

ILLINOIS

AG
MAG

An Agricultural
Magazine for Kids

DAIRY

DAIRY DEFINED

Dairy cows turn grass and grains into milk. Heifers are female dairy animals 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—just like humans! Newborn calves weight 80-100 pounds.

Milk is an important part of a healthy diet. Milk provides your body with calcium, which is needed for healthy bones and teeth. Milk products also provide us with carbohydrates, protein, and Vitamin D. You should have three servings of low-fat milk and milk products every day.

MILK PROVIDES 13
ESSENTIAL NUTRIENTS

CALCIUM
Helps maintain strong bones

POTASSIUM
Helps the heart pump blood

PHOSPHORUS
Helps build bones & teeth

PROTEIN
Helps preserve & build muscle

VITAMIN A
Helps eye health & vision

VITAMIN D
Promotes bone growth

VITAMIN B12
Helps maintain brain function

NIACIN
Helps body function normally

**VITAMIN B2, B5, D3, ZINC,
SELENIUM & IODINE**

Just like us, dairy cows need to eat well too! A 1,500 pound dairy cow eats 100 pounds of feed every day. Their diet is called Total Mixed Ration (TMR) and includes corn silage, hay, ground corn, soybean meal, and vitamins and minerals. Dairy farmers work with veterinarians and feed specialists to make sure their cows are eating a healthy diet. Dairy cows also drink about thirty to fifty gallons of water a day. That is about an entire bathtub full of water!

2 lbs.
Vitamins
Minerals

5 lbs.
Soybean Meal

8 lbs.
Ground
Corn

20 lbs. Hay

65 lbs.
Corn Silage

Technology

on the farm

Advances in technology have helped farmers to make smarter day-to-day decisions to improve cow health and efficiency on the farm.

Automated cow feeders provide nutrition for calves several times a day. These feeders can adjust for the animal's age, helping calves grow faster and stay healthier.

Computer-controlled and robotic milking equipment is able to identify the cow, sanitize the udder, collect the milk, and release the cow when she is done milking.

Milk yield recording systems provide the farmer with data for each individual cow. Farmers can monitor how much milk the cow is producing, among many other things. This information helps farmers spot changes in an animal's health and allows them to provide necessary care quickly.

Activity monitors, such as tracking collars, monitor each animal's activity. These collars can detect abnormal activity changes that might be early warning signs of illness or infection.

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 this information to make decisions to increase milk production while minimizing the number of animals needed on the farm.



automated cow feeders



computer controlled & robotic milking



activity monitor

VOCABULARY

BULL: male dairy animal used for breeding

CALCIUM: a mineral found in dairy products that is needed for healthy teeth and bones

CALF: cattle less than 3 months of age

COW: a female dairy animal that has given birth to a calf

CUD: partially digested food that is regurgitated from the first compartment in a cow's stomach into the mouth to be chewed again.

DAIRY: food group containing milk and milk products

HAY: grass, clover, or alfalfa that is cut, dried and baled, and fed to cattle

HEIFER: female dairy animal that has not had a calf

HERD: a grouping of cows on a dairy farm

HOMOGENIZATION: process where milk fat is broken into tiny particles that are evenly spread throughout the milk

MILK: a nutrient-rich liquid that comes from female mammals

MILKING PARLOR: a specialized area on the farm where the cows are milked, sometimes with the help of robotic milking machines

