

Dairy Lesson



Goals

Students will...

- Increase their familiarity with dairy farming and milk.
- Drink milk when it is offered to them.
- Increase their awareness of the environmental benefits of composting.
- Increase their understanding of nutrition.

Objectives

Students will...

- a. Locate the origin of dairy cows on a map
- b. Identify the breed of cow that produces more milk
- c. Explain the difference between organic and traditional dairy farming
- d. Write step by step directions that someone their age could follow for making a dairy fruit smoothie
- e. Write a paragraph with appropriate punctuation and capitalization
- f. Construct a bar graph for dairy nutrients
- g. Participate in composting activities.

Lesson Activities

- Review points about safety, sanitation, and cooperation
- Introduce dairy
- Background information on dairy farming and milk
- Lessons from the Farm
- Prepare dairy fruit smoothies (Form groups of 4 to 6 students)
- Do compost activity (See compost lesson for mini-lessons)
- Eat
- Wrap-up
- Distribute copies of recipe and challenge sheets to students
- Clean-up

Other Dairy Activities

Nutrition science lesson

The many forms of milk

Global and regional mapping

Milk fact sheet

Writing ideas

Background Information on Dairy



Did you know that...?

Cows have a four-compartment stomach

A four-compartment stomach enables cows to obtain their nutrients from the roughage in their diet. The bacteria in the cow's stomach allow the cow to convert inedible feeds (such as grain, hay or silage) that a human stomach cannot break down into a highly nutritious product: milk! Cows need certain nutrients to produce high quality milk. These nutrients are carbohydrates and fats for energy and milk production, and proteins for body growth, maintenance and milk production. They also need vitamins and minerals such as calcium, phosphorus, vitamin A, vitamin D, vitamin E and vitamin C. Cows need a lot of clean water (approximately 50 gallons per day) to produce milk.

Milk contains droplets of fat

Unprocessed milk contains fat in the form of droplets that form an emulsion, a liquid containing suspended fat particles. Milk also contains protein, such as casein and albumin. Another component of milk is sugar, which is mostly found in the form of lactose. Minerals, such as calcium, phosphorus, and iron are also important nutrients found in milk. Milk is the cheapest and most abundant source of calcium, which is an important mineral for humans to build strong teeth and bones. Milk also provides vitamin A, some vitamin B, and a little vitamin C. Milk processors also add vitamin D to milk. Water, however, is the largest component of milk. The average milk composition is as follows: 87% water, 5% sugar, 4% fat, 2.6% casein, .7% albumin and .7% minerals.

No dairy cattle breeds originated from the United States

All purebred dairy cattle originated in Europe. The Holstein-Friesian or Holstein originated in Holland, and is the most common cattle on dairy farms. Holsteins are usually black and white in color, but can also be red and white. Colored breeds, such as the Jersey or Brown Swiss are usually light brown in color. These breeds produce milk higher in solids content, and the milk is usually higher in butterfat. This type of milk is best used to make butter and cheeses.

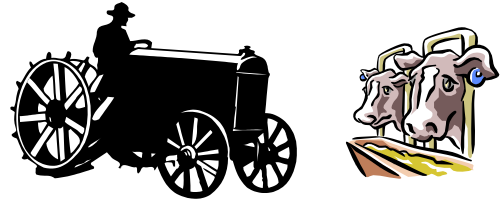
Background Information continued



Dairy farms employ a number of practices to help produce safe milk and keep their animals and farmland healthy and productive. Modern farmers feed their cows grain, silage and hay. Grain and silage is usually grown with practices to preserve soil quality and health, and prevent pests from destroying the crops. While some farmers use artificially made fertilizers, minimally till the soil to preserve soil structure and organic matter, and use limited amounts of man-made pesticides, other farmers certify their crops as organic and only use naturally made fertilizers and pesticides. Modern dairy farmers care for their animals but when cows get sick, most modern farmers treat them with medicines. Organic farmers choose natural herbal remedies, and if the cow gets too sick, they remove the cow from the organic herd and give it regular medications. Maine consumers have heard that some states allow cows to have artificial growth hormones to boost milk production, but in Maine our farmers do not use this practice, which helps us when we market our milk as wholesome, without any added hormones.

For information on field trips to dairy farms, contact Oakhurst Dairy (Portland) at 772-7468 or Garelick Dairy (Bangor) at 942-4604.

Lessons from the Farm - Dairy



Most dairy farmers love their cows. Until calves are two months old, they get milk or milk replacer feed and grain and hay. Cows also get vaccinated for cow diseases just like you are vaccinated for human diseases. When they are two months old they go into a pen with a water bowl. They start getting hay, silage (corn or grass) and grain to grow. When they are about 15 months old they are bred and when they calve they are then put with the milking cows. Before they are old enough to milk, they just eat, sleep, exercise and grow.

The cows are milked in the stanchion barn with a pipeline that takes the milk to the milk room and a bulk tank, which cools the milk to 36 degrees. A tractor-trailer truck comes every other day to empty the tank and take it to the dairy for processing.

To make sure the cows are fed the best possible silage, hay, and grain, a nutritionist comes to the farm to test the silage and hay and adds the right minerals to make the diet balanced for the cows so that they can produce good milk and stay healthy. If a cow doctor is needed, a cow veterinarian can come to the dairy farm to treat the sick cows

Dairy farmers enjoy their cows and want them to be comfortable, healthy, and well fed.

