Evaluation: Quiz</p>	<p>Answers</p> <ol style="list-style-type: none"> 1. c 2. a 3. d 4. a 5. d 6. b 7. Flank streaking and maturity 																																	

Lesson 4: Lamb and Mutton

Name _____

Yield Grading

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

Calculate the yield grades of the following ovine carcasses.

Formula: $.4 + (10 \times \text{adjusted fat measurement}) = \text{yield grade}$

Carcass #	Adjusted Fat Measurement	Yield Grade
1	.4	
2	.25	
3	.1	
4	.15	
5	.22	
6	.31	
7	.5	
8	.16	
9	.12	
10	.18	

UNIT - INTRODUCTION TO ANIMAL PRODUCTS

Name _____

Lesson 4: Lamb and Mutton

Date _____

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)
4. *Introduction to Animal Products (Student Reference)*. University of Missouri-Columbia: Instructional Materials Laboratory, 1998.
5. *Introduction to Animal Products Curriculum Enhancement*. University of Missouri-Columbia: Instructional Materials Laboratory, 2003.

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

- ❑ “Inspection & Grading - What are the Differences?” Safe Food Handling Fact Sheets. Food Safety and Inspection Service. United States Department of Agriculture. Accessed on October 19, 2007, from http://www.fsis.usda.gov/Fact_Sheets/Inspection_&_Grading/index.asp.
- ❑ “Poultry-Grading Manual.” Agriculture Handbook Number 31. Agricultural Marketing Service. United States Department of Agriculture. Accessed on October 19, 2007, from <http://www.ams.usda.gov/poultry/resources/PYGradingManual.pdf>.
- ❑ “How to Buy Eggs.” Home and Garden Bulletin Number 264. Agricultural Marketing Service. United States Department of Agriculture. Accessed on October 19, 2007, from <http://www.ams.usda.gov/howtobuy/eggs.htm>.
- ❑ “Basic Egg Facts.” The American Egg Board. Accessed on October 19, 2007, from <http://www.aeb.org/LearnMore/EggFacts.htm>.

2. Print




- ❑ Mountney, G.J. and C.R. Parkhurst. *Poultry Products Technology*. 3rd ed. Binghamton, NY: Food Products Press, 1995.
 - ❑ Pond, K. and W. Pond. *Introduction to Animal Science*. New York: John Wiley & Sons, 2000.
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Interest Approach

Using an entire chicken (or turkey) carcass, a cutting board, and a knife, cut up the chicken. Explain to students what the various parts are called. If time allows, demonstrate how boneless parts are achieved.

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.

Instructor Directions	Content Outline
<p>Objective 1</p> <p><i>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.</i></p>	<p>Identify the edible parts of poultry.</p> <ol style="list-style-type: none">1. Half2. Breast quarter with or without wing3. Breast with or without ribs4. Boneless, skinless breast5. Breast tenderloin6. Wishbone7. Leg quarter8. Leg9. Drumstick10. Thigh11. Wing12. Drumette13. Back14. Liver, gizzard, heart, neck <p>(Note: Unless otherwise stated, skin remains attached to the parts.)</p>
<p>Objective 2</p> <p><i>Ask students how poultry carcasses are graded. Use HO 1, HO 2, and HO 3 for discussion.</i></p> <p> HO 1 - Ready-to-Cook Poultry - A Quality</p> <p> HO 2 - Ready-to-Cook Poultry - B Quality</p> <p> HO 3 - Ready-to-Cook Poultry - C Quality</p>	<p>Describe how ready-to-cook poultry is graded.</p> <p>USDA Grades</p> <ol style="list-style-type: none">1. A2. B3. C <p>Quality factors</p> <ol style="list-style-type: none">1. Conformation2. Fleshing3. Fat covering4. Defeathering5. Exposed flesh

Instructor Directions	Content Outline
<p><i>Explain the possible defects. Point out that if a carcass or part does not meet <u>all</u> 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).</i></p> <p> AS 1 – Poultry Grading (Instructor)</p> <p> AS 1 – Poultry Grading (Student)</p>	<ol style="list-style-type: none"> 6. Discoloration 7. Disjointed and broken bones 8. Missing parts 9. Freezing defects
<p>Objective 3</p> <p><i>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.</i></p> <p> PPt 1 – Main Parts of an Egg</p> <p> HO 4 – Summary of U.S. Standards for Quality of Individual Shell Eggs</p>	<p>Describe the quality factors that influence egg grading.</p> <ol style="list-style-type: none"> 1. Shell 2. Air cell 3. White 4. Yolk

