The Amazing Dairy Cow

Dairy cows are amazing animals. They can turn grass and grains into milk! Heifers are female dairy cattle and after two years, they give birth to their own calves. 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.

What's Black and White and Red All Over?

Dairy cows come in many colors. The black and white cows are called Holsteins. You'll find mostly Holsteins here in the United States. Some other breeds include Jersey, Brown Swiss, Guernsey, Ayrshire and Milking Shorthorn. 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.

Fill'er Up!

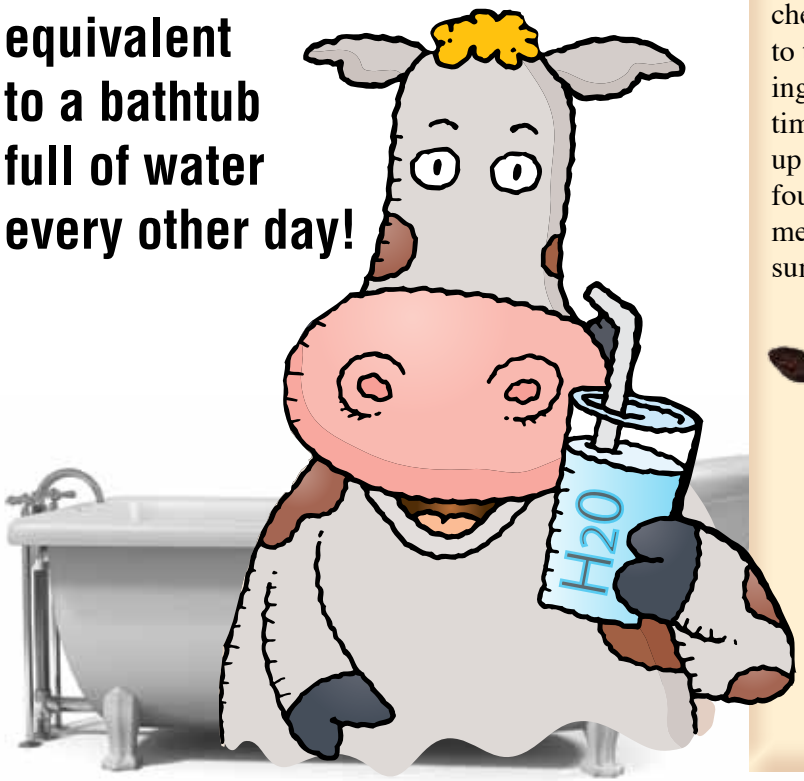
Dairy cows eat hay, silage and grain. Silage is fermented corn, wheat or hay with the stalks and leaves. Cows eat 50 pounds of silage as well as 40 pounds of feed and hay each day, for a total of 90 pounds of food. Dairy cows also drink 25-50 gallons of water each day.

- If one cow eats 90 pounds of feed each day, how many pounds of feed would a herd of 100 cows eat in a day?

_____

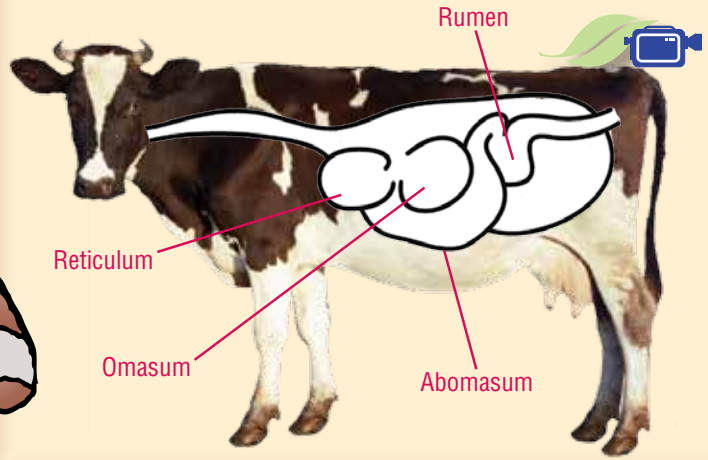
- If a cow drinks 40 gallons of water a day, how many cups of water does she drink? (16 cups = 1 gallon) _____

A cow drinks the equivalent to a bathtub full of water every other day!



Do A Double Take

Dairy cattle are called ruminants because they have multiple compartments in their stomach. Ruminant animals first chew their food to soften it, swallow it, and then returned 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 will spend up to eight hours a day chewing their cud. Cows have a four-compartment stomach. The four digestive compartments of a cow's stomach are the rumen, reticulum, omasum and abomasum.