Materials and Preparation

Food needed for dairy fruit smoothies (for 4 groups)

1/2 gallon (5 cups) nonfat or low-fat frozen yogurt,
or low-fat ice cream

1 package (5 Tbs.) frozen or fresh blueberries

1 package (1 1/4 cups) fresh or frozen strawberries

1 qt. (2 1/4 cups) milk

1 banana

2 1/2 tsp. vanilla extract

Skim milk, whole milk, cream, evaporated milk, sweetened condensed milk and
buttermilk (nutrition science lesson)



Materials needed (for 4 groups)

4 blenders

4 large spoons

4 cutting boards

4 sets dry measuring cups

4 knives

4 measuring spoons

4 liquid measuring cups

Cleaning towels, napkins

Plastic spoons and cups

Paper plates

Drinks for students

Compost bucket

Wax paper

Copy of recipe for each student

Copy of challenge sheet for each student

Copy of milk fact sheet for each student

Copy of writing ideas sheet for each student

Materials and Preparation continued



Each station should have the following:

Food

1 cup nonfat or low-fat frozen yogurt, or low-fat frozen ice cream
1 Tbs. blueberries
1/2 cup milk
1/4 cup strawberries
3 slices banana
1/2 tsp. vanilla

Materials

1 blender
1 large spoon
1 cutting board
1 set dry measuring cups
1 knife
1 set measuring spoons
1 liquid measuring cup
Plastic spoons
Plastic cups
Cleaning towel
Copy of recipe

Use Maine ingredients whenever available.

Classroom Recipe for Dairy Fruit Smoothie

Ingredients:

1 cup nonfat or low-fat frozen yogurt, or low-fat frozen ice cream
1 Tbs. blueberries
1/2 cup milk
1/4 cup strawberries
3 slices banana
1/2 tsp. vanilla

Choose Maine ingredients when possible.

Student Cooking Activities

Note: This recipe requires the use of blenders and knives.

Measure ice cream or yogurt and place in blender.

Add blueberries and strawberries.

Slice banana and add to blender.

Add milk and vanilla.

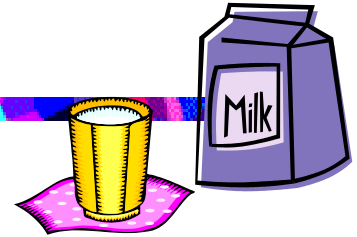
Blend ingredients at high speed for approximately 4 minutes or until smooth.

Pour and enjoy!

Yield: 1 1/2 cups

Nutrition Science Lesson - Milk

The Many Forms of Milk



Using skim milk, whole milk, cream, evaporated milk, sweetened condensed milk, and buttermilk, pour samples of each into clear glasses.

Make labels for each type of milk to be used later.

Discuss with students the differences in appearance of the different types of milk.

Pour samples of each type of milk into paper cups for the students to taste.

Discuss with students the flavors of different types of milk, and differences between the types.

Using milk labels, describe how each variety differs. Ask students to match the label with the correct glass of milk.

Types of milk:

Skim - All of the milk fat is removed. It is thinner, but contains all of the nutrients of whole milk except fat.

Whole - “Regular milk.” It contains all of the original milk fat.

Cream - Contains more milk fat than whole milk. It is thicker and creamier and can be whipped to make whipped cream.

Evaporated - Some of the water is removed to make it thicker. It is packaged in a can and is sometimes called “canned milk.” The light brown comes from the reaction of sugars in the milk when it is heated.

Sweetened Condensed - It is like evaporated milk with water removed, plus added sugar. This kind of milk is used to make sweetened desserts such as lemon or key lime pie filling.

Buttermilk - A bacteria culture is added to milk to give it more body than regular milk, and an acidic flavor. It is very similar to skim milk except it contains more acid. It is often used in cooking, such as for buttermilk pancakes. Originally, buttermilk was the liquid left over after the fat was removed from the cream in the butter making process.

Discuss other foods that can be made from milk (cheese, sour cream, cottage cheese, butter, yogurt and ice cream).

Dairy Student Activity Sheet



Name _____

When you look at the nutrition labels on the milk products, look for the serving size information near the top of the label. Be sure the serving size is one cup for all the types that you compare. Use the labels to record the information in the table below.

Milk Comparison

Type	Calories	Total Fat	Cholesterol	Sodium	Carbohydrate	Protein	Vitamins & Minerals
Skim							
Whole							
Cream							
Evaporated							
Sweetened Condensed							
Buttermilk							

Your teacher will assign you one of the columns in the table. On a separate piece of paper, please construct a bar graph for all the types of milk using the information from your assigned column. (Example: graph all types of milk and the amount of sodium they contain.)

Global and Regional Mapping

Milk



World Map

Discuss with students the origin of dairy cows. Have them find it on the map.

Dairy Cows ----- Europe (0°, 45°)

Local Harvest Calendar

Have students identify different types of dairy cows that live here in Maine (Holstein, Jerseys, Guernseys, Ayrshires, Brown Swiss).

Discuss differences in milk quality depending on type of dairy cow (colored breeds such as Jerseys, Guernseys, Ayrshires, and Brown Swiss produce milk higher in fat and solids).

Discuss with students where in Maine dairy farms are located (all areas of the state!) and differences between organic and commercial dairy farms.

Date _____

Name _____

Milk Fact Sheet



1. What is milk mostly made up of?
2. Where did cows originally come from?
3. What do organic farmers do differently than traditional dairy farmers?
4. What breed of cows produces more milk fat?

Writing Ideas – Dairy



1. What did you like or dislike about this lesson?
2. Write a paragraph that includes at least three of the facts from the milk fact sheet.
3. Write step by step directions for making a dairy fruit smoothie that someone your age could follow.
4. Prepare the milk recipe for your family or friends. What did they think? Did they like it? Were they surprised?
5. Come up with your own ideas...

