



UDDER-LY AMAZING! (COLORADO DAIRY)

Colorado has approximately
110 DAIRY FARMS
that are home to approximately
203,000 MILK COWS.

Within the United States,
Colorado ranks
13TH IN NUMBER
OF MILK COWS,
13TH IN MILK PRODUCTION,
2ND IN MILK OUTPUT
PER COW.

The total amount of milk
produced in Colorado is about
5.2 BILLION POUNDS.
That's equal to
604 MILLION GALLONS.

Each dairy cow in Colorado
provides an average of
3,019 GALLONS
OF MILK PER YEAR.
That's equal to
8.27 GALLONS PER DAY.

The average herd size of Colorado
dairy farms is approximately
1,845 MILKING COWS.

The average value of the
milk a Colorado dairy cow
produces in one day is about
\$12.35.

In 2021, the cost of a Colorado
dairy cow was about
\$1,375.
There are
8 DAIRY PROCESSING PLANTS
throughout the state of Colorado.

Source: Facts based on 2021 and 2020 USDA data; Photo courtesy of Kristie Dixon Docheff, a dairy farmer in Mead, Colorado.

COWABUNGA! (ALL ABOUT DAIRY BREEDS)



NESSIE WILL PRODUCE FOR YOU!

Nessie is a Holstein cow originating from the Netherlands, a country in northern Europe. Nessie weighs 1,500 pounds and is one of the largest **breeds** of dairy cattle. She is known around town as a real classy gal, partly because of her simple, black and white wardrobe. She wears all white, with large black spots. Unfortunately, cows don't get to change their clothes; it's what they're born with. Differences in coloring help us identify breeds. Nessie's great-great-grandmother entered the United States by ship in 1852, arriving in Boston, Massachusetts. Holsteins make more milk than any other breed. Nessie is no exception and produces about 10 gallons of milk per day.



A SWEET SWISS

If you travel to Switzerland, a mountainous country in Europe popular for skiing and cheese, you are sure to meet Heidi, a Brown Swiss dairy cow. She enjoys grazing on grass, but she sure does have a sweet tooth!! She produces pure white milk high in **lactose**, also known as milk sugar. Her milk is perfect for making cheese. Heidi weighs 1,500 pounds and is very athletic. Brown Swiss cattle are famous for strong feet and legs, and for

their brown coloring. Heidi's ancestors came to the U.S. in 1869, arriving in Massachusetts. Heidi, like her Brown Swiss relatives, lives and works well in both hot and cold climates.



STRIKE IT RICH WITH A GOLDEN GUERNSEY!

Gertrude is a Guernsey cow from Guernsey, a very small island nation off the northern coast of France. Gertrude's family came to the U.S. by boat in 1840. They entered through a port in New York. Guernseys like Gertrude are famous for producing milk that is golden in color. Everything about Gertrude is golden, including her gold coat with white patches. Gertrude is a medium-sized dairy cow, weighing 1,150 pounds. She will be making milk for you for many years, as her breed is well known for living longer than any other breed.



AN UNBELIEVABLE UDDER

Red and white speckled Adie the Ayrshire is a dairy cow from Scotland, but she can't play the bagpipes. She can, however, produce milk used for high quality butter and cheese. Adie and her relatives weigh about 1,200 pounds each. They are considered medium-sized cows famous for having healthy **udders**. Ayrshires entered the U.S.

in 1822. They arrived in Connecticut by ship. Adie's ancestors thrived in the rocky hills and cold weather, similar to their home in Scotland.



LITTLE IN SIZE, BUT BIG IN MILK

If you travel to the small island of Jersey off the coast of France, you will find relatives of Jenny the Jersey. Jenny only weighs 900 pounds and is small compared to other breeds, but she still produces high quantities of milk for her petite size. Many people call Jersey cows, like Jenny, the "prettiest" breed, as they are small and slim through their head and shoulders and have an attractive honey-brown coat color. Jersey cows were first introduced to America in 1850, and are the second most popular breed in the U.S.



