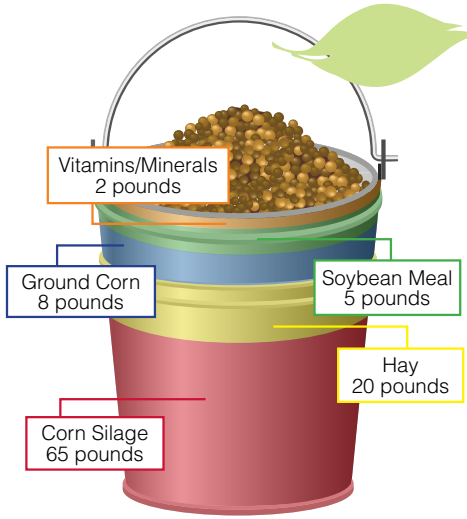
What is DAIRY?

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.

COW'S HEALTHY DIET



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.

DAIRY breeds


Holstein


Guernsey


Red and White Holstein calf

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.


Brown Swiss


Ayrshire and calf

VOCABULARY

BULL: male cattle 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

CARBON FOOTPRINT: the effect life has on the environment

COW: a female cow that has given birth to a calf

DAIRY: food group containing milk and milk products

GENETICS: how certain features pass from parents to their young

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

HEIFER: female cattle that have not had a calf

HOMOGENIZE: 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

PASTEURIZE: 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

SILO: a structure for storing bulk materials used in agriculture to store grain or fermented feed known as silage

STEER: male cattle not used for breeding

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

WEAN: switching a calf from its mother's milk to eating on its own

Environment & Sustainability

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.

FAMILY FARMS: A True Commitment

97% 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.

TECHNOLOGY ON THE FARM

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.

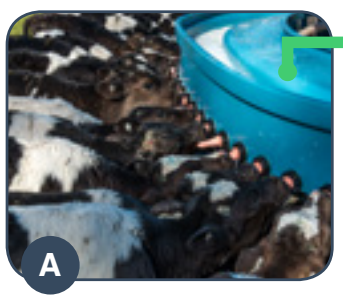
Automated milking systems (C) reduce the labor required to milk cows. Cows enter an automatic milking unit without human help. Computer-controlled equipment identifies the cow, sanitizes the udder, collects the milk and releases the cow when she is done milking.

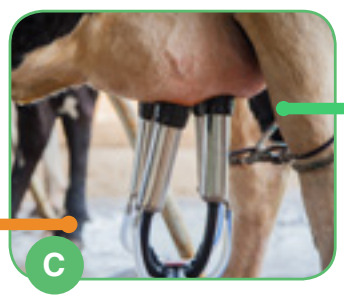
Activity monitors (D), such as tracking collars, measure activity. They are similar to Fitbits. The collars detect abnormal activity changes, which often are early warning signs of illness or infection. This allows for quicker treatment. The Fitbit-type devices also show activity changes that help detect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

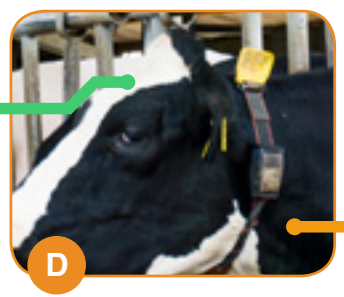
Computer, tablet, (E) and phone apps and programs allow for greater data collection and accurate decision models. They also provide more ability to quickly monitor changes in animal behavior that might reflect changes in health or well-being.

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.







Safety and Quality

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

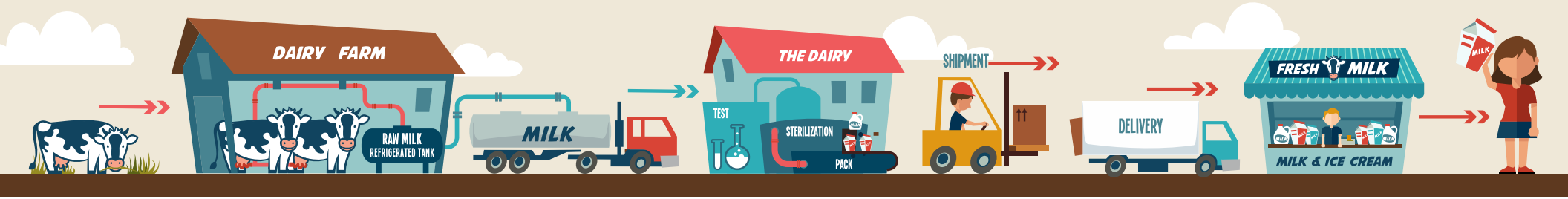
Veterinarians help dairy farmers administer antibiotics when they are needed to treat an illness. Antibiotics are not used regularly, but when they are used, the treated cow's milk is discarded and does not enter the human food system. Every tanker of milk is tested for antibiotic. In the rare event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