Udderly Cool

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.

Five aircraft carriers like the USS Ronald Reagan would equal about 1 billion pounds.

Photo: U.S. Navy

President Reagan's favorite recipe of macaroni and cheese contained a cup of milk.

Milk: From the Farm to your Kitchen

At the Farm

On today's dairy farms, cows are milked 2 or 3 times a day with special milking machines. Farmers use automated equipment to milk the cows and take extra steps to keep the milk clean and safe. The udder is cleaned before rubber-lined cups are attached to the teats. Then a pump sucks the milk through the cups and into a pipe. This pipe takes the milk from the machine to a refrigeration tank that stores the milk at 40 degrees Fahrenheit.

Before modern milking machines, a farmer could milk about six cows by hand in one hour. Now, farmers can milk over 100 cows in an hour!

Illinois has about 102,000 dairy cows that produce close to 2 billion pounds of milk a year. On average, each cow produces enough milk to fill 125 glasses. That's about 8 gallons per day!

On the Road

Special trucks haul the milk from the farm to the dairy plant. The trucks keep the milk cold—like a giant thermos on wheels. The truck drivers take samples of the milk to make sure it meets certain standards before they deliver it.

In Your Body

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 to 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 1-2 ounces of cheese.

Your bones need more than calcium to stay strong. They also need exercise! How many of these good bone-building activities do you like to do?

- Play Soccer
- Jump Rope
- Roller Blade
- Dance
- Skate
- Play Ball

Strong Bones

What would happen to bones if they didn't get calcium? Try this to find out:

- Find 2 jars with lids. Put one chicken bone in a jar of milk. Put another chicken bone in a jar of vinegar. Put the lids on the jars.
- Remove the bones after 2 days and try to bend the tip of each bone. What happens?
- Wait 2 or 3 more days and try to bend the bones in the middle. Try to cut them with scissors. Which one is softer?

The acid in vinegar dissolves calcium. The bone in the vinegar becomes brittle because it lost calcium. Keep your bones strong with plenty of calcium.

At the Plant

This is where the milk is tested, standardized, homogenized, pasteurized and packaged.

- Milk is tested for butterfat content, flavor, odor and bacteria. Then it is pumped into a refrigerated storage tank.
- The milk is moved from the storage tank to a clarifier, where it is standardized. Here, milk from several different dairy farms is mixed so it all tastes the same and has the same amount of cream.
- Milk fat is broken into tiny particles that are evenly spread throughout the milk. This is called homogenization. Without being homogenized, the cream would rise to the top of the milk and it would need to be stirred or shaken before drinking.
- Milk is pasteurized to kill bacteria and protect its purity and flavor. This is done by quickly heating, then cooling the milk. Pasteurization got its name from Dr. Louis Pasteur, who first discovered that heat kills germs.
- Automated machines package the milk. The machines fill, seal and stamp the expiration date on each milk carton or jug. The milk is refrigerated until it is ready to be shipped out of the plant.

In the Kitchen

Dairy farmers take special care of the cows on their farms. They also take extra steps to keep the milk their cows produce safe and clean. You should do the same at home. Milk should be stored in a refrigerator that is 40 degrees Fahrenheit or below. Always wash your hands with warm soap and water before handling any food or beverage. Never consume any food item or beverage that is past the sell by or use by date. Cooking and baking is fun! Just be sure to be safe when handling any food or beverage.

Try this activity to make your own butter!

- Place a half-pint of room temperature whipping or heavy cream in a plastic or glass jar with a lid. One half-pint of cream will make about ¼ pound of butter.
- Shake the jar for 5-10 minutes.
- When a lump of butter forms, pour the contents of the jar into a colander to separate the butter from the buttermilk.
- Eat the butter on bread or crackers. A pinch of salt can be added.

At the Store

Refrigerated delivery trucks pick up the packaged milk from the dairy plant and deliver it to grocery stores across the country. The milk you purchase is fresh. In most cases, only two days have passed from milking the cow to stocking the shelves at the grocery store. Long ago, milk was stored in jars, pails, cans and eventually, glass bottles. Paper cartons arrived in 1906 and plastic jugs followed. Today, we are lucky enough to find milk available almost everywhere, thanks to refrigerated tanks and trucks.