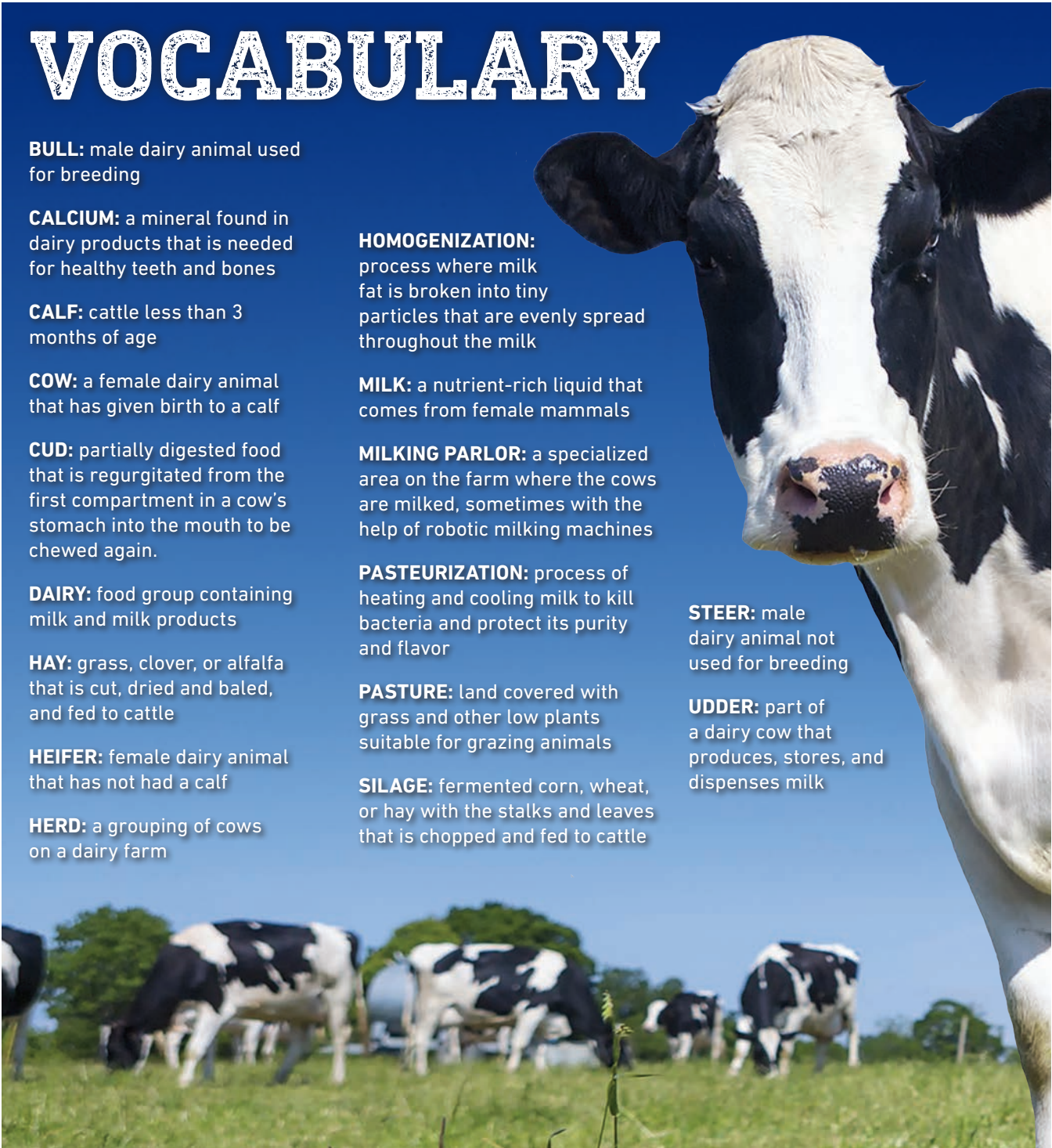
PASTEURIZATION: process of heating and cooling milk to kill bacteria and protect its purity and flavor

PASTURE: land covered with grass and other low plants suitable for grazing animals

SILAGE: fermented corn, wheat, or hay with the stalks and leaves that is chopped and fed to cattle

STEER: male dairy animal not used for breeding

UDDER: part of a dairy cow that produces, stores, and dispenses milk




FOCUS on Sustainability


Most dairy farmers live and work on their farms. They protect the land, water, and air not only for their animals, but also for their families, the surrounding community, and future generations. Dairy farmers are dedicated to innovation and conservation practices to make their farms more sustainable. Advances in cow care, nutrition, genetics, and technology have had big impacts on dairy farm sustainability over the years.

Did you know?


The U.S. dairy industry has **decreased water usage by 65%** over the past decades. Water used to clean milking parlors is reused to clean alleyways and irrigate fields.




Most dairy farm manure is incorporated into fields as natural fertilizer, increasing the soil's water-holding capacity and **reducing the need for synthetic fertilizers**.




Some dairy farms use anaerobic digester systems that **convert manure into clean, renewable electricity**, which can power their farms, their homes, and their communities.




The latest research shows that the U.S. dairy industry accounts for just **2%** of U.S. greenhouse gas emissions. Dairy farmers are working to reduce that figure even more.



80% of a dairy cow's diet comes from plant fibers and feedstuffs that they can digest but humans can't.



Dairy farmers today use **90% less land** to make a gallon of milk than in the past.





