

# Dairy

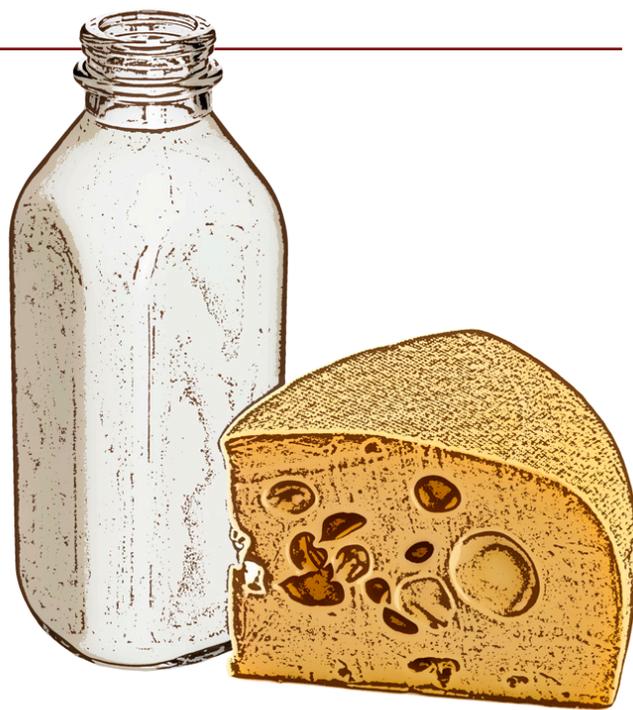
## HOW IT'S MADE

Once a cow gives birth to a calf it begins to produce milk, lots of milk. Dairy cows are milked 2-3 times each day. A typical dairy farm has 350 cows and milking machines are used to keep up, cows are no longer milked by hand. Dairy farmers are busy cleaning cows and the equipment before and after milking. Time is also spent growing and buying food since each cow eats about 75 pounds of food daily!

The milking machinery pumps milk into a refrigerated tank to cool it quickly. Every day the cold milk is transferred from the tank to a large insulated truck and driven to the dairy plant for processing. At the dairy plant, computer controlled machines test the milk to ensure it is healthy to drink. Once the milk meets nutrition and food safety standards, it is heated to 161 degrees to kill any bacteria or germs it may contain. This process is called pasteurization. Next the milk is homogenized by mixing at such high speeds that the cream and milk will be permanently combined. Before homogenization, the cream would float to the top and people would shake milk before drinking it.

Lastly, the milk is fortified with Vitamin D to help our bones use the calcium in milk. Very few foods contain Vitamin D because our bodies are designed to produce it with the help of sunlight. In Seattle we have more grey than sunny days, so getting Vitamin D from our diet is very important for strong bones. The finished milk is put into cartons and shipped to your school cafeteria.

**For more information, visit:**  
<http://www.havemilk.com/article.asp?id=2347>



## DID YOU KNOW?

- The first 16 dairy cows came to Washington around 1836, when Dr. Marcus Whitman brought cows to make milk for his mission in Walla Walla. The first creamery opened in 1880.
- Washington State has approximately 460 dairy farms and about 243,000 dairy cows. On average, how many cows are in each farm's herd? (528).
- All 28 counties in Washington have dairy farms. Whatcom County has 130 dairies, more than any other county in the state.
- Yakima County has fewer dairies than Whatcom, but its 72 dairies have a total of 95,000 cows. In 2009 Yakima County produced 38% of Washington's milk-- more than two billion pounds!
- Washington ranks 10th in the United States for milk production. Other top states include California, Wisconsin, New York, Idaho, Pennsylvania, Minnesota, Texas, New Mexico, and Michigan.
- Washington cows make a lot of milk! Our state's cows rank 2nd for the amount of milk produced per cow. Our state's cows make an average of 2,688 gallons of milk per year.

Source: <http://www.heartofwashington.com/consumer/dairy.html>

## COOKING IN THE CLASSROOM

### Mango Lassi

Makes approximately 32 ¼ cup samples  
(serve in 3-ounce Dixie cups)

#### Ingredients:

- 4 cups vanilla, low-fat yogurt
- 2 cups 1% milk
- 4 cups frozen mango, thawed (or chopped fresh mango)
- A dash of ground cardamom (optional)

#### Directions:

1. Put half of the ingredients into the blender (2 cups yogurt, 1 cup milk, 2 cups mango, 2 Tbsp sugar). Cover and blend until smooth.
2. Pour into glasses and sprinkle with cardamom, if using.
3. Repeat with remaining ingredients.



## SCHOOL GARDEN

### WINTER FOCUS: EARTHWORMS

Illustrate the role of earthworms as soil tillers by preparing two boxes with organic materials and adding earthworms to one. Earthworms play a pivotal part in gardening by digesting organic matter and excreting castings, pellets that are excellent fertilizer high in nitrogen, phosphorous, and potassium. Students will see earthworms at work by setting up a home for them in a clear plastic box. As a bonus, use your classroom worm box as a food recycling center!

