Dairy cows are fascinating animals. They turn grass and grains into milk. Heifers are female dairy cattle that have not given birth to a calf. Once a heifer gives birth, it is called a cow. All female dairy cows must have a calf to produce milk. The gestation (pregnancy) period for cows is nine months. Newborn calves weigh about 80-100 pounds. Male dairy cattle are called bulls and do not produce milk.

Milk provides your body with calcium, which is needed for healthy bones and teeth. Calcium also helps our muscles and nerves work properly, and helps blood clot. Milk products also provide us with carbohydrates, protein and Vitamin D. You should have 3 servings of nonfat or low-fat milk and milk products each day. One serving of dairy is equal to 1 cup of milk, yogurt or ice cream and 1 ½ -2 ounces of cheese.

A 1,500 pound dairy cow eats 100 pounds of feed each day. This includes corn silage, hay, ground corn, soybean meal and vitamins/minerals. Dairy cows also drink 30-50 gallons of water each day. That is about an entire bathtub full of water. With all that eating and drinking, are cows stuffed? The simple answer is ‘no’. They are eating to meet their energy (calorie) needs—they do not overeat. Young animals that are actively growing have greater requirements for protein than older animals.

**What is DAIRY?**

**COW’S HEALTHY DIET**

- Corn Silage: 65 pounds
- Hay: 20 pounds
- Soybean Meal: 5 pounds
- Ground Corn: 8 pounds
- Vitamins/Minerals: 2 pounds

Total: 100 pound per day

**DID YOU KNOW?**

- National Milk Day is January 11th.
  - It marks the first day milk deliveries in glass bottles began in the United States in 1878.
- Each year, U.S. dairy farmers provide milk to make more than 1 billion pounds of butter, 7 billion pounds of cheese and 1 billion gallons of ice cream.
- Milk is part of your school lunch and has been for over 70 years. The National School Lunch Act was passed in 1946.
- On average, each cow produces 8-10 gallons of milk per day. That is over 100 glasses per day.
There are seven different dairy cow breeds in the United States. The most common breed in the United States is Holsteins. Holsteins are black and white. Other breeds include Jersey, Brown Swiss, Guernsey, Ayrshire, Milking Shorthorn, and Red and White Holstein. They can be tan, brownish gray, golden brown, reddish brown or shades of these colors with patches. Some breeds produce a lot of milk and some breeds produce milk with a lot of butterfat. Farmers consider this when choosing a breed of dairy cows. Farmers improve their herd through genetics and select cows that produce more milk or have a higher butterfat content in their milk.
Most dairy farmers live and work on their farms. Dairy farmers protect the land, water and air not only for their animals, but also for their families, the surrounding community, and future generations. Water conservation, manure management, and improving air quality are a few ways they protect their farm and the environment. For example, water used to clean milking parlors is reused to clean alleyways and irrigate fields. Nutrient-rich manure is spread on fields so crops grow better. Air quality is improved by following proper manure storage practices and by maintaining clean facilities.

Of all U.S. dairy farms are family-owned and operated. There are about 42,000 dairy farms in the United States. Dairy farmers work hard each day to provide safe, wholesome, nutrient-rich milk to the public, while caring for their animals, land and communities. Dairy farmers make positive contributions to rural America. To keep a Dairy farm running, every member of the family is involved. Farm kids are learning hard work, dedication and family loyalty. This helps prepare them to come back to the farm to continue the legacy of their family.

Technological advances are enabling farmers to make smarter day-to-day decisions to improve cow health, production and on-farm efficiencies. Following are some examples of technology used on dairy farms.

Automated calf feeders (A) provide nutrition for calves several times a day, adjusting for the calves’ age. Automated feeders can help calves grow faster and stay healthier because of precise diet delivery.

Milk yield recording systems (B) provide individual animal data including the amount of milk produced at each milking. It also tests milk components, such as protein. Dairy farmers can spot changes in animal health and provide necessary care quickly with the help of these systems.

Automated milking systems (C) reduce the labor required to milk cows. Cows enter an automatic milking unit without human help. Computer-controlled equipment identifies the cow, sanitizes the udder, collects the milk and releases the cow when she is done milking.

Activity monitors (D), such as tracking collars, measure activity. They are similar to Fitbits. The collars detect abnormal activity changes, which often are early warning signs of illness or infection. This allows for quicker treatment. The Fitbit-type devices also show activity changes that help detect when a cow is ready for breeding or labor so the farmer can provide timely attention and the cow can deliver a healthy calf.

Computer, tablet, (E) and phone apps and programs allow for greater data collection and accurate decision models. They also provide more ability to quickly monitor changes in animal behavior that might reflect changes in health or well-being.

Ear tags (F), similar to earrings, allow farmers to track critical information about each cow. The ear tags contain chips that can be scanned. The scan sends information to a computer about a cow’s body temperature, health, and how much milk it gives.

Genetic samples can be obtained from a cow’s blood, hair, or tissue. These samples are sent to a lab that creates a genomic report. The farmer uses the information to make decisions to increase milk production while minimizing the number of animals needed on the farm.
There are many practices dairy farmers use to produce high-quality, wholesome and safe milk. These critical practices start with the cow and end at your table. The practices include:

**KEEPING COWS HEALTHY**
By adopting best management practices, such as climate-controlled barns, milking sanitation and regular veterinary care, dairy farmers increase the well-being of their cow herd by reducing the risk of disease and infection.

**STRICT, ON-FARM MILKING PROCEDURES**
Today, human hands never touch milk as it travels from cow to consumer. People milking cows wear gloves to prevent any transfer of pathogens from cow to cow. A cow’s teats are cleaned before and after milking to minimize the chance bacteria is transferred to milk. Equipment is also cleaned after each milking.

**QUICK COOLING OF MILK AND IMMEDIATE TRANSPORTATION TO THE MANUFACTURER**
Milk collected from dairy cows is cooled to 45°F or less within two hours of the completion of milking in order to reduce the possibility of any bacteria growth. The practice of quick cooling assures that the most wholesome milk reaches the consumer.

**TESTING FOR ANTIBIOTICS**
Veterinarians help dairy farmers administer antibiotics when they are needed to treat an illness. Antibiotics are not used regularly, but when they are used, the treated cow’s milk is discarded and does not enter the human food system. Every tanker of milk is tested for antibiotic. In the rare event a tanker tests positive, the milk is destroyed immediately and never reaches the consumer.

**PASTEURIZATION**
Pasteurization involves heating, then rapidly cooling raw milk. This step is very important for the continued production of safe milk. The Food and Drug Administration and the Centers for Disease Control recommend drinking only pasteurized milk.

**PROCESSING AND DISTRIBUTION**
It takes about two days for milk to go from the farm to the store. Milk is transported in tanker trucks that keep it cold and sanitary. When milk is received at the processor, it is checked to ensure quality. Once the milk passes inspection, it is pumped into large insulated vats. Then it is pasteurized, homogenized, and packaged for distribution to stores, schools and households.

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**The Power of 4**
Dairy cattle are called ruminants because they have a four-compartment stomach. The four compartments of a cow’s stomach are the rumen, reticulum, omasum and abomasum. Dairy cows chew their food to soften it, swallow it, and then return it to their mouth for continued chewing. This is called chewing the cud. After chewing the cud, it is swallowed a second time, broken down further, and digested. Cows spend up to eight hours a day chewing their cud. Cows can convert plants that humans cannot eat into nutritious foods like milk because of this unique digestive system.

**human NUTRITION**
Together, milk, cheese, and yogurt provide nine essential nutrients, including calcium, potassium, phosphorus, protein, vitamins A, D and B12, riboflavin and niacin. Beyond building stronger bones, three daily servings of low-fat or fat-free dairy foods improve overall diet quality and reduce the risk of various chronic diseases.
DAIRY PRODUCTS

Many dairy products can be found in the grocery store. These include milk, flavored milk, ice cream, cheese, butter, yogurt, cream cheese, sour cream, cottage cheese and buttermilk.

ICE CREAM
Ice cream is a popular dessert. At any given time 87% of Americans have it in their homes. Milk and cream are the essential ingredients in ice cream. In fact, it takes 12 pounds of whole milk to make 1 gallon of ice cream.

Most Americans prefer vanilla over any other flavor. What is your favorite flavor? Determine your classmates’ favorite flavor with a class survey. Create a graph showing the results.

CHEESE
Cheese is another nutritious food made from milk. People crave cheese more than any other food, so it is not surprising that the average American eats over 37 pounds of cheese each year. That is easy to do, considering cheese can be found in many of our favorite foods, such as pizza. There are many different varieties of cheese – something for everyone’s taste preference.

YOGURT
The two main ingredients in yogurt are milk and bacterial cultures. That is a good thing. Milk strengthens our teeth and bones, while the cultures help fight infection and boost our immune system. There are many different varieties and flavors of yogurt. When you are at the grocery store, check them out. Yogurt is a fun way to add calcium to your diet.

Fun Fact:
The ice cream sundae originated in Evanston, IL.

The Top 5 Milk Producing States Are:
1. California
2. Wisconsin
3. New York
4. Idaho
5. Texas

Illinois...
has over 680 licensed dairy herds.
ranks 21st in milk production in the United States.
has 24 dairy processing plants
that make a variety of delicious and nutritious dairy products for you.
Think about what you have had to drink today. Refer to your drink label(s) or search the web for them, if possible. Discuss whether your drink choices have been nutritious with your class.

### Think Your Drink

8 fluid oz. serving comparison  
Percent Daily Values are based on a 2,000 calorie diet.

<table>
<thead>
<tr>
<th>Low-fat Milk 1%</th>
<th>Fat-free Chocolate Milk</th>
<th>Sports Drink</th>
<th>Cola</th>
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<tbody>
<tr>
<td>% Daily Value</td>
<td>% Daily Value</td>
<td>% Daily Value</td>
<td>% Daily Value</td>
</tr>
<tr>
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<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total Carbohydrates</td>
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<td>10</td>
<td>0 g</td>
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<tr>
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<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Vitamin C</td>
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<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Vitamin D</td>
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<td>25</td>
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</tr>
<tr>
<td>Calcium</td>
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<td>30</td>
<td>0</td>
</tr>
<tr>
<td>100 CALORIES</td>
<td>120 CALORIES</td>
<td>60 CALORIES</td>
<td>100 CALORIES</td>
</tr>
<tr>
<td>0 tsp ADDED SUGARS</td>
<td>1.5 tsp ADDED SUGARS</td>
<td>3 tsp ADDED SUGARS</td>
<td>6 tsp ADDED SUGARS</td>
</tr>
</tbody>
</table>

### What is the difference?

When it comes to milk, there are many varieties to pick from. Here is a closer look at some milk choices available. Next time you tag along to get groceries you will have a better idea what the different choices mean.

- **DRY MILK (POWDERED MILK)**  
  Liquid milk that has been dehydrated forming a powder. It has a long shelf-life and is easy to store because it does not require refrigeration before opening.

- **LACTOSE FREE**  
  Real milk, just without the lactose. It is a good way for people who are lactose intolerant to get all the great nutrients found in regular milk.

- **ORGANIC**  
  Milk products from livestock raised according to organic farming methods including no antibiotics or added hormones.

- **FLAVORED MILK**  
  Chocolate milk and strawberry milk are examples. Flavored milk has the same amount of vitamins, minerals, and protein as white milk.

- **SKIM (FAT FREE), LOW FAT, OR WHOLE MILK**  
  Refers to the amount of fat in milk. All have the same 9 essential nutrients, but they have different fat and calorie contents. They taste different, too. People often consider taste preferences and dietary needs to make the choice that is right for them.

- **ULTRA HIGH TEMPERATURE (UHT) MILK**  
  Milk pasteurized to about 280°F and held only 2 seconds. Taste and nutrition are preserved while providing a longer shelf-life.
1. Describe your position as a ruminant nutritionist.

My position entails understanding the food dairy cows eat, and how those cows utilize and transform their food into the products that will be consumed by humans. For example, if we feed soybean meal to cows, we would expect the cows to convert that into protein. Feeding cows needs to be affordable to the farmer, so I am always checking the prices to make sure the farmers and the cows are happy. Lastly, I teach students about animal and ruminant nutrition to prepare them for a future career in this field.

2. How involved are you with dairy?

My research and all classes I teach revolve around dairy cows and dairy breeds. A couple examples of those breeds include Holstein and Jersey. I make sure my research and community-based learning programs are relevant and helpful to the farmer by making dairy farming more affordable.

3. What is your favorite part of your job?

My favorite part is changing people’s lives by teaching them the importance of the dairy cow. I help students understand how to feed a cow properly and I feel a sense of pride when my students can talk about lessons learned from my research and teaching. Teaching animal science can be challenging. Each person learns differently, so the content must be taught in many different styles in order for the students to fully understand. Once the students have a good understanding, they can teach farmers about proper dairy nutrition.

4. What new and exciting things are happening in the dairy industry now?

There is new technology being introduced every day. We have incorporated a lot of that in our new milking facility. Due to better genetics, feed, and housing, the cow of today is able to produce more milk. Research is showing how important milk and milkfat is for the developing mind and as part of a balanced nutritious diet.
Homemade ice cream

Try this simple recipe to make your own ice cream!

WHAT YOU WILL NEED:
- Individual serving containers of dairy coffee creamer
- Ice
- Ziploc bag
- Salt, any variety
- Dish towel to insulate hands

PROCEDURE:
1. Fill Ziploc bag 1/3 full of ice.
2. Shake several solid sprinkles of salt on ice.
3. Put 2-3 sealed creamer cups in Ziploc.
4. Layer with more ice, filling Ziploc about 2/3 full.
5. Layer with more salt.
6. Finish filling Ziploc with ice.
7. Shake Ziploc vigorously for about ten minutes.
8. Dig creamer cups out and enjoy!

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DAIRY HAS 9 ESSENTIAL NUTRIENTS

- CALCIUM
  Helps maintain strong bones
- POTASSIUM
  Helps heart pump blood
- PHOSPHORUS
  Helps build bones and teeth
- PROTEIN
  Helps preserve and build muscle
- VITAMIN A
  Helps eye health and vision
- VITAMIN D
  Helps promote bone growth
- VITAMIN B12
  Helps maintain brain function
- RIBOFLAVIN
  Helps convert food into fuel
- NIACIN
  Helps body function normally

For More Information, Visit These Websites
- prairiefarms.com
- midwestdairy.com
- stdairy council.org
- nationaldairy council.org
- holsteinusa.com
- usjersey.com
- browns wissusa.com
- usguernsey.com
- milkingshorthorn.com
- usayrshire.com
- dairygood.org
- moomilk.com/fueluptoplay60.com
- fofarms.com
- hilmarcheese.com
- millife.com

WhereIsMyMilkFrom.com

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