Holstein dairy cows in a freestall barn. This provides them a clean, dry, and comfortable resting space.

Rumination NAVIGATION

Dairy cattle are called ruminants. Unlike humans, they have a four-compartment stomach to digest their food. The four compartments of a cow's stomach are the rumen, reticulum, omasum, and abomasum.

#2: Reticulum

The reticulum is the second compartment. It catches food that is too big and needs to be broken down more. This causes the cow to regurgitate the wad of food back up the esophagus and into the mouth to be re-chewed. This is called "chewing the cud."

#3: Omasum

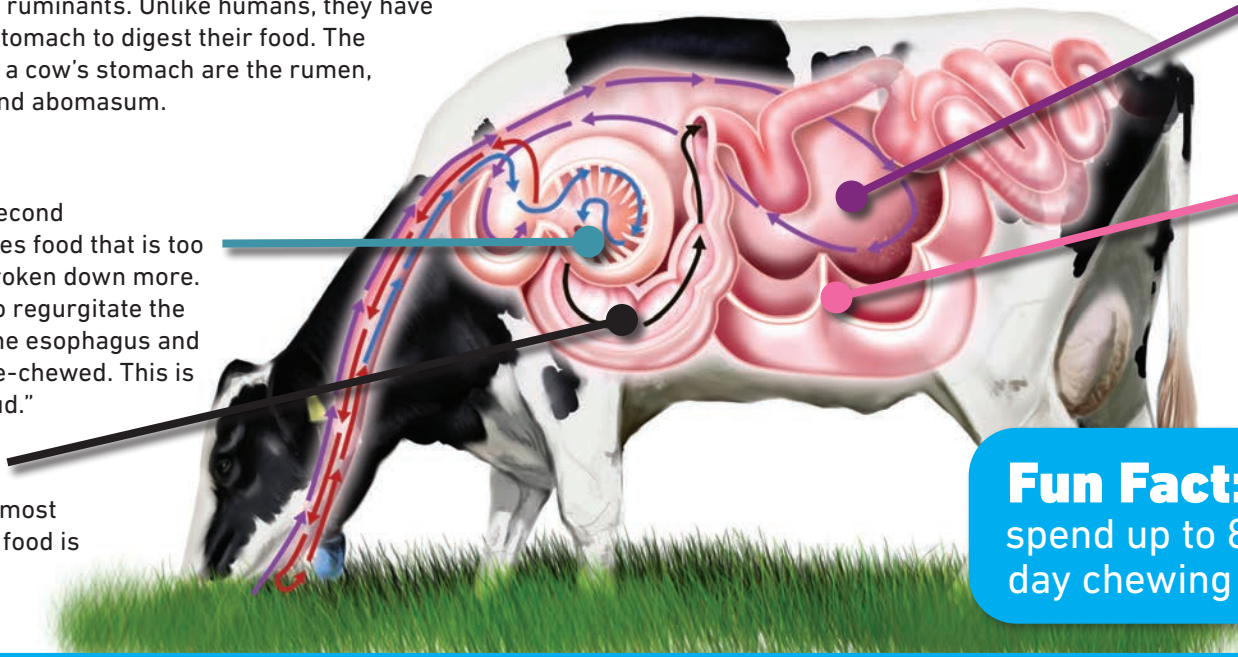
In this compartment, most of the water from the food is absorbed.

#1: Rumen

The rumen is basically a large storage bin that can hold up to 50 gallons! Microorganisms in the rumen begin to break down and digest whatever the dairy animal eats.

#4: Abomasum

The abomasum is very similar to a human's stomach. Stomach acids and other enzymes break down the food even further before sending what is left to the intestines to complete digestion.



Fun Fact: Dairy cattle spend up to 8 hours every day chewing their cud!



FARM to Table

Ever wonder how milk gets from the farm to your table? There are many important practices dairy farms use to provide excellent care to their dairy animals while also producing high-quality, safe, and healthy milk that we use every single day.

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. 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. Some dairy farms even use robotic milking machines to ensure safety procedures are done and to better track data for each cow's milking performance.



DAIRY EVERYDAY

Many dairy products can be found in the grocery store. These include milk, flavored milk, ice cream, cheese, butter, yogurt, cheese, sour cream, whipped cream, cottage cheese, and buttermilk. What is your favorite way to eat dairy?

