

Taste and Teach

June - Dairy Foods



Five **Fun Facts** About Dairy Foods!

- On average a dairy cow can produce 6-10 gallons of milk per day, which equals 96-160 glasses of milk.
- Milk goes from farm to store in just two days.
- Dairy foods build healthy bodies with important nutrients that work together like: Calcium, Protein, Vitamin D, Potassium and many more!
- Fermented dairy foods like cheese, yogurt and kefir have live active cultures, also known as good bacteria, that create unique tastes, textures and healthy qualities.
- It takes 10 pounds of milk to make one pound of cheese.

Four **Fun Teaching Ideas!**

- Go on a virtual field trip to a dairy farm. As a class, discuss your observations. www.HealthyEating.org/MDC
- Explore the journey of milk and your favorite dairy foods. Ask students or small groups to research how specific dairy foods are made from milk and report back. Include less familiar foods like cottage cheese and buttermilk.
- Find the counties in California where milk is one of the top three commodities. <https://LearnAboutAg.org/resources/grab>
- Make butter by shaking heavy whipping cream in small containers! Investigate the physical changes that occur.

Explore all the great dairy resources in this section!

Tasting Dairy Foods

Taste testing helps children get familiar with nutritious foods that they may have never tried or seen before. Tastings are a fun hands-on way to discover new tastes and explore foods with all the senses.



Milk tasting.

Provide each student with 2-3 disposable or reusable cups, paper and pencil. Choose 2-3 different milks to compare, such as: whole milk, 2-percent milk, 1-percent milk, fat-free milk, reconstituted powdered milk, butter milk, or goat milk. Pour just enough so each person can have a taste while minimizing food waste. Ask students to discuss and journal about their experience:

- How do the types of milk taste differently?
- Could you guess what the different types of milk were? (fun to do as blind taste test)
- What factors affect the taste of milk?
- How did the milk look, smell, feel in your mouth, and taste?

Additional activity: Compare the taste of dairy milk to non-dairy beverages from soy, almond, coconut, rice or hemp. Discuss the same questions above. Expand the discussion to explore how different milks are made.

Cheese tasting.

Provide each student with a napkin, paper and pencil. Offer students small servings of different types of hard and soft cheeses, such as: cottage cheese, spreadable cheese, cheddar (sharp, mild), Colby, Monterey jack, pepper jack, mozzarella (fresh, dry), parmesan, Swiss, bleu/gorgonzola, goat cheese, provolone, gouda, low-fat cheese. Cut or spoon just enough cheese for each person to taste while minimizing food waste. Ask students to discuss and journal about their experience:

- What do the cheeses look, smell, feel and taste like?
- Describe and compare the texture, color, appearance, taste and smell of the cheese.
- Can you tell the difference between cheeses? (This is fun to do as blind taste test with a blindfold.)
- Discuss how cheese is produced and what it means to be “aged.”

Yogurt tasting.

Provide each student with a napkin, cup(s), paper and pencil. Offer students 1-3 different types of yogurt products such as: plain or flavored yogurt, whole milk and fat-free yogurt, European style, Greek, Kefir or drinkable yogurt. Pour or spoon just enough yogurt for each person to taste while minimizing food waste. Ask students to discuss and journal about their experience:

- What does the yogurt look, smell, feel and taste like?
- Describe and compare the texture, color, appearance, taste and smell of the yogurt.
- Can you tell the difference between yogurts? (fun to do as blind taste test)
- Discuss what “fermentation” means and how it affects the taste and texture.

Taste and Teach

Healthy Snack Pairs



Nutritious snacks are a great way to introduce a variety of wholesome foods and set a foundation for lifelong healthy habits. Snacks help keep tummies full in between meals and support student achievement. Lack of adequate consumption of specific foods, such as fruits, vegetables, or dairy products, is associated with lower grades among students.

Pairing two or more food groups together as snacks adds even more variety and enjoyment. Here are some fun ways to pair your Taste and Teach fruits and vegetables with dairy!

- Tomatoes - layer with mozzarella cheese
- Apples - dip in yogurt with a dash of cinnamon
- Grapes - string on kabobs with cubes of cheese in between
- Citrus - add a splash of citrus and herbs to yogurt for a tasty dip
- Nuts - layer within or on top of a yogurt parfait
- Leafy greens - sprinkle with a yogurt salad dressing
- Green beans - pair with a quick Greek yogurt dip
- Avocados - mix into cottage cheese
- Berries - mix into plain yogurt or layer in a parfait
- Pears - pair with slices of cheese
- Peaches - blend into a smoothie with a little milk and vanilla extract

Recipe Ideas!