For a full lesson plan, see:

<http://www.csgn.org/images/pdf/GreatAndPowerfulEarthworm.pdf>

## JUST THE FACTS

- When a farmer milks a cow by hand, it takes 345 squirts to make one gallon of milk.
- There are six main breeds of dairy cows: Holstein, Jersey, Ayrshire, Milking Shorthorn, Guernsey, and Brown Swiss. Holsteins, the white cows with black spots, are the most common in the U.S.
- It takes about 10 pounds of milk to make one pound of cheese.
- Cheese and yogurt were made before humans had refrigerators, in order to preserve the milk and prevent it from spoiling.
- The first cows in North America arrived at the Jamestown Colony 1611.
- An average American cow produces approximately 1,448 gallons of milk per year, enough to fill over 35 bathtubs!

Source: <http://www.havemilk.com/category.asp?id=1334>

## LITERATURE LINKS

### GRADES K-2

*Clarabelle: Making Milk and So Much More*  
by Cris Peterson (Boyds Mills Press, 2007)

*Extra Cheese, Please! Mozzarella's Journey from Cow to Pizza*  
by Cris Peterson (Boyds Mills Press, 1994)

*The Milk Makers*  
by Gail Gibbons (MacMillan, 1985)

### GRADES 3-5

Teach your students how cheese is made while enjoying a well-aged slice of American history. *A Big Cheese for the White House, The True Tale of A Tremendous Cheddar* by Candace Fleming (DK Pub, 1999) is a story based on the following historical fact: On January 1, 1801, Elder John Leland, a Baptist minister, delivered a 1,235-pound wheel of Cheshire cheese to Thomas Jefferson as a gift of gratitude for Jefferson 's support of religious freedom.

The way Fleming tells it, the people of Cheshire, MA, were inspired to produce such a lavish gift after hearing that President Jefferson was serving Norton, CT cheese at the White House. Elder John Leland suggested that everyone could help make a whopping big cheddar, a cheese so big that it would replace Norton cheese for years to come.

After gathering milk from all the cows in Cheshire, and making a tremendous amount of cheese curds, they use an apple press to drain the whey. To get the cheese to Jefferson's New Year's Day party, it sails down the Hudson River and is then carted on a sleigh to Washington. President Jefferson declares it the best that he has ever tasted, puts it in the record books, and serves it until it finally goes bad in 1805. As a finale serve Washington produced cheese and apple slices for a stately snack!

## MAKING CHEESE

There are many steps in cheese making process. Some types of cheese are ready after sixty days, but some cheeses age for many years before they are eaten!

1. First, the milk arrives from the farm to the cheesemaker. A big hose pipes the milk from the refrigerated truck into the factory.
2. The milk gets tested to make sure that it is pure and high quality.
3. Next, the milk is weighed and heated. The heating process is called "pasteurization," and it helps to make sure that the milk is safe to drink and turn into cheese.
4. Cheesemakers add starter culture, a "good bacteria," to the milk. Starter cultures give cheeses their different flavors and textures.
5. They also add rennet to make the milk get thicker, or "coagulate." The milk begins to thicken, like custard or pudding.
6. Now the cheese gets cut with big wires. Cutting helps to separate the curds (the solid cheese) from the whey (the liquid).
7. After that, cheesemakers cook and stir the curds. When the curds are firm enough, they drain the whey.
8. The solid blocks of curds are salted, which removes more whey and adds flavor.
9. The curds now get pressed into molds. Different kinds of cheeses have different shaped molds. This takes three to 12 hours.
10. The last step is curing. This is when the cheese sits on shelves in a special dry, cold room from two up to ten years. During this time, cheese develops its final flavor and texture. Now it's ready to eat!

For picture of these steps, visit [http://www.eatwisconsincheese.com/wisconsin/how\\_cheese\\_is\\_made.aspx](http://www.eatwisconsincheese.com/wisconsin/how_cheese_is_made.aspx)

To research different kinds of cheeses and their history, see [http://www.ilovecheese.com/cheese\\_profile.asp?Cheese=Brick](http://www.ilovecheese.com/cheese_profile.asp?Cheese=Brick)

## STUDENT SLEUTH

1. How many years ago did humans domesticate cows and begin drinking milk? (10,000 years ago)
2. Dairy cows are large mammals. How much does a cow weigh? (1,500 pounds)
3. Potassium is a nutrient that regulates blood pressure, therefore eating foods high in Potassium is important for people with high blood pressure, a condition called hypertension. Fruit, vegetables and \_\_\_\_\_ are high in Potassium. (milk)
4. How many stomachs does a cow have? Cows spend \_\_\_\_\_ hours per day "chewing their cud." (4 stomachs, 6 hours)
5. Obesity is becoming more dangerous to our health than smoking. In the United States, researchers think that one of the many factors causing to obesity is high-fat cheese consumption. In 1910 the average American ate 5 pounds of cheese in a year. In 2007, Americans' cheese intake increased to \_\_\_\_\_ pounds. (33 pounds)
6. Milk is a nutrient rich food. What nutrients are found in milk and what are they good for? (Calcium and Vitamin D- bones and teeth, Protein- muscles, Potassium- regulates blood pressure, Vitamin A- vision and skin)

For more information, see:  
<http://wadairy.com/index.shtml>

## ADVENTUROUS ACTIVITIES

### SOCIAL STUDIES & READING

Have 4th and 5th grade students read "job descriptions" about the characteristics of different dairy cow breeds. Find a reading page, graphic organizer, and answers for this activity on pages 10-12 of "Cowabunga: All About Breeds" <http://www.cfaitc.org/lessonplans/pdf/413.pdf>.