MILK
Milk comes in a variety of types. Types of milk vary based on the percentage of milkfat, or the amount of fat that is in the milk by weight. The main types of milk are whole milk (3.25% milkfat), reduced-fat milk (2%), low-fat milk (1%) and fat-free milk, also known as skim milk.

ICE CREAM
Ice cream is a very popular dessert. At any given time, 87% of Americans have it in their homes! Milk and cream are the main ingredients in ice cream. 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?

CHEESE
Cheese is another nutritious food made from milk. The average American eats over 37 pounds of cheese each year! There are many different varieties of cheese, and cheese can be found in many of our favorite foods. Mozzarella and cheddar are the two most popular types of cheese in the United States. Do you have a favorite type of cheese? What is your favorite way to eat cheese?

YOGURT
The two main ingredients in yogurt are milk and bacterial cultures. Milk strengthens our teeth and bones while the cultures help fight infection and boost our immune system. Yogurt is a fun way to add calcium to your diet. There are many different varieties and flavors of yogurt to enjoy!

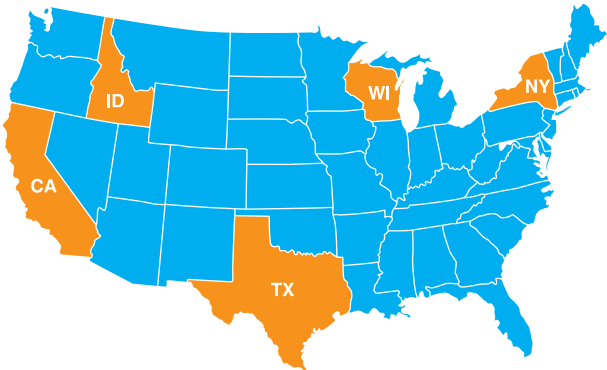


Fun Fact:
The ice cream sundae originated in Evanston, IL.

dairy data

The Top 5 Milk Producing States:

1. California
2. Wisconsin
3. Idaho
4. New York
5. Texas



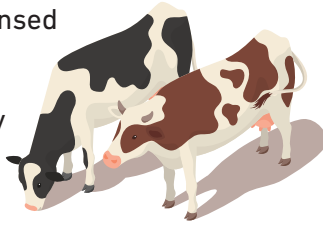
Illinois...

has over **450** licensed dairy herds.

has approximately **81,000** dairy cows.

ranks 22nd in milk production in the United States.

On average, each dairy cow produces **8-10 gallons** of milk per day. That is over **100 glasses** per day!



Each year, U.S. dairy farmers provide milk to make more than **1 billion** pounds of butter, **7 billion** pounds of cheeses, and **1 billion** gallons of ice cream.



95% of U.S. dairy farms are family-owned.



DAIRY BREEDS

There are seven different dairy cow breeds in the United States. The most common breed in the U.S. is Holstein. Holsteins are black and white. Other popular 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.



Guernsey



Jersey



Red and White Holstein calf



Brown Swiss



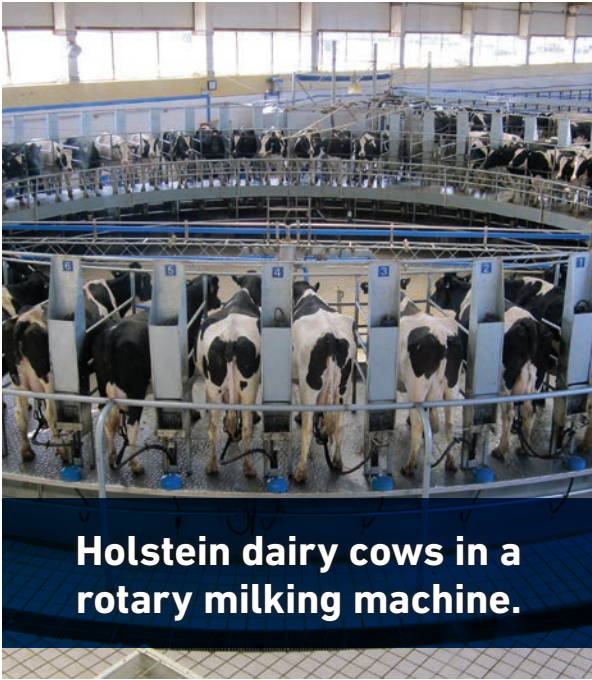
Ayrshire and calf



Shorthorn



Holstein



Holstein dairy cows in a rotary milking machine.

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 antibiotics. In the rare event a tanker tests positive, the milk is destroyed immediately and never reaches the consumer.