PASTEURIZATION

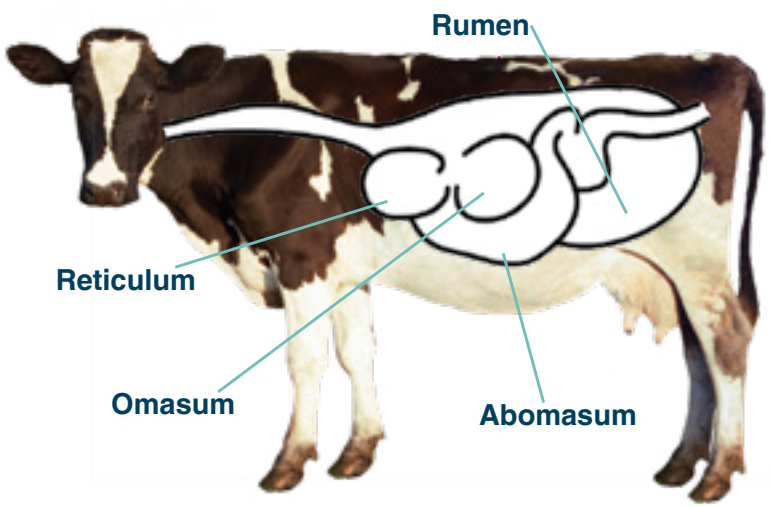
Pasteurization involves heating, then rapidly cooling raw milk. This step is very important for the continued production of safe milk. The Food and Drug Administration and the Centers for Disease Control recommend drinking only pasteurized milk.

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.



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.

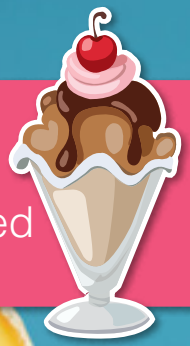
CHEESE

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

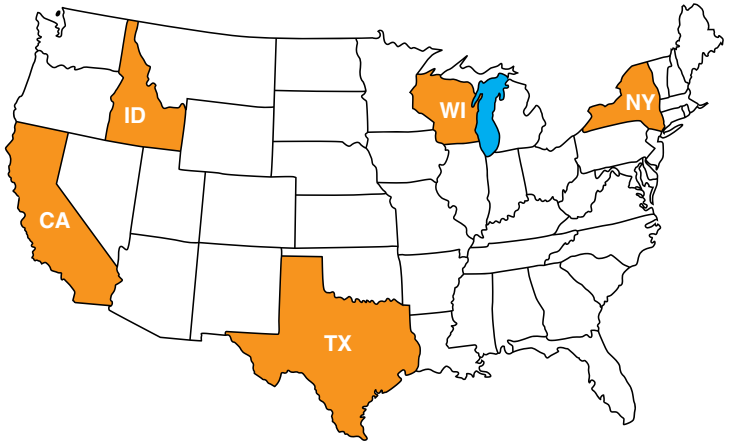
The two main ingredients in yogurt are milk and bacterial cultures. That is a good thing. Milk strengthens our teeth and bones, while the cultures help fight infection and boost our immune system. There are many different varieties and flavors of yogurt. When you are at the grocery store, check them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

thinkYOURdrink

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

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.

Low-fat Milk 1%

	% Daily Value
Total Fat	4
Total Carbohydrates	4
Protein 8 g	16
Vitamin A	10
Vitamin C	0
Vitamin D	30
Calcium	30

100 CALORIES
0 tsp ADDED SUGARS

Fat-free Chocolate Milk

	% Daily Value
Total Fat	0
Total Carbohydrates	7
Protein 8 g	16
Vitamin A	10
Vitamin C	2
Vitamin D	25
Calcium	30

120 CALORIES
1.5 tsp ADDED SUGARS

Sports Drink

	% Daily Value
Total Fat	0
Total Carbohydrates	5
Protein 0 g	0
Vitamin A	0
Vitamin C	0
Vitamin D	0
Calcium	0

60 CALORIES
3 tsp ADDED SUGARS

Cola

	% Daily Value
Total Fat	0
Total Carbohydrates	8
Protein 0 g	0
Vitamin A	0
Vitamin C	0
Vitamin D	0
Calcium	0

100 CALORIES
6 tsp ADDED SUGARS

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.