- Greek yogurt dip for veggies: mix dry dip or dressing mix with plain Greek yogurt
- Yogurt dip for fruit: plain yogurt or Greek yogurt, mix in honey or maple syrup, cinnamon, and vanilla extract.
- Smoothie: in a blender add 3 cups fruit, $\frac{1}{2}$ cup yogurt or cottage cheese, 1 cup milk and blend until smooth. Makes 2 servings.

Commodity Fact Sheet

Dairy

Information compiled by the Dairy Council of California

How Produced – California produced 39.8 billion pounds of milk in 2017. Approximately 1.73 million dairy cows produce milk on approximately 1,300 dairies located throughout the state. California's available land, mild climate, and plentiful feed supply make it a desirable and productive location for dairies.

A dairy cow must give birth to a calf to produce milk. A female calf is called a heifer and a male is called a bull. After nine months gestation, a mature two-year old heifer gives birth and is called a "fresh cow." She produces milk (lactation) for 10 months during which time she is bred again. Her milk production then decreases until she produces no milk (dry) for two months. She will produce milk again after she has her next calf. Cows have a production cycle of four to seven years.



Dairy cows are milked two (sometimes three) times each day. A cow will produce six to seven gallons of milk each day which is more than 2,000 gallons of milk each year.

Cows are ruminant animals, which have four stomach compartments, and efficiently digest many different commodities such as hay, silage (fermented corn, wheat or hay including the stalks and leaves), and grain (corn, oats and barley). Cows also consume many different agricultural by-products including cottonseed, almond hulls, sugar beet pulp, and blemished vegetables. Cows drink approximately 35 gallons of water each day.

History – Anthropologists suggest that Ancient Egyptians, Romans, and Greeks made cheese and yogurt as early as 600 B.C. Missionaries brought the first dairy cows to California in 1770. During the Gold Rush, immigrants brought cows, cheese presses, and churns to California along with their own recipes for making dairy products.

In 1882, David Jacks, a Scotsman from Monterey, named his cheese Monterey Jack. He was the first person to sell cheese commercially in California. The early 1900s brought changes to the dairy industry including centralized manufacturing and distribution. As California's population increased, the dairy industry focused on improving sanitation, increasing production, and mechanization.

Today, California's dairy industry utilizes technology and

advanced food processing systems to provide safe, quality products for California, the United States, and the world.

Breeds – There are five dairy breeds in California. The black and white Holstein is the most common. The Jersey is a smaller cow whose milk is often used for cheese production. The Brown Swiss, Guernsey, and Ayrshire are other breeds used for milk production.

Commodity Value – California has been the nation's leading dairy state since 1993 when it surpassed Wisconsin in milk production. Sales of milk and cream contributed \$6.9 billion in 2017 to California's economy. In 2017 California accounted for 18.5% of the U.S. milk production. California's cheese production ranks second in

the nation, with approximately 46 percent of all the Golden State's milk used to make cheese.

Top Producing Counties – Although during 2017, 31 counties contributed to the state's total milk production, a handful of counties continued to be responsible for the bulk of the production. Tulare, Merced, Kings, Stanislaus, and Kern counties accounted for 72 percent of the state's total milk production.

Nutritional Value – Dairy products such as milk, yogurt, and cheese contain numerous essential nutrients including calcium, potassium, phosphorus, magnesium, and protein. This "package of nutrients" is critical for the development of strong bones and teeth, maintaining a healthy weight, and reducing the risk of high blood pressure, osteoporosis, and certain cancers. Whether it's protein to help build and repair muscle tissue or vitamin A to help maintain healthy skin, dairy products are a natural nutrient powerhouse.

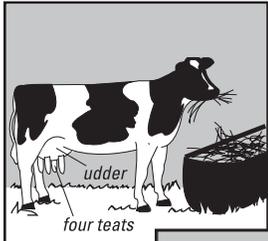
For additional information:

Dairy Council of California
(877) 324-7901
Website: www.HealthyEating.org

California Milk Advisory Board
Website: www.realcaliforniacheese.com

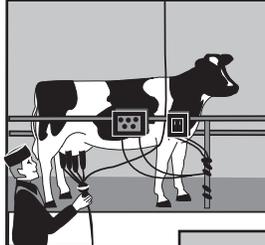

DAIRY COUNCIL
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Healthy Eating Made Easier®

Dairy Activity Sheet



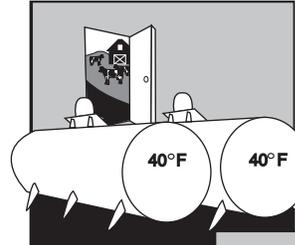
◀ #1

Dairy cattle convert feed energy to milk production. A cow produces milk in her udder. Milk is released through the udder's four teats.



◀ #2

Cows are milked in a milking parlor where the teats are cleaned and attached to a milking machine.