COOL IT QUICKLY

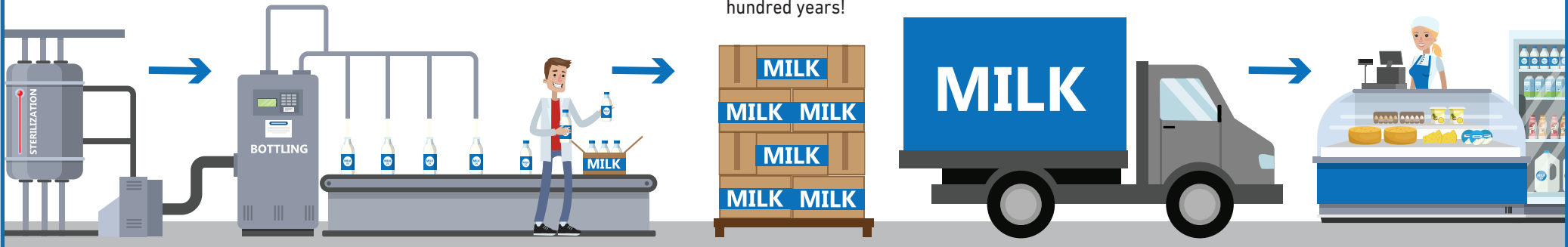
Milk collected from dairy cows is cooled to 45° F or less within two hours of the completion of milking to reduce the possibility of any bacteria growth. The practice of quick cooling assures that the most wholesome milk reaches the consumer.

PASTEURIZATION

Pasteurization involves heating, then rapidly cooling raw milk. This step is very important for the continued production of safe milk. Some milk is "ultra-pasteurized" by heating the milk to an even higher temperature. This process allows milk to stay fresh and safe for a very long time. The Food and Drug Administration and the Centers for Disease Control recommend drinking only pasteurized milk. Pasteurization is a simple, effective method of killing harmful pathogens that has been around for well over one hundred years!

BOTTLING AND DELIVERY

Milk is then bottled in various container sizes and shipped to restaurants, schools, grocery stores, and other consumers. Typically, the whole process takes two days to get the milk from the cow to the grocery store, and then into your fridge!



CAREERcorner



**The Marcoot Family,
Amy & Beth Marcoot**
Marcoot Jersey Farm & Creamery
Greenville, IL



Erin Massey
Prairie Farms
Product Development Manager
Edwardsville, IL



Morgan Scharping
Lena Veterinary Clinic
Lena, IL

Can you describe your dairy operation?

Our dairy farm is located south of Greenville, IL. We (Amy and Beth) are seventh-generation dairy farmers. Our family came from Switzerland in 1842 and brought a Jersey calf with them! We milk 110 Jersey cows and raise all our young stock on our farm. We rotationally graze our cows and our cows have access to pasture year-round. In 2010 we opened our creamery to process our cow's milk into cheese. The Creamery and Robot Barn were built with viewing windows so that visitors can watch cheese being made and watch our robotic milkers as they milk the cows!

How did you get into making cheese on your dairy farm?

We decided to make cheese with our cow's milk because of the high quality milk of our Jerseys. We currently make 20+ cheeses including fresh cheeses like fresh cheese curds, farmstead cheeses like Gouda, White Cheddar, and Havarti. We also have a cheese aging room modeled off a man-made cheese cave in Switzerland. Our cave-aged cheeses include Tomme, Alpine and Heritage. Our cheese cave stays at 50-55 degrees nearly the entire year and is the perfect environment for aging cheeses.

In what ways are you trying to make your farm more sustainable?

Sustainability is very important to us. On our farm we try to meet our needs without compromising the needs of future generations. For us, zero waste is always the goal! We use the cows' manure to fertilize our pastures. We use whey from our cheese to feed our animals and make Extreme Ice. We also added a geothermal heating system for our creamery to lower our energy inputs! Part of sustainability for us is education about agriculture. We believe that if we can advocate and kindly and honestly teach, that it might help people to gain a deeper understanding of agriculture.

Can you describe your job.

I am responsible for overseeing all aspects of our development process from concept to commercialization. That includes everything from the recipe to the equipment we use to make and fill the product, all the way to the finished package you find on your grocery store's shelf. I am fortunate to 'wear many hats,' as we say, and am also a Corporate Engineer for five of our manufacturing plants. In addition, I manage one of our National Accounts. There's never a dull moment and I wouldn't have it any other way!