RHONDA THE ROAN

Rhonda, a Milking Shorthorn, is one of the oldest recognized breeds of cattle in the world. Her ancestors are from northeastern England and came to the U.S. in 1783. She is raised for the large volumes of milk she produces. Some of her relatives are raised for beef. Rhonda's coloring is called roan, meaning a mixture of red and white. No other breed of cattle has the roan color. Milking Shorthorns can also be red, red and white, or white. Rhonda weighs 1,450 pounds and her calves are very spunky at birth and grow rapidly.

ACTIVITY

Complete the following graphic organizer using the information about dairy breeds in the Cowabunga! article.

Breed	Country of Origin	Physical Description	Weight	Other Unique Characteristics
Holstein				
Brown Swiss				
Ayshire				
Guernsey				
Jersey				
Milking Shorthorn				

Imagine for a moment that you are a Colorado dairy farmer. Which breed would you buy for...

1. Making ice cream? _____
2. Making cheese? _____
3. A very healthy herd? _____
4. Making "golden" milk? _____
5. Calves that grow rapidly? _____
6. Making a lot of milk? _____
7. Living in Antarctica? _____
8. A beautiful herd? _____
9. Healthy udders? _____
10. Small cows? _____
11. Making butter? _____
12. Running a marathon? _____
13. Living a long time? _____
14. Raised for both milk and meat? _____

THE JOURNEY OF MILK! (FROM FARM TO TABLE)

1. COWS TURN PLANTS INTO MILK

Cows have special stomachs with four compartments that allow them to digest plants that humans can't, like hay and grass. The cows naturally transform those plants into milk.



2. CARING FOR COWS & THE ENVIRONMENT

Cows are the center of the dairy farm. **Dairy farmers** work 365 days

a year making sure the cows are comfortable, with nutritious food (about 100 pounds per day) and clean water (about a bathtub full per day), as well as comfortable bedding and regular veterinary care. Dairy farmers also want the land to stay healthy for themselves and their children. Farmers recycle the cows' manure as fertilizer for crops and reuse water multiple times, using it to cool the milk, wash the barn, and irrigate crops.

3. MILKING

Cows need to be milked two or three times a day. Milking machines provide a light suction that pulsates to gently allow the milk to release. It's a relief for cows to empty their udders, so they often line up on their own to have their udders cleaned and milked!



4. COOLING & TRANSPORTATION

Milk comes out of the cows at about 100 degrees Fahrenheit, then goes into large steel tanks and is cooled very quickly – within two hours – down to 38 degrees

or less. Quick cooling minimizes growth of any bacteria. The milk also gets tested to ensure it's safe, then goes into insulated tanker trucks to be transported to a **processing plant**.

5. PROCESSING & PACKAGING



At the processing plant, the milk is tested again for safety, then **pasteurized** (heat-treated to eliminate any harmful bacteria and quickly re-cooled). The milk can then make all sorts of dairy products:

- Milk **coagulation** is the process that turns milk into cheese (including cottage cheese).
- To make yogurt, milk undergoes the fermentation process.
- Fat that naturally rises to the top of the milk can be skimmed off by using a separator and packaged as cream or churned into butter. The fat-free milk underneath is known as skim milk.
- To make whole milk or lower fat milks, the processor will use homogenizing equipment to evenly mix the fat throughout the milk, so it doesn't separate again.
- Processors can create lactose-free milk for people with lactose intolerance by adding an ingredient called lactase to break down the **lactose** (sugar).

6. THE STORE & YOUR FRIDGE

Once the milk is packed in cartons or jugs, it heads to the grocery store in a refrigerated truck. All in all, it only takes about two days for the milk to get from the cow to the store. It's tested multiple times along the way, so it's always fresh and safe when it gets to you. Dietitians recommend you eat or drink three servings of dairy every day for important nutrients like protein and calcium.



MILK IS ESSENTIAL!

Milk, cheese, yogurt and ice cream are all part of the dairy group. Drinking milk helps build strong bones! Kids, ages 2 to 8, need to eat or drink 2 cups from the dairy group a day. Older kids need 3 cups from the dairy group every day. Sadly, most Americans do not drink or eat enough foods from the dairy group. Milk is a great source of 13 essential **nutrients**, listed on the infographic to the right. The Daily Value indicates the percentage that a nutrient in a serving of food contributes to a general diet of 2,000 calories per day.