<p>Application:</p> <p>AS 1 – Poultry Grading (Student)</p>	<p>Answers to AS 1</p> <p>Answers are at the Instructor's Discretion.</p> <p>Other activities:</p> <ol style="list-style-type: none"> 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.
<p>Closure/Summary</p>	<p>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.</p>
<p>Evaluation: Quiz</p>	<p>Answers</p> <ol style="list-style-type: none"> 1. d 2. a 3. b 4. a 5. air cell, white, and yolk

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)

		A Quality					
Conformation:		Normal					
Breastbone		Slight curve or dent					
Back		Slight curve					
Legs and Wings		Normal					
Fleshing:		Well fleshed, considering kind and class					
Fat Covering:		Well developed layer -- especially between heavy feathers tracts					
Defeathering:		Turkeys (feathers less than 3/4 in.)		Ducks and Geese ¹ (feathers less than 1/2 in.)		All Other Poultry (feathers less than 1/2 in.)	
Free of protruding feathers and hairs		Carcass	Parts	Carcass	Parts	Carcass	Parts
		4	2	8	4	4	2
Exposed Flesh: ²		Carcass		Large Carcass Parts ³ (halves, front and rear halves)		Other Parts ³	
Weight Range							
Minimum	Maximum	Breast and Legs	Elsewhere	Breast and Legs	Elsewhere		
None	2 lbs.	1/4 in.	1 in.	1/4 in.	1/2 in.	1/4 in.	
Over 2 lbs.	6 lbs.	1/4 in.	1 1/2 in.	1/4 in.	3/4 in.	1/4 in.	
Over 6 lbs.	16 lbs.	1/2 in.	2 in.	1/2 in.	1 in.	1/2 in.	
Over 16 lbs.	None	1/2 in.	3 in.	1/2 in.	1 1/2 in.	1/2 in.	
Discolorations:		Lightly Shaded			Moderately Shaded ⁴		
Carcass		Breast and Legs	Elsewhere	Hock of leg	Elsewhere		
None	2 lbs.	3/4 in.	1 1/4 in.	1/4 in.	5/8 in.		
Over 2 lbs.	6 lbs.	1 in.	2 in.	1/2 in.	1 in.		
Over 6 lbs.	16 lbs.	1 1/2 in.	2 1/2 in.	3/4 in.	1 1/4 in.		
Over 16 lbs.	None	2 in.	3 in.	1 in.	1 1/2 in.		
Discolorations:		Lightly Shaded			Moderately Shaded ⁴		
Large Carcass Parts (halves, front and rear halves)		Breast and Legs	Elsewhere	Hock of leg	Elsewhere		
None	2 lbs.	1/2 in.	1 in.	1/4 in.	1/2 in.		
Over 2 lbs.	6 lbs.	3/4 in.	1 1/2 in.	3/8 in.	3/4 in.		
Over 6 lbs.	16 lbs.	1 in.	2 in.	1/2 in.	1 in.		
Over 16 lbs.	None	1 1/4 in.	2 1/2 in.	5/8 in.	1 1/4 in.		
Discolorations:		Lightly Shaded			Moderately Shaded ⁴		
Other Parts							
None	2 lbs.	1/2 in.			1/4 in.		
Over 2 lbs.	6 lbs.	3/4 in.			3/8 in.		
Over 6 lbs.	16 lbs.	1 in.			1/2 in.		
Over 16 lbs.	None	1 1/4 in.			5/8 in.		
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 pock-marks 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)

