

<b>Course</b>	Agricultural Science I
<b>Unit</b>	Introduction to Animal Products
<b>Lesson</b>	Dairy Products
<b>Estimated Time</b>	90 minutes or 2-50 minute blocks
<b>Student Outcome</b>	

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](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><b>Objective 1</b></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><b>Identify which consumer products are eligible to be made from which grades of milk.</b></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><b>Objective 2</b></p> <p><i>Ask students how raw milk is processed. Discuss the difference between pasteurization and homogenization.</i></p>	<p><b>Identify the major processes or treatments given to fluid milk.</b></p> <p>Pasteurization</p> <ol style="list-style-type: none"><li>1. Heating to 161°F and above</li><li>2. Over 15 seconds</li><li>3. Kills bacteria and other disease-causing microorganisms</li></ol> <p>Homogenization</p> <ol style="list-style-type: none"><li>1. Milk is passed through a fine orifice (opening) under high pressure to break fat globules into smaller sizes.</li><li>2. This treatment prevents milk from separating into cream and skim milk.</li></ol>

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



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