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

Ice Cream

Ice cream is a popular dessert item. Illinois ranks fourth in ice cream production. The average American consumes 23.2 quarts of ice cream a year. Milk and cream are the essential ingredients for making 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. Take a class vote to find out the favorite ice cream flavors in your class. 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 31 pounds of cheese each year. That's easy to do, considering that cheese can be found in many of our favorite foods, such as pizza. Also, 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. And that's a good thing! Milk strengthens our teeth and bones, while the cultures can help us 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.

THINK YOUR DRINK

MILK

Nutrition Facts

Serving Size 1 cup = 8 oz.
Servings Per Container 2
Calories 83

		% DAILY VALUE
Total Fat	0g	0%
Total Carbohydrate	13g	4%
Protein	8g	17%
Vitamin A		10%
Vitamin C		0%
Vitamin D		25%
Calcium		30%

CHOCOLATE MILK

Nutrition Facts

Serving Size 1 cup = 8 oz.
Servings Per Container 2
Calories 158

3 tsp. added sugar

		% DAILY VALUE
Total Fat	2.5g	4%
Total Carbohydrate	26g	9%
Protein	8g	16%
Vitamin A		10%
Vitamin C		4%
Vitamin D		25%
Calcium		30%

COLA

Nutrition Facts

Serving Size 1 cup = 8 oz.
Servings Per Container 1.5
Calories 150

6 tsp. added sugar

		% DAILY VALUE
Total Fat	0g	0%
Total Carbohydrate	22g	8%
Protein	0g	0%
Vitamin A		0%
Vitamin C		0%
Vitamin D		0%
Calcium		0%

FRUIT PUNCH

Nutrition Facts

Serving Size 1 cup = 8 oz.
Servings Per Container 1.5
Calories 120

7 tsp. added sugar

		% DAILY VALUE
Total Fat	0g	0%
Total Carbohydrate	30g	10%
Protein	0g	0%
Vitamin A		0%
Vitamin C		0%
Vitamin D		0%
Calcium		0%

Using information from the drink labels, answer the following questions about some of your favorite drinks.

From highest to lowest, rank the drinks according to their added sugar levels.

_____
_____

What is the relationship between the added sugar and carbohydrate levels?

_____
_____

What drink(s) provide you with the highest percentage of calcium? About how many servings of this drink do you need to reach 100% of your daily requirements?

_____
_____

What other products could you consume to help reach your daily requirements of calcium?

_____
_____
_____

Which drink do you think is the healthiest choice? Why?

_____
_____
_____

The Milking Parlor

Mark Erdman
Dairy Producer
Chenoa, IL

Tell us about your dairy operation and how you got involved.
My dad started his dairy career with one heifer when he was 11 years old. By the time he married my mom, he was milking 10 head. By the time I was born, they were milking 40 head. Erdman Dairy has expanded over the years to continue our family dairy. At the time of my college graduation, we were milking 90 head. I always knew I was going to come home to be a dairy farmer because that is what I have a passion for. Today, we are milking 480 cows. Two of my nephews have decided they want to continue our Erdman Dairy and have recently joined the operation.

Tell us about serving on the Midwest Dairy Association Board as well as the National Dairy Board. What do these associations do?
By serving on the Midwest Dairy Association Board and the National Dairy Board, I bring input from my fellow dairy farmers to plan the promotion and research efforts that help consumers understand the nutritional value of milk and dairy foods. These farmer boards also support programs that make sure there are new markets for our milk and dairy foods. They also support efforts that continue to tell the dairy farmers' story to consumers who want to know where their food comes from.

Where do you see the dairy industry headed in the future?
The dairy industry has been working with many national restaurants to help develop new products with an emphasis on health, nutrition and convenience. These efforts will be even more important in the near future to create more market opportunities for our milk and to keep improving products for today's consumer, as well as future consumers. We will continue to place an emphasis on working with schools to help students make informed choices about nutrient-rich foods, like dairy, and to remain physically active every day. In the future, just as we have always done, dairy farmers will be good stewards of the land, good neighbors in our communities and good caregivers to our animals.

Andy Lenkaitis
Environmental Sales Engineer
GEA Farm Technologies
Naperville, IL

Tell us about GEA Farm Technologies.
GEA Farm Technologies designs and manufactures equipment for dairy farms. We make milking equipment to collect and cool milk from dairy cows so it can be shipped and made into dairy products such as milk, cheese and ice cream. Other equipment we build, such as manure handling and barn equipment, is designed to keep the dairy cow comfortable, clean and happy.