1. Unscramble the nutrients that support strong bones.

lmalccu _____
 tmniiav D _____
 nieido _____
 srphhosoup _____

2. Four servings of milk will give you 100% daily value for this nutrient.

3. For your age, how many cups from the dairy group are recommended you eat or drink each day?

4. These two nutrients help your body use carbohydrates, fats, and protein for fuel:

5. Which nutrients will give you 100% or more of your daily value with just 2 servings of milk?

6. Which of these nutrients support your immune system?

A. Calcium B. Niacin C. Zinc D. Riboflavin

7. True or False? Milk is a great source for 13 essential nutrients.

PROTEIN: Helps build and repair tissue; supports immunity	16% Daily Value
CALCIUM: Helps build and maintain strong bones and teeth	25% Daily Value
POTASSIUM: Supports healthy heart, blood pressure, body fluid balance, and muscle function	10% Daily Value
VITAMIN D: Supports strong bones, teeth, and immune system	15% Daily Value
ZINC: Helps build and repair tissue; supports immunity	10% Daily Value
VITAMIN A: Supports healthy skin, eyes, and immune system; promotes growth	15% Daily Value
RIBOFLAVIN: Helps your body use carbohydrates, fats, and protein for fuel	30% Daily Value
NIACIN: Used in energy metabolism in the body	15% Daily Value
PANTOTHENIC ACID: Helps your body use carbohydrates, fats, and protein for fuel	20% Daily Value
VITAMIN B12: Supports normal blood function and nervous system	50% Daily Value
IODINE: Crucial for bone and brain development in pregnancy and infancy	60% Daily Value
PHOSPHORUS: Supports strong bones and teeth; helps tissue growth	20% Daily Value
SELENIUM: Supports healthy immune system and metabolism; helps protect healthy cells from damage	10% Daily Value

CHEESEMAKING! (A SCIENCE, AN ART, A CRAFT)

Cheesemaking is a science, an art, and a craft. Science is the tool to transform milk into cheese. Art accounts for the creative skills used in the development of new cheese flavors and varieties. Crafts represent activities requiring skill. Cheesemaking requires many skills.

Cheese is delicious and nutritious. It can be made from four basic ingredients:

1. Milk
2. Salt
3. A good bacteria
4. **Rennet**, an enzyme

From there, cheesemakers can adjust the basic recipe in so many ways that there are nearly 2,000 varieties of cheese. Cheese varieties can be grouped into these eight categories: blue, hard, pasta filata, processed, semi-hard, semi-soft, soft and fresh, and soft-ripened.

All cheese is made from milk. In the United States, milk from cows is most common. However, many specialty cheeses are made from the milk of sheep, goats, water buffalo, and other mammals. Currently more than one-third of all milk produced each year in the United States is made into cheese.

The cheesemaking process uses science and chemistry to remove **whey** and liquid from milk to form a **curd** (cheese). Along with a vast array of cheese types, there are also a variety of cheese-making processes.

History of Cheese

According to ancient records passed down through the centuries, the making of cheese dates back more than 4,000 years. No one really knows who made the first cheese, but according to legend, it was made accidentally. An Arabian merchant put his supply of milk into a pouch made from a sheep's stomach as he set out on a day's

journey across the desert. The rennet in the lining of the pouch, combined with the heat of the sun, caused the milk to separate into curd and whey. That night he found that the whey satisfied his thirst and the curd (the cheese) had a delightful flavor that satisfied his hunger.

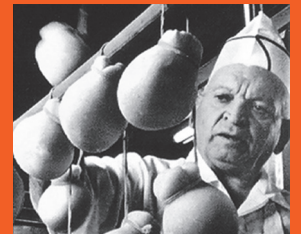
Make Your Own Cheese

To learn more about cheesemaking and to make your own mozzarella cheese in your classroom or at home, check out the "Cheesemaking: From Liquid to Solid" lesson in the online Curriculum Matrix at AgClassroom.org/Matrix/ or scan the QR code. You will find the recipe, video instructions, and more on the science, art, and craft of cheesemaking!