### RESEARCH

Dairy foods are notable for being rich in Calcium, although they aren't the only foods that contain this important mineral. Other good food sources of calcium include some green vegetables, like okra, kale, and bok choy; canned fish with soft, edible bones (the calcium's in the bones!) such as sardines and salmon; nuts - especially Brazil nuts and almonds; some fruits such as oranges, apricots and dried figs; and calcium-set tofu. Have your students write down everything they eat for 1 day. Encourage them to bring in food labels from packaged foods. Did they get enough Calcium? (hint: 4-8 year olds need 800mg, 9-18 year olds need 1,300mg per day). Students may use computer lab time to research mg of Calcium in the foods they eat. Refer them to a "calcium calculator"

at the link below: [http://www.eatsmart.org/external/default.asp?URL=/games/c\\_calculator/](http://www.eatsmart.org/external/default.asp?URL=/games/c_calculator/)

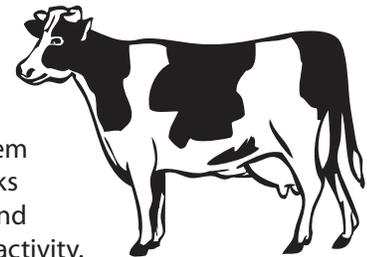
### PROBLEM SOLVING

Use story problems about milk production to introduce volume measurements and conversions (cups, pints, quarts, gallons). Advanced students could do conversions from gallons of milk into pounds. (On average, a gallon of milk weighs between 8.5 and 8.8 pounds.)

### MATH

Practice writing time with primary students by reading aloud a story about a day in a dairy farmer's life. Provide them with a worksheet of blank clocks so that they can follow along and draw the proper time for each activity.

Find the story and worksheets at <http://oklahoma4h.okstate.edu/aitc/lessons/primary/timeday.pdf>.



Assign students to record how many dairy products they can find in their homes. Tally them by category and make bar graphs or pie charts from classroom-wide statistics. Secondary students could complete more complex calculations like percentages. Depending on grade level, the categories could include dairy products such as skim or fat-free milk, 1% or lowfat milk, 2% or reduced-fat milk, whole milk, buttermilk, half-and-half, cream, plain yogurt, flavored yogurt, cheese, cream cheese, cottage cheese, butter, ice cream, frozen yogurt, and "other." Cheese categories could be divided further (e.g. Cheddar, Swiss, Parmesan, mozzarella, Monterey Jack, Colby, feta, blue, and other). You could also include non-cow and non-dairy milks, such as goat milk, soy milk, rice milk, or nut milk (e.g. almond or hazelnut).

### STUDENT ADVOCATES

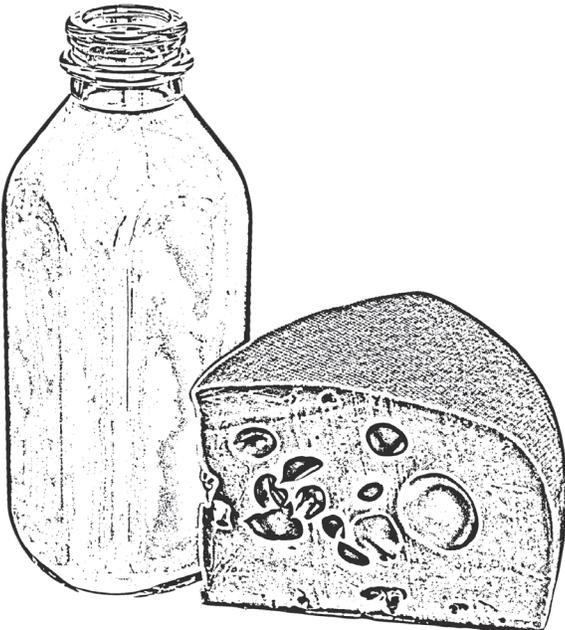
Do all the kids at school drink milk? Packed with nutrition and low in sugar, milk is a healthy beverage to choose at breakfast and lunch. Even though it's nutritious, some kids don't choose milk for very good reasons. Milk may not be culturally appropriate, meaning that milk wasn't a typical beverage in the place where their family comes from. For instance, some Asian countries drink soy milk and eat tofu made from soybeans instead of drinking milk from cows. Other kids may not tolerate the lactose that cow milk contains, this is called lactose-intolerance. Drinking milk when you're lactose-intolerant may cause gas, cramping and diarrhea. Survey the children in the lunchroom to find out how many will never make the nutritious choice of drinking cow milk. If your school needs more to choose from to ensure all kids have a calcium rich beverage, ask your kitchen manager to supply an alternative like fortified soy milk.



HEAL IS A collaboration between Seattle Public Schools nutrition services, health education, physical education and risk management departments.

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# Dairy



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