◀ #3

The milk is piped immediately to refrigerated storage tanks.

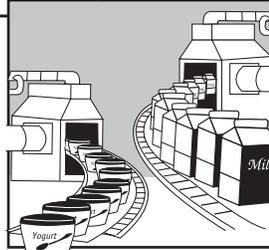
#4 ▶

The milk is transported daily, in large stainless steel tanker trucks, to processing facilities.



#5 ▶

The milk is pasteurized, homogenized, and processed into many products such as milk, yogurt, cheese, and ice cream.



#6 ▶

A variety of dairy products are available to meet the tastes and nutritional needs of consumers.



Lesson Ideas

- Explore different dairy breeds including their characteristics, history, and origin.
- Compare a cow's diet and digestive process to a human's diet and digestive process. Diagram ruminant and monogastric digestive systems.
- Make butter by shaking heavy whipping cream in baby food jars.
- Create a picture collage of products made from milk.
- Visit a dairy or milk processing facility.
- Taste test different cheese and dairy products.
- Make homemade ice cream.
- Research the nutrients found in dairy products.

Fantastic Facts

1. Cows have four stomach compartments.
2. Cottonseed, almond hulls, sugar beet pulp, and blemished vegetables are all agricultural by-products eaten by cows.
3. Monterey Jack cheese was developed by the Jacks family in Monterey, California.
4. Silage is partially fermented grains and grain by-products.
5. On average, a cow produces milk for four to seven years.
6. The most common dairy breed in California is the black and white Holstein.
7. Yogurt, ice cream, cheese, and butter are all dairy products.
8. Calcium is an essential nutrient found in milk.

Lesson Plan: Milk-From the Farm to the Family Class Book

Introduction: Dairy products have been around since 600 B.C. However, today's milk production and the production of dairy products is very scientific and technical.

Objective: Students will perform independent research on one aspect of milk and dairy product production. The class will produce a book that depicts the process.

California Standards: CC ELA: W.3-12.2, 4, 7
SL.3-12.4, 5

Materials: Index cards, resources including Internet access, books and encyclopedias, 12" x 18" paper, markers.

Procedure:

1. Write key words or phrases on index cards. These should be one card per student or pair of students. Example words include ruminant, lactation, cow diet, pasteurization, homogenization, etc.

2. Distribute one card to each student or partnership.
3. Have the students research, on the Internet and in libraries, the meaning of their word or phrase and learn how it relates to milk production.
4. Have the students write and roughly illustrate their findings using a standard format.
5. Have the students each read their page to the class. As a class, sequence the information and have the students use technology to create a professional looking page about their findings so that it blends with the work of other classmates.
6. Title the book "Milk: From the Farm to the Family." Bind the book and share it with other classes or at Open House.



Ice Cream in a Bag

Explore the history of ice cream and dairy products, and the chemistry of ice, salt, and exothermic reactions.

Recipe

1. Fill the large bag half full of ice and add the rock salt. Seal the bag.
2. Put milk, vanilla, and sugar into the small bag and seal it. You can use two bags to prevent leaking.
3. Place the small bag inside the large one, sealing it again, carefully.
4. Shake until the mixture is ice cream, which takes about 5 minutes.
5. Wipe off the top of the small bag, then open it carefully. Enjoy!

Materials

- 1 gallon-size plastic food storage bag
- Ice cubes
- 6 tablespoons rock salt
- 1 pint-size resealable plastic food storage bag
- ½ cup milk or half & half
- ¼ teaspoon vanilla
- 1 tablespoon sugar

Tip

A ½ cup of milk will make about 1 scoop of ice cream; double the recipe if you want more.

Classroom Activities

English Language Arts/History

- Research the origin of the ingredients, discuss how transportation systems are part of the distribution system for these ingredients. Locate the nearest place in their community that ice cream is produced.
- Have students research the history of ice cream or other dairy products and present their findings to the class.

Math

- Before the activity, have students estimate the amount of milk needed for the experiment. Then, calculate actual amount needed. Calculate the cost of the milk that was used.
- Have students multiply and divide fractions to determine the amount of supplies needed for 1 scoop of ice cream for each person in the whole class, half the class, etc.

Science

- Create a food chain or food web with cows and humans and explain the relationships.
- Have students write down their observations and discuss the process of how milk turned into ice cream, describing the physical and chemical properties.