		B Quality					
Conformation:		Moderate deformities					
Breastbone		Moderately dented, curved, or crooked					
Back		Moderately crooked					
Legs and Wings		Moderately misshapen					
Fleshing:		Moderately fleshed, considering kind and class					
Fat Covering:		Sufficient fat layer--especially on breast and legs					
Defeathering:		Turkeys (feathers less than 3/4 in.)		Ducks and Geese ¹ (feathers less than 1/2 in.)		All Other Poultry (feathers less than 1/2 in.)	
A few scattered protruding feathers and hairs		Carcass		Parts		Carcass	
		6		3		10	
Exposed Flesh:		Carcass				Parts	
Weight Range							
Minimum: Maximum:							
None		2 lbs.				No part on the carcass (wings, legs, entire back, or entire breast) has more than 1/3 of the flesh exposed	
Over 2 lbs.		6 lbs.				No more than 1/3 of the flesh normally covered by skin exposed	
Over 6 lbs.		16 lbs.					
Over 16 lbs.		None					
Discolorations: ²		Carcass					
		Lightly or Moderately Shaded Discolorations					
Carcass		Breast and Legs				Elsewhere	
None		1 1/4 in.				2 1/4 in.	
Over 2 lbs.		2 in.				3 in.	
Over 6 lbs.		2 1/2 in.				4 in.	
Over 16 lbs.		3 in.				5 in.	
Discolorations: ²		Large Carcass Parts					
		Lightly or Moderately Shaded Discolorations					
Large Carcass Parts (halves, front and rear halves)		Breast and Legs				Elsewhere	
None		1 in.				1 1/4 in.	
Over 2 lbs.		1 1/2 in.				1 3/4 in.	
Over 6 lbs.		2 in.				2 1/2 in.	
Over 16 lbs.		2 1/2 in.				3 in.	
Discolorations: ²		Other Parts					
		Lightly or Moderately Shaded Discolorations					
Other Parts		Breasts, Legs, and Parts					
None		3/4 in.					
Over 2 lbs.		1 in.					
Over 6 lbs.		1 1/2 in.					
Over 16 lbs.		1 3/4 in.					
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:		Carcass				Parts	
		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.

Ready-to-Cook Poultry - C 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)

		C Quality					
Conformation:		Abnormal Seriously curved or cooked Seriously crooked Misshapen					
Breastbone							
Back							
Legs and Wings							
Fleshing:		Poorly fleshed					
Fat Covering:		Lacking in fat covering over all parts of carcass					
Defeathering:		Turkeys		Ducks and Geese¹		All Other Poultry	
Scattering of protruding feathers and hairs		(feathers less than 3/4 in.)		(feathers less than 1/2 in.)		(feathers less than 1/2 in.)	
		Carcass	Parts	Carcass	Parts	Carcass	Parts
		8	4	12	6	8	4
Exposed Flesh:		Carcass			Parts		
Weight Range							
Maximum	Minimum						
None	2 lbs.				No limit		
Over 2 lbs.	6 lbs.						
Over 6 lbs.	16 lbs.						
Over 16 lbs.	None						
Discolorations:		Carcass					
Carcass		Breast and Legs			Elsewhere		
None	2 lbs.				No limit on size, number of areas, or intensity of discolorations and flesh bruises if such areas do not render any part of the carcass unfit for food.		
Over 2 lbs.	6 lbs.						
Over 6 lbs.	16 lbs.						
Over 16 lbs.	None						
Discolorations:		Parts					
Parts (includes large carcass parts)		Breasts, Legs, and Parts					
None	2 lbs.				No limit on size, number of areas, or intensity of discolorations and flesh bruises if such areas do not render any part unfit for food.		
Over 2 lbs.	6 lbs.						
Over 6 lbs.	16 lbs.						
Over 16 lbs.	None						
Disjointed and Broken Bones:		No limit					
Missing Parts:		Wing tips, wings, and tails.					
		Bucks shall include all meat and skin from pelvic bones, except that the meat contained in the ilium (oyster) may be removed.					
		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).					
Trimming:		Carcass			Parts		
		Trimming of the breast and legs is permitted, but not to the extent that the normal meat yield is materially affected.					
		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.					
Freezing Defects:		Numerous pockmarks and large dried areas.					

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.