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.

FLAVORED MILK

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

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.

Phil Cardoso, DVM, PhD
Assistant Professor,
Dairy Research and Extension
University of Illinois | Urbana, IL

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.

Amy Hildebrandt
Dairy Farmer | South Beloit, IL

1. Tell us about your dairy farm and how you got involved.

My husband was a dairy farmer and I began feeding calves after our first child was born. We milked 150 cows at that time and then expanded to 200, 400, and presently 800 cows. My daughter and I feed 80-100 calves pasteurized milk twice a day. We also have 60 weaned calves that we feed calf starter and hay.

2. Tell us about your farm and the technology being used.

We presently milk 800 cows in a 40 stall rotary parlor. The rotary has a robotic post-dip arm. Our cows are housed in a cross-ventilated barn which is climate-controlled. There are 72 fans that pull the air across to keep the building cool. Our cows have RFID ear tags which have a computer chip that is scanned when they enter the parlor. This sends information, such as how much each cow gives, to the computer. Our cows also wear tracking collars to measure activity. This is similar to a Fitbit. We use recycled bedding in our cow stalls. The manure runs through a press that separates the liquids from the solids and then we use a skid steer to blow the bedding in the stalls. This gives us a smaller carbon footprint and is part of our sustainability plan. We also have auto-steer on our tractors to help with planting and harvesting crops.

3. What is your favorite part of your job?

I love feeding the calves and working with my family. We have 4 children that are all part of the dairy. We are fortunate and blessed to be doing something we love. We live in a great community.

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.

Frank Doll
Dairy Farmer | Greenville, IL

1. Tell us about yourself and how you got involved in Dairy farming.

My dad took over the family farm in the late 1950s. I came along in 1969 and I had a favorite cow as a child. I milked her and learned how to breed cows. My interest in dairy farming solidified in high school. Some days are trying, but I still love every minute of dairy farming. I have two sons and one is showing interest in farming, so there is a chance Dairy farming will go into the 4th generation for my family which really excites me.

2. What technology do you use on your farm?

The Dairy industry is exciting because it is rapidly changing with all the new technology. I am a big believer in genomics testing. For about $35 I get a sample of tissue from a baby calf. I send it to a lab for analysis and usually have the calf's genomics information back in about a month. If a calf's numbers are not good for milk production, I can try to sell her. That way I do not put resources into an animal that is not going to be productive. I can also learn if a cow is going to be an exceptional producer. I currently have a cow ranked 130TH in the nation. It's a big deal. Genetics-based numbers are a very reliable predictor of a cow's potential. I have had people reach out about buying her strictly based on seeing her numbers on the internet.

3. What do you want people to know about the Dairy industry?

Each generation is getting further removed from dairy farms so there is less understanding of what we do. I think young people are getting bombarded with information and it's not all correct. I encourage you to get out and see dairy farms. We work hard every day to do the right thing by our animals and to produce great products for people. While I am partial to Prairie Farms, whether you want to drink organic, or Great Value, or whatever brand is in your grocery store, or eat foods that have cow's milk in them like ice cream, cheese, or yogurt - it's all good. It's what I give to my family, and just like your family, I only want what is best for my family.

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!

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

Locate the code on your carton or container, enter it and click Find It. You'll instantly know which dairy your milk came from. The same goes for your yogurt, chocolate milk, coffee cream, cottage cheese, ice cream and more.

For More Information, Visit These Websites

- prairiefarms.com
- midwestdairy.com
- stldairycouncil.org
- nationaldairycouncil.org
- holsteinusa.com
- usjersey.com
- brownswissusa.com
- usguernsey.com
- milkingshorthorn.com
- usayrshire.com
- dairygood.org
- moomilk.comfueluptoplay60.com
- fofarms.com
- hilmarcheese.com
- milklife.com

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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: Inheritance and Variation of Traits: Life Cycles and Traits: 3-LS1-1; 3-LS3-1; 3-LS3-2; 3-LS4-2; Structure, Function, and Information Processing: 4-LS1-1; Structure and Properties of Matter: 5-PS1-2; 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

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