California Standards:

Grade 1

ELA CC: RI.1.10; SL.1.1
Math CC: 1.OA.1, 1.MD.4

Grade 2

ELA CC: RI.2.10; SL.2.1
Math CC: 2.OA.1, 2.MD.8
NGSS: 2-PS1-1, 4

Grade 3

ELA CC: RI.3.10; SL.3.1; SL.3.4
Math CC: 3.OA.1, 3.MD.2
NGSS: 3-LS4-3

Grade 4

ELA CC: RI.4.10; SL.4.1, 4
Math CC: 4.NF.4c, 4.MD.2

Grade 5

ELA CC: RI.5.10; SL.5.1, 4
Math CC: 5.NF.1, 2
NGSS: 5-PS1-3, 4, 5-PS3-1



Say Cheese

Investigating the cheese-making process.

Mozzarella Recipe

California is a leading producer of Mozzarella cheese. Mozzarella is a fresh cheese that originated in Italy and is commonly used on pizzas and in pastas. The recipe makes approximately 12-14 ounces of fresh mozzarella cheese and takes 30-60 minutes.

1. Pour milk into stainless steel pot, add citric acid and stir gently to blend. Heat milk over medium-low heat to 88-90°F.
2. Remove from heat, add rennet and stir for 30-60 seconds to blend. Cover and let sit for five minutes. Continue to heat to 105°F as curd and whey separate.
3. Line colander with cheesecloth. Gently pour curds (solids) and whey (liquid) into colander to strain. Place curds in microwave-safe bowl. Whey can be retained for other baking projects like bread.
4. Microwave curds for 30-60 seconds on high. Remove from microwave and gently press curds with hands (draining off additional whey). Repeat process two to three more times, microwaving in 20-30 second intervals. Press curds together while cheese is warm (almost too warm to handle) and knead cheese like bread dough until it is smooth and pliable (like pulling taffy). If needed, microwave cheese in 10 seconds intervals to keep cheese warm and pliable. Then, knead in salt.
5. Cheese is done when it is smooth. Form cheese into a ball and place in cold water to cool. When cheese is cold, remove from water and place in plastic wrap and refrigerate. Eat within one week.



Adapted from "30 Minute Fresh Mozzarella" by Utah Education Network.

Materials

- ¼ teaspoon liquid or ¼ tablet rennet (dilute in ¼ cup water)
- 6-8 quart stainless steel pot (not aluminum)
- 1 gallon of whole milk
- 1 ½ teaspoons citric acid (dilute in 1 cup water)
- Dairy thermometer
- Colander
- Cheesecloth
- Microwave-safe bowl
- 1-2 teaspoons salt
- Food-grade rubber gloves

Tip

Take a virtual tour of California dairies and meet dairy farmers at RealCaliforniaMilk.com

Classroom Activities

Science

- Have students record observations throughout the cheese-making process including descriptions of how the ingredient properties changed and the temperatures at which they observed phase changes. Have students identify the catalyst and describe the role it played in cheese making.
- Instruct students to categorize mozzarella cheese into a food group, list the number of recommended servings of that food group per day and the nutritional facts of mozzarella cheese.

English Language Arts

- Have students work in groups to create their own mozzarella cheese brand name, slogan, logo, and informational advertisement that persuades shoppers to purchase their product. Students can present this material to their classmates using a poster, PowerPoint, or video.

California Standards

Grades 9-12

ELA CC: W.9-12.1, 4, 6;

SL.9-12.1, 2, 4, 5; WHST.9-12.1, 7

NGSS: HS-PS1-1, 2, 4, 5



This is one in a series of Ag-Bites developed by CFAITC. Ag-Bites meet the standards of the California Department of Education. 2600 River Plaza Drive, Suite 220, Sacramento, CA 95833-3292 • (800) 700-AITC • info@LearnAboutAg.org • LearnAboutAg.org © 2019 California Foundation for Agriculture in the Classroom



Look for the Seal

California Milk Advisory Board

STEM: Make Your Own Yogurt

Enjoy delicious yogurt that you and your family can make at home. It's easy!

Or make cheese using the "Say Cheese" Ag-Bite from California Foundation for Agriculture in the Classroom:

<http://learnaboutag.org/resources/bites>



ACTIVITY

Healthy Food Scramble

Ingredients:

1 quart (4 cups) low-fat or fat-free Milk
2 tablespoons Yogurt, plain with live, active cultures
2/3 cup fat-free powdered Milk (Omit if using whole milk)

Non-stick saucepan, 2 quarts or larger
Wisk
Candy or general cooking thermometer
Quart sized jar, container or insulated bottle

For sweetened yogurt, stir in
2-4 tablespoons Honey or Maple syrup
1-2 cups fresh or dried Fruit
1/2 teaspoon Vanilla

Preparation:

Combine milk and powdered milk in a non-stick saucepan. Wisk together and constantly stirring, heat milk to 180-190 degrees. The milk will be steaming, expanding and beginning to form bubbles.

Remove from heat and let milk cool to 115-120 degrees.