SUMMARY OF U.S. STANDARDS FOR QUALITY OF INDIVIDUAL SHELL EGGS
Specifications for Each Quality Factor

Quality Factor	AA Quality	A Quality	B Quality
Shell	Clean. Unbroken. Practically normal.	Clean. Unbroken. Practically normal.	Clean to slightly stained.* Unbroken. Abnormal.
Air Cell	1/8 inch or less in depth. Unlimited movement and free or bubbly.	3/16 inch or less in depth. Unlimited movement and free or bubbly.	Over 3/16 inch in depth. Unlimited movement and free or bubbly.
White	Clear. Firm.	Clear. Reasonably firm.	Weak and watery. Small blood and meat spots present.**
Yolk	Outline slightly defined. Practically free from defects.	Outline fairly well defined. Practically free from defects.	Outline plainly visible. Enlarged and flattened. Clearly visible germ development but not blood. Other serous defects.

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

Dirty	Check
Unbroken. Adhering dirt or foreign material, prominent stains, moderate stained areas in excess of B quality.	Broken or cracked shell but membranes intact, not leaking.***

- * 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.

Lesson 5: Poultry Products

Name _____

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.

Quality Factors	Carcass # ____	Carcass # ____	Carcass # ____	Carcass # ____
Conformation (Breastbone, Back, Legs and Wings)				
Fleshing				
Fat covering				
Defeathering				
Exposed flesh				
Discolorations				
Disjointed and broken bones				
Missing parts				
Freezing defects				
Quality grade				

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

UNIT - INTRODUCTION TO ANIMAL PRODUCTS

AS 1 (Instructor)

Lesson 5: Poultry Products

Name _____

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

Name _____

Lesson 5: Poultry Products

Date _____

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?

Course	Agricultural Science I
Unit	Introduction to Animal Products
Lesson	Dairy Products
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.
3. *Introduction to Animal Products Curriculum Enhancement*. University of Missouri-Columbia: Instructional Materials Laboratory, 2003.

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
 - "Grade A Milk and Milk Products." Arkansas Board of Health. Accessed October 19, 2007, from http://www.healthyarkansas.com/rules_regs/Milk_Grade_A.pdf.
 - American Dairy Science Association. Accessed October 19, 2007, from <http://www.adsa.org/>.
 - Dairy Council of California. Accessed October 19, 2007, from <http://www.dairycouncilofca.org/>.


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- ❑ “How to Buy Dairy Products.” Agricultural Marketing Service. United States Department of Agriculture. Accessed on October 19, 2007, from <http://www.ams.usda.gov/howtobuy/dairy.htm>.
2. Print
- ❑ Pond, K. and W. Pond. *Introduction to Animal Science*. New York: John Wiley & Sons, 2000.
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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.

Instructor Directions	Content Outline
<p>Objective 1</p> <p><i>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.</i></p> <p> AS 1 – Comparing Dairy Products</p>	<p>Identify which consumer products are eligible to be made from which grades of milk.</p> <p>Milk can be either grade A or manufacturing grade</p> <p>A. Grade A milk originates from grade A dairies. Fluid milk products <u>must</u> be made from only grade A milk. Other dairy foods <u>may</u> be made from grade A milk.</p> <p>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).</p>
<p>Objective 2</p> <p><i>Ask students how raw milk is processed. Discuss the difference between pasteurization and homogenization.</i></p>	<p>Identify the major processes or treatments given to fluid milk.</p> <p>Pasteurization</p> <ol style="list-style-type: none">1. Heating to 161°F and above2. Over 15 seconds3. Kills bacteria and other disease-causing microorganisms <p>Homogenization</p> <ol style="list-style-type: none">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.