HAVE YOU HEARD OF LEPRINO FOODS?

Leprino Foods is a cheese processing and dairy nutrition products company. They are the world's largest mozzarella cheese maker! The company began in Denver, Colorado in 1950 when Mike Leprino, Sr. started making mozzarella cheese for his family's corner grocery store. Today, Leprino Foods is still family-owned and their headquarters office is in Denver. They have manufacturing facilities in California, Colorado, Michigan, New Mexico, and New York. Leprino Foods cheese and dairy nutrition products are found in 55+ countries. The next time you enjoy a slice of pizza, most likely the mozzarella cheese on top of that pizza came from Leprino Foods and was made from milk from Colorado dairy farmers!



Mike Leprino, Sr. making mozzarella cheese. Photo credit: Leprino Foods.

TYPES OF CHEESE ACTIVITY

Use the list of cheese names to write the name of the correct cheese type for each photo.

Blue
Brie
Cheddar
Colby Jack

Gouda
Muenster
Mozzarella
Parmesan

Pepper Jack
Provolone
Ricotta
Swiss



1. _____



2. _____



3. _____



4. _____



5. _____



6. _____



7. _____



8. _____



9. _____



10. _____



11. _____



12. _____

Pick one type of cheese from the activity to answer the following questions.

1. What do you notice about this cheese?

2. What do you wonder about this cheese?

3. What do you imagine this cheese tastes like?

DID YOU KNOW?

- It takes approximately 10 pounds of milk to make 1 pound of cheese.
- The holes found in Swiss cheese are known as "eyes" to a cheese maker.
- Cheddar cheese is not naturally yellow. All cheese is white, like the milk it is made from. Yellow cheeses have had a coloring added to them.
- Mozzarella was once only made with milk from a water buffalo. Today mozzarella is most often made from milk produced by cows.

MEET A COLORADO DAIRY FAMILY!

About 2% of the country feeds the rest of us. Many have been farming for generations. Many are immigrants. When it comes to dairy farms, 95% are family-owned. They work behind the scenes, at the mercy of the weather, with no weekends off. Yet something still makes them choose this living. Let's meet the Dinis Family of Empire Dairy.

Norm Dinis is a first-generation U.S. citizen whose father, Jack, moved to the U.S. from Azores, a small group of islands in the North Atlantic Ocean. Jack grew up dairy farming on the tiny islands, immigrated to Toronto, Canada when he was 17 and worked various jobs until he decided to sell everything he owned to move to Colorado. There, he joined a cousin who was milking cows. Eventually, when his son Norm had graduated from high school, Jack bought a dairy farm of his own.

Norm and his brother, Bill, now manage a large dairy herd in Colorado. Norm has a wife, Britt, and three children; Austin, Jagger and Olivia. He sees the larger size of his dairy as an advantage and a

more sustainable business model – he can ship full tankers of milk, eliminating the need for multiple route stops to fill a truck, and lowering carbon emissions and gas use. He also reuses water by first using it to cool milk before it is stored, then later giving it to his cows to drink.

The farm is also smart about using manure to fertilize the fields of corn and alfalfa they grow. They keep track of their cows with electronic monitors.

“Cattle are creatures of habit,” Norm said. “They want to be fed and milked the same way every day – having technology and protocols in place helps maintain this consistency.”

Norm is especially proud of his farm's employees – many of whom have immigrated to the U.S. just like his own father.

“I saw what my dad had to work through as an immigrant and how hard he struggled to be where he is today – to attain that ‘American Dream.’ I am proud of the legacy of my family and of the industry as a whole.”



Norm and Britt Dinis, with two of their three children, Olivia and Jagger.



Jagger Dinis walks down the feed lane examining cows.

Source (story and photos):
DairyDiscoveryZone.com

DAIRY TOUR 360

Want to learn more about dairy production?



Take a 360-degree virtual tour of a dairy farm. Visit <https://dairytour360.com/> or scan the QR code. Or visit DairyMax.org for VR viewing options.



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