In a small container, mix two tablespoons of yogurt with two tablespoons of the heated milk and wisk until smooth.

Stir yogurt mixture into the saucepan of cooling milk and continue stirring for at least two minutes.

Pour the contents of the saucepan into a warm jar, container or insulated bottle. Cover it and keep it warm until it sets, usually 4-6 hours. You can wrap the jar in kitchen towels, place your container in an insulated cooler or place it in the oven with a light bulb on.

Once the yogurt sets, refrigerate it to firm its structure and mix in any desired flavorings.



LEARN MORE AT: <http://www.healthyeating.org/Healthy-Eating/Meals-Recipes/Browse-Search-Recipes/rid/58472/homemade-yogurt.aspx>

Unscramble the words to finish each sentence:

Yidra _ _ _ _ _ foods are an important part of a healthy diet.

Milk is a good source of lmccuia _ _ _ _ _ which is important for strong bones.

Gtyuor _ _ _ _ _ and eesehc _ _ _ _ _ are examples of dairy foods.

Milk has rtpneoi _ _ _ _ _ which is good for building muscle.

Children ages 9 and older, as well as adults, should eat erhte _ _ _ _ _ servings of dairy foods each day.



Mmmm...Milk!



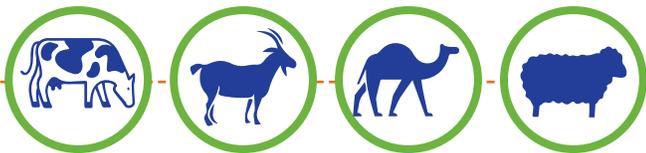
Milk is the top agricultural product in California! And our dairy farmers and processors produce that milk more efficiently than ever before.



What's in the Dairy Aisle?

Where does milk come from?

Milk and dairy foods are rich in a wide range of nutrients that are enjoyed by children and adults. Most milk in the United States comes from cows, but goats, camels and sheep also produce milk. Beverages from plant sources like rice or almond are not true "milk."

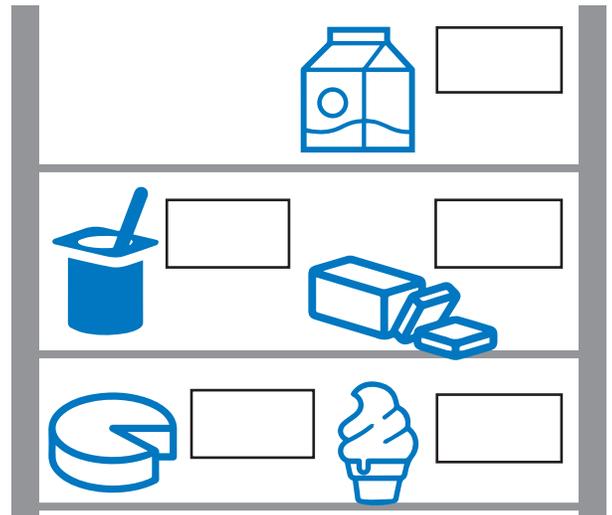


ACTIVITY



Milk is a great beverage to have with meals and can also be made into other delicious products. Children ages 9 and older and adults should include three servings of milk, yogurt or cheese each day. Use the following list to label the foods in the dairy aisle from the grocery store:

milk cheese ice cream yogurt butter
Next draw in another product you would find in the dairy aisle.



Check Your Price

Look in your local newspaper and find ads with dairy foods. Record the prices you find for the items listed. Compare prices from other stores or ads.

BONUS: Use the **Serving Sizes of Dairy Products Chart** to find the price per serving. How do other healthy foods stack up per serving, like canned peaches or peanut butter?

ONE SERVING =

OR

1 cup of milk or yogurt

Size comparison

One fistful

ONE SERVING =

1½ ounces of cheese

Size comparison

One finger

#MyPlateMyState: California

California leads the nation in agricultural production. Not only do California's dairy farmers produce more milk than any other state, our farmers grow more different types of vegetables, fruits and grains than any other state.

That means it's easy to find #CAonMyPlate all year long.

ACTIVITY



Fill in this outline of the state of California with some of the commonly grown or produced foods from all five food groups.

Choose **MyPlate.gov/MyState**

State Products of California

State Fruit: Avocado

State Grain: Rice

State Nut: Almond

State Vegetable: Artichoke

Other California grown or produced foods: Almonds, apples, apricots, asparagus, artichokes, barley, beans, beef, black-eyed peas, blueberries, bread, broccoli, cabbage, cantaloupe, carrots, cauliflower, celery, cheese, cherries, chicken, chickpeas, corn, cucumbers, dates, eggs, figs, garlic, grapefruits, grapes, green beans, honey dew, kiwi fruit, leaf lettuce, lemons, lima beans, milk, mushrooms, nectarines, oats, olives, onions, oranges, peaches, pears, pecans, peppers, persimmons, pistachios, plums, pomegranates, potatoes, prunes, pumpkins, raspberries, red kidney beans, romaine lettuce, spinach, squash, strawberries, sweet corn, sweet potatoes, tangerines, tomatoes, turkey, walnuts, watermelon, wheat, yogurt



Western Europe

Europe's cheeses exemplify the continent's diversity. Parmesan from Italy, gouda from the Netherlands, brie from France, feta from Greece—the list goes on. In fact, Western Europe leads the world in both production and consumption of cheese. But California has its own claim to (cheese) fame: dairy, including cheese, is California's most valuable agricultural commodity.

Recipe

Cheese Herb Zucchini

This kid-friendly recipe can be modified to feature locally-sourced cheese, such as Monterey Jack, or a European cheese, such as parmesan.

Ingredients
 6 zucchini
 1 tsp. garlic salt
 1 tsp. Italian herbs
 2 Tbsp. butter, melted
 1 cup cheese, grated

Procedure

1. Cut off ends of zucchini. 2. Drizzle melted butter 3. Bake at 400°F for 10 cut lengthwise. Parboil over zucchini. Sprinkle minutes, until cheese in boiling salted water with garlic salt and is melted and lightly until tender but crisp. herbs, top with grated brown. Drain. Turn into lightly cheese and paprika. buttered baking dish.

Source: healthyeating.org

California Spotlight

In California, 46 percent of cow's milk is used in cheese production. The state's dairy processors produce more than 250 different varieties and styles of cheese—including Monterey Jack which was originally produced in California missions more than 200 years ago. Additionally, California leads the nation in producing Hispanic-style cheeses.

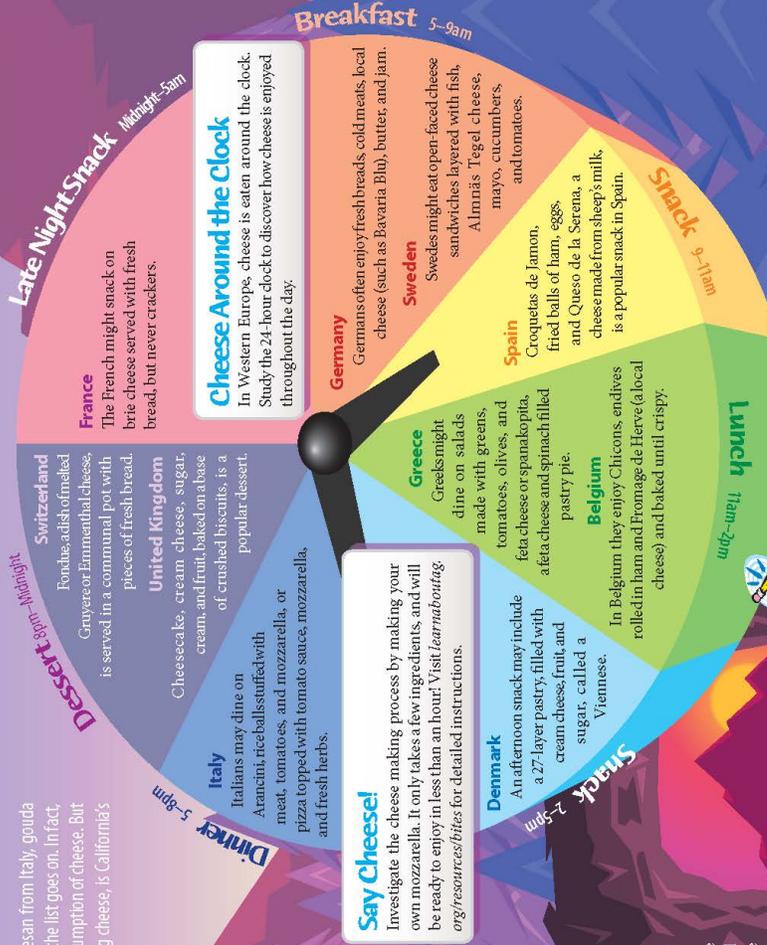
Folklore for Foodies

The folklore behind blue cheese goes back to the 7th century, to a cave outside the village of Roquefort in France. Legend has it that a distracted shepherd forgot his lunch of bread and cheese in the cave. When he returned a few months later, the cheese had become infested with penicillium roqueforti, a mold that was growing in the cave. Imagine his surprise when he realized this new variety of cheese was both safe to eat and delicious!

Cheese Around my Clock

How might you and your family enjoy cheese (or other dairy products) around the clock? If you get stuck, the Dairy Council of California (healthyeating.org) hosts dozens of healthy recipes that include cheese. Sides: CA Health Education, Grade 4-6 LFN, Grade 5-5 LFN

Mealtime	Meal Idea
Breakfast	
Morning Snack	
Lunch	
Afternoon Snack	
Dinner	
Dessert	



Cheese Around the Clock
 In Western Europe, cheese is eaten around the clock. Study the 24-hour clock to discover how cheese is enjoyed throughout the day.

The Degrees of Cheese

Standards: CC Math: 4, MD, C, 5, 6, R, F, A, 3
 Find the angle of each mealtime sector. Use a protractor, or use mathematical equations. To find the percent of each sector, divide the number of hours in each sector by the total number of hours in the circle (24). To find each angle, multiply the percent (in decimal form) by 360.

Sector	Percent (%)	Angle (°)
Breakfast		
Morning Snack		
Lunch		
Afternoon Snack		
Dinner		
Dessert		
Late Night Snack		

Did You Know?

Cheese can be digested by many people with lactose intolerance. Aged cheeses, such as swiss, parmesan, and cheddar, contain only trace amounts of lactose.



MMM...Milk

Where does milk come from?

Milk and dairy foods are rich in a wide range of nutrients that are enjoyed by children and adults. Most milk in the United States comes from cows, but goats, camels and sheep also produce milk. Beverages from plant sources like soy or almond are not true "milk."

Milk is number one!

#1

It is the top commodity in California!

And our dairy farmers and processors produce that milk more efficiently than ever before.

Activity

Milk is a great beverage to have with meals and can also be made into other delicious products. Children and adults should include three servings of milk, cheese or yogurt each day. Use the following list to label the foods in the Dairy Aisle from the grocery store:

Milk, cheese, ice cream, yogurt, butter, and draw in another product you would find in the dairy aisle.

Whats in the Dairy Aisle?



Activity

Look in your local newspaper and find ads with dairy foods. Record the prices you find for the items listed. Compare prices from other stores or ads. **BONUS:** Find the price per serving.

Serving Sizes of Dairy Products

FOOD	SYMBOL	COMPARISON	SERVING SIZE
Milk + Milk Products			
Cheese (string cheese)		Pointer finger	1½ ounces
Milk and yogurt (glass of milk)		One fist	1 cup

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Career Spotlight

Career: Animal Nutritionist

Calvin Willis, Animal Nutrition consultant, CMW Nutrition, Chino, CA

What do you do in your job? I visit dairies, look at cows, and formulate rations and supplements for them.

What is in a dairy cow's ration? A meal for a cow would include corn silage, alfalfa hay, cottonseed, rolled corn, almond hulls, and a protein source such as canola meal.

What is your education and background? I was raised on a farm in Arkansas, got my bachelor's degree in Animal Science, my master's degree in Dairy Science, and my PhD in Ruminant Nutrition. I've been doing my job for over 30 years.

Activity

Unscramble the words to finish each sentence. Yidra _____ foods are an important part of a healthy diet.

Milk is a good source of Imccuia _____ which is important for strong bones. Gtyuor _____ and eeeshc _____ are examples of dairy foods.

Milk has rtipneo _____ which is good for building muscle. Children ages 9 and older as well as adults should eat erhte _____ servings of dairy foods each day.

MyPlate

MyPlate is an illustrated guide of what a balanced meal looks like. It should include: Grains, Protein, Vegetables, Fruits, and Dairy.

Activity: What should you put on your plate? Draw or write foods for your own MyPlate for lunch. Make sure you create a balanced meal!

See www.choosemyplate.gov/about for more details of what each food group contains as well as portions. Share your balanced meal with your classmates!



Activity

Biotechnology
An early example of **biotechnology** was the use of **micro-organisms** to produce cheese, yogurt, and bread. Ancient Egyptians made cheese using biotechnology. In the 12th century, Genghis Khan fed his already **brawny** warriors yogurt for extra strength. Research how biotechnology and the use of micro-organisms help in the process of cheese and yogurt making. Compare "then and now" procedures. Students can work in groups and present their findings to the class.