Instructor Directions	Content Outline
	Addition of Vitamins A and D 1. Vitamin D must be added to all fluid milk. 2. Vitamin A must be added to milk containing less than 3.25% milk fat
<p>Objective 3</p> <p><i>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.</i></p>	<p>Explain how flavor defects affect milk quality.</p> <ol style="list-style-type: none"> 1. Milk is naturally sweet and bland-tasting 2. Off flavors of milk and their effect on milk saleability <ol style="list-style-type: none"> a. Bitter – not saleable b. Feed – reduces flavor appeal c. Flat/watery – reduces flavor appeal d. Foreign – not saleable e. Malty – will probably make the milk unsaleable f. Oxidized – will usually make the milk unsaleable g. Rancid – not saleable h. Salty – reduces flavor appeal i. Sour – not saleable
<p>Objective 4</p> <p><i>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.</i></p> <p> AS 2 – Comparing Different Cheeses for Nutritional Value</p>	<p>Describe the identifying characteristics of cheeses.</p> <ol style="list-style-type: none"> 1. Cheese varies in color, taste, and texture (solid to porous, soft to firm, and smooth to grainy) 2. Types of cheeses <ol style="list-style-type: none"> a. Blue – white, blue mold running through the cheese, peppery taste, semisoft b. Brick – yellow, small openings, mild- to medium-strong flavor, smooth and waxy, semisoft c. Brie/Camembert – mild to pungent flavor, very soft but with a thin crust d. Cheddar – yellow, nut-like flavor, can be mild to sharp in flavor, firm but smooth texture e. Colby – yellow, many irregular openings, mild and slightly sour, softer than Cheddar f. Cottage – made from skim milk, soft, curds are cut into cubes g. Cream – soft, white, spreadable cheese, unripened, nut-like and slightly sour flavor h. Gouda/Edam – similar to Cheddar in taste, but is less sour, nutty flavor, round openings throughout

Instructor Directions	Content Outline
	<ul style="list-style-type: none"> i. Monterey Jack – white to light yellow, small holes throughout the cheese j. Mozzarella – white, stringy pizza cheese, bland flavor k. Munster (Muenster) – yellow to white, mild to mellow butternut flavor, semisoft l. Pasteurized Process American – yellow to white, heated mixture of cheeses m. Provolone – yellow to white color with a smokey and/or salty flavor, hard n. Swiss – yellow to white, large gas holes, sweet, nut-like flavor, firm

Application	Answers to AS 1																																				
<p> AS 1 – Comparing Dairy Products</p>	<table border="1"> <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 & Half</td> <td>Liquid</td> <td>White</td> <td>Cream</td> </tr> <tr> <td>Coffee whitener</td> <td>Liquid</td> <td>White</td> <td>Artificial milk</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>	Product	Texture	Color	Flavor	Butter	Both smooth when left at room temperature. Butter is very hard when refrigerated.	Yellow, depending on added coloring	Creamy	Margarine			Nutty to oily	Whipped Cream	Light, fluffy	White	Milk to cream	Nondairy topping	Light, fluffy	White	Virtually none unless vanilla is added	Half & Half	Liquid	White	Cream	Coffee whitener	Liquid	White	Artificial milk	Real cheese	Firm and smooth	Light yellow	Cheese-like	Imitation cheese	Very firm, grainy	Unnatural color	Oily
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<p> AS 2 – Comparing Different Cheeses for Nutritional Value</p>	<p>Answers to AS 2 Answers will vary.</p> <p>Other activities</p> <ol style="list-style-type: none"> 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. 																																				

Instructor Directions	Content Outline
Closure/Summary	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.
Evaluation: Quiz	<p>Answers</p> <ol style="list-style-type: none"> 1. a 2. c 3. b 4. d 5. To kill bacteria and other disease-causing microorganisms in the milk

Lesson 6: Dairy Products

Name _____

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.

Product	Texture	Color	Flavor
Butter			
Margarine			
Whipped cream			
Nondairy topping			
Half and half			
Coffee whitener			
Real cheese			
Imitation cheese			

Lesson 6: Dairy Products

Name _____

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?

UNIT - INTRODUCTION TO ANIMAL PRODUCTS

Name _____

Lesson 6: Dairy Products

Date _____

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:

AggieMeat. Meat Judging. Accessed January 29, 2003, from <http://aggiemeat.tamu.edu/judging/meatjudging.html>.

Introduction to Animal Products. University of Missouri-Columbia, Instructional Materials Laboratory, 1998.

Missouri CDE Handbook. Accessed January 29, 2003, from http://www.dese.state.mo.us/divvoted/ag_cde_guidelines.htm.

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>.
 - 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/divvoted/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/divvoiced/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.

Agricultural Science I

Introduction to Animal Products Scoring Guide

Name _____

Assessment Area	Criterion	Weight	Total
Identification of 40 Different Cuts of Beef, Pork, and Lamb	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.	X .3125	

Final Assessment Total ____/100 pts.

Comments:

