

DISCOVER DAIRY

A COLLECTION OF AGRICULTURE IN THE CLASSROOM'S FAVORITE DAIRY RESOURCES

CLASSROOM LESSONS

- Birthday Cow
- Sym-MOO-try Cow
- Bone Up on Calcium
- Butter Lab
- Thank Goodness for Cows
- Building Healthy Bones
- Be Smart, Drink Smart
- Undeniably Dairy Virtual Field Trip Companion
- Rethink Your Drink

BOOK SUGGESTIONS

VOLUNTEER ACTIVITIES

- Irresistible Ice Cream
- Moo Mask
- Paper Plate Cow

ADDITIONAL RESOURCES

*Agriculture in the Classroom's Dairy Unit has been generously sponsored by **The Dairy Alliance** and the **Maryland & Virginia Milk Producers Cooperative Association**. For more information on how you can support Agriculture in the Classroom visit AgInTheClass.org.*



Maryland & Virginia
Milk Producers Cooperative Association

THE DAIRY
ALLIANCE



Birthday Cow

Standards of Learning

Math: K.13, K.14, 1.14, 2.17

Science: K.1, 1.1, 2.1

English: K.2, 1.3, 2.3

Objective

Students will:

- Use symbols to create a representation of information
- Illustrate data by using objects graphs, picture graphs, and tables
- Count numbers and say number words

Materials

- White paper plates with one hole punched out for the tail
- Construction paper of all colors
- Black circles to represent spots
- Yarn
- Markers/crayons/colored pencils
- Scissors
- Glue

Background Knowledge

Cattle wear identification tags usually in their ears or around an ankle in a bracelet. Identifying the cow helps the farmer keep up with how much the cow eats, the age of the cow, and basic information the farmer needs. For this activity help the student create a cow to learn their own birthday.

Procedure

1. Use a paper plate to form the cow's head. Cut out and glue on ears, eyes, and nose.
2. Have students cut out black spots, one for each year of their age. Glue onto plate.
3. Ear tags are used to keep track of farm animals. Have students cut out a square of construction paper for an ear tag. Assign each month a different color. Have student's write the numerals for their birthday on it. Attach ear tags to one of the ears.



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Sym-MOO-try Cow

Standards of Learning

Math: 1.3, 2.3, 2.15

Objective

The student will be able to:

- identify a line of symmetry
- define and investigate symmetry using paper folding
- identify half versus whole

Materials

- 11 x 17 white paper
- scissors
- cow template, attached
- sponge paint brushes
- black and pink tempura paint
- glue
- black marker
- optional: black yarn and “googly” eyes

Background Knowledge

The most widely recognized dairy cow is the Holstein, which has black and white spots. The spots are similar to people's fingerprints in that no two cows have the same pattern of spots. Dairy farmers milk their cows at least twice a day. One cow produces 90 glasses