STEMActivity

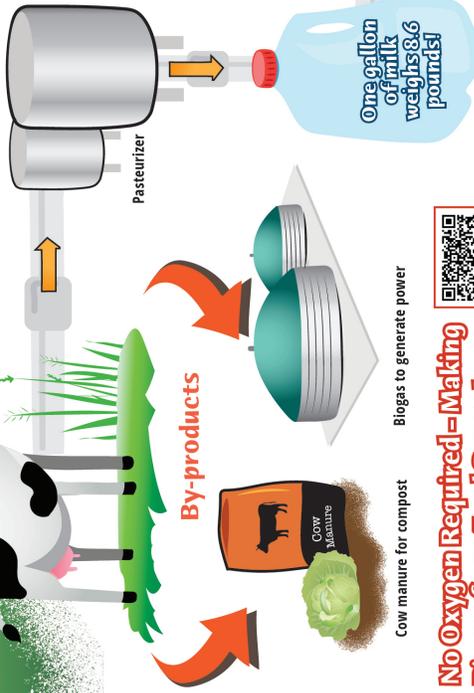
Enjoy delicious yogurt that you and your family can make at home. It's easy! www.healthyeating.org/HealthyEating/Meals-Recipes/Browse-Search-Recipes/rid/58472/Search-Recipes.aspx or make homemade-yogurt.aspx or make cheese using the "Say Cheese" Ag-Bite from CFAITC. Go to www.learnaboutag.org/agbites/

CA Standards: ELA CCSS: RI.3-5.1, 7, RI.6-8.1, SL.3-5.4, SL.6-8.4, RST.6-8.2, 3, WHST.6-8.7 Math CCSS: 3.OA, 4.OA, 4.NF.7, 5.NBT.3b, 5, 6.NS.2, 3, 7.NS.3 NGSS: 5-PS1-3, 5-PS1-4, 5-PS1.A, MS-PS1.B, MS-LST.C **Source:** Dairy Council of California, www.healthyeating.org

Udderly Efficient Cattle By-Products!



Since 1993, California has been the nation's leading dairy state in milk production, with the most recent recorded amount of 39.8 billion pounds of milk produced in 2017. That is over 4 million gallons of milk! In addition to milk, dairy cattle farmers can also profit from marketing a by-product produced from dairy cattle: **manure**. With innovative technology, dairy farmers can reuse this somewhat smelly by-product - creating less waste and generating renewable energy.



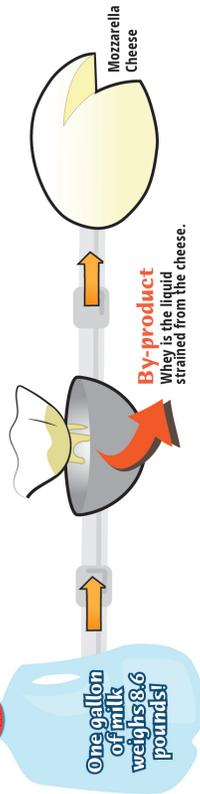
No Oxygen Required - Making Biogas from Food Scraps!

Renewable energy can be created from manure, but did you know that it can also be created from food scraps? Scan the QR code to follow along in an experiment creating your own **biogas**. Cattle produce thousands of pounds of manure a year that can be transformed into by-products such as **biofuel**, soil amendments, **fertilizers**, and even building materials. Biofuel can be collected through the anaerobic digestion process. In the dairy industry, the anaerobic digestion process is the use of microbes to break down organic matter when oxygen is not present, generating biogas as the organic matter is decomposing. This biogas is collected and used as a renewable energy resource. **Standard: NGSS: 3-5.ETS.1**



From Cow to Curd - How Whey is Made

When making cheese, the first thing needed is milk. Milk is collected from cows and sent to a milk processing facility. The milk is then **pasteurized**, and the cheesemaker adds enzymes to create cheese flavor and texture. When making cheese, a liquid by-product is produced that is high in protein, called **whey**. Whey is considered a by-product from the cheese making process and is sold as a protein supplement. Try making Mozzarella cheese and collect the whey with your class by completing the Say Cheese Ag-Bite activity found at LearnAboutAg.org/resources/bites



By-product
Whey is the liquid strained from the cheese.

Did you know?
California is the top producer of butter and ice cream and number two for yogurt and cheese in the United States.

Buttered up By-Products!

To make butter at home, the first dairy product needed is heavy whipping cream. Heavy whipping cream is placed into a sealable container, filling only half of the available space. The cream is shaken vigorously, creating energy to repel the fat globules, causing the liquid to separate from the solid in the container. The solid piece is the butter, and the liquid is a by-product called buttermilk. Try making butter with your class!



Dairy Division

1. If an average cow produces 22,916 pounds of milk in one year, how much is she producing daily?
2. Considering these averages, how many cows will it take to produce 100,000 pounds?
3. If a gallon of milk weighs 8.6 pounds; how much does a quart weigh? Hint: There are 4 quarts in 1 gallon!
4. A milk tanker can transport 12,000 gallons in one trip; how many pounds of milk are in 1 tank?

Standards: CC Math: 4.O.A.A.2, 4.MD.A.1, 6.NS.B.2, 5.MD.A.1

History of Milk

Use this QR code to learn more about the historical findings of milk and milk by-products.