Why are jobs like yours important to the dairy industry?

The cows do the hard work---making nutritious and delicious milk. Jobs like mine make sure we can maintain that quality by packaging it in a safe and convenient way for consumers like you and I to enjoy.

What classes/subjects in school helped prepare you for your current position?

I grew up on a dairy farm, so I was familiar with having to solve problems on the fly when something would break down or not operate as planned. I earned a bachelor's degree in Chemical Engineering, which is also known as process engineering. This directly correlates to the operations of our manufacturing plants with things like piping, instrumentation, flow, mechanics, etc.

What is the most exciting/interesting thing about your current role with Prairie Farms?

With my dairy upbringing, I have a deep-rooted passion to invigorate the industry with exciting and innovative products. I love that I work for farmers and that no two days are the same.

Can you describe your job as a large animal veterinarian?

Every day my job allows me to do something new and different. I spend most of my time doing dairy pregnancy exams with ultrasound, but I also do a lot of surgery, preventative medicine, and sick animal medicine. Most of my day is spent working with cattle and dairy/beef producers, and occasionally I get to work with other livestock species.

Why are jobs like yours important to the dairy industry?

As dairy veterinarians, we have a responsibility to work side by side with our producers to ensure the health of their herds, so that they can deliver a safe and nutritious product to the consumer. Large animal veterinarians are involved in every part of the supply chain from on-farm production, to carcass inspection at the slaughterhouse before the product hits the grocery store.

What types of classes in school helped you to prepare to become a veterinarian?

I still use information that I learned in my math, biology, and chemistry classes on a daily basis. Without them, I wouldn't be able to do my job!

What is your favorite part about your job?

I love getting up every day knowing that I have the opportunity to go out and help producers overcome a challenge. I thoroughly enjoy working with my coworkers in the dairy industry to work through problems and accomplish their goals.

WhereIsMyMilkFrom?



You can actually track where your milk comes from! Go to the website www.whereismymilkfrom.com. Locate the dairy code on your carton or container. This code is often found near the expiration date and is a series of four to six numbers. Type in the code to instantly see which dairy your milk came from! You can also use this online tool for yogurt, chocolate milk, coffee cream, cottage cheese, ice cream and more. Check your carton of milk at school to see where it came from!

Ingredients

- | | |
|----------------------------|--------------------------------------|
| ¼ cup sugar | 1 cup rock salt |
| ½ teaspoon vanilla extract | 1 quart and 1 gallon size Ziploc bag |
| 1 cup milk | Duct tape |
| 1 cup whipping cream | Bath towel |
| Crushed ice | |

Directions

1. Put the milk, whipping cream, sugar, and vanilla in a 1 quart freezer bag and seal. For security, fold a piece of duct tape over the seal.
2. Place the bag with the ingredients inside a gallon freezer bag.
3. Pack the larger bag with crushed ice around the smaller bag. Pour ¾ to 1 cup of salt evenly over the ice.



4. Wrap in a bath towel and shake for 10 minutes. Open the outer bag and remove the inner bag with the ingredients. Wipe off the bag to be sure salt water doesn't get into the ice cream.
5. Cut the top off and spoon into cups or cones.

Enjoy plain or top with nuts, coconut, or fruit!

This issue of Ag Mag has been provided by:
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To learn more about Agriculture visit us at aginthe classroom.org, or contact your County Farm Bureau office or Agriculture in the Classroom, Illinois Farm Bureau, 1701 Towanda Avenue, Bloomington, IL 61701.

Common Core: ELA-Literacy.RI.4.1; RI.4.2; RI.4.3; RI.4.5; RI.4.7; SL.4.1; L.4.3 Math.Content.3.NF.A.1; 3.NF.A.2; 3.MD.A.2; 3.MD.B.3; 4.MD.A.1

Next Generation Science Standards: From Molecules to Organisms: Structures and Processes: 3-LS1-1; 3-LS3-1; 3-LS3-2; 3-LS4-2; 4-LS1-1; Matter and Its Interactions: 5-PS1-3

Illinois Learning Standards for Social Science: SS.IS.1.3-5; SS.IS.2.3-5; SS.IS.3.3-5; SS.IS.4.3-5; SS.IS.5.3-5; SS.IS.6.3-5; SS.EC.1.3; SS.EC.2.3; SS.G.3.4; SS.EC.2.4