How did you become involved in agriculture?
I grew up on a small dairy farm milking 40 registered Holsteins. As a youth, I was involved with showing dairy cattle and pigs. I was also involved in 4-H, FFA and the Junior Holstein Association. I was able to work on the farm after school and learn about how mechanical equipment operates and how it plays a role in raising the dairy cow.

What new and exciting things are happening in the dairy industry now?
There is more advanced technology coming to the dairy industry every day. Manure treatment systems, such as digesters, are allowing farmers to produce energy on their farm and reduce the odor from their operation. Robotic milkers allow the cow to be milked on her schedule with less labor from the farmer. Technologies in barn equipment, such as ventilation controllers and cooling pads, allow the cow to be comfortable no matter how hot or cold it is outside.

Jennifer DeHoog, RD, LDN
Nutrition Educator
St. Louis District Dairy Council
Peoria, IL

Describe what your position as Nutrition Educator entails.
As a nutrition educator with the St. Louis District Dairy Council, my job is to help people learn about the importance of eating dairy foods, as well as provide them with materials they can use to educate others about dairy. I do this by visiting with school leaders, such as school nurses, people in charge of preparing school meals and teachers, meeting with health educators, giving presentations and doing television and radio interviews.

Why is it important to include dairy in your diet?
Eating three servings of dairy every day is a deliciously easy way to add good nutrients to your diet. Besides great taste, three servings of dairy – milk, cheese and yogurt – provides calcium along with eight other nutrients that help build strong bones and healthy bodies.

What is your favorite part of your job?
The favorite part of my job is working with a variety of people in different settings, including schools, colleges, health departments, hospitals, University of Illinois Extension, health and school professional organizations, and television and radio stations to deliver information and resources they can use to educate others about the importance of dairy.

Have You Had Your 3-A-Day Today?

Your body needs calcium for strong bones and teeth. The best way to get calcium is from milk and other dairy products. To get enough calcium, you need at least 3 servings of dairy each and every day!

Use the space below to see if you are getting your 3-A-Day of dairy. For each day, record the dairy products that you eat or drink.

DAY 1 _____

DAY 2 _____

DAY 3 _____

For More Information...

Check Out These Websites

- www.prairiefarms.com
- www.midwestdairy.com
- www.stldairycouncil.org
- www.nationaldairycouncil.org
- www.holsteinusa.com
- www.usjersey.com
- www.brownswissusa.com
- www.usguernsey.com
- www.milkingshorthorn.com
- www.usayrshire.com
- www.ilovecheese.com
- www.3aday.org
- www.whymilk.com
- www.moomilk.com
- www.nutritionexplorations.org

Rock 'n Roll Ice Cream

Try this simple recipe to make your own homemade ice cream!

1. In an empty and clean 1-pound coffee can, mix 1 pint of half & half with ½ cup sugar. Add a little vanilla or fruit if you like.
2. Place the lid on the can, secure it with duct tape, and then place it inside of an empty and clean 3-pound coffee can.
3. Pack ice around the small can. Then sprinkle about 2 table spoons of rock salt on the ice. Finally, fill the rest of the can with ice.
4. Place the lid on the large can. Secure the lid with duct tape so it does not fall off.
5. Sit on the floor with some friends and roll the large can to each other. You may want to put a tarp on the floor for this. After about 10 minutes of rolling your can, you will have made ice cream in the small can!
6. Remove the small can and rinse it with water before opening. If you don't, you may end up with salt in your ice cream.
7. Enjoy!

Illinois Learning Standards: 1.B.2d; 6.B.2; 6.C.2a; 7.A.2a; 10.A.2a; 10.B.2b; 11.A.2b; 11.A.2c; 11.A.2e; 12.A.2a; 12.A.2b; 12.B.2a; 13.B.2a; 13.B.2b; 13.B.2c; 16.E.2b(W); 17.B.2a; 17.B.2b; 17.C.2c; 22.A.2b; 23.B.2; 23.C.2a; 26.B.2d

Illinois Assessment Framework: 1.4.04; 1.4.12; 6.4.05; 6.4.10; 6.4.12; 7.4.04; 7.4.06; 10.4.01; 11.4.03; 11.4.04; 12.4.02; 12.4.05; 13.4.08; 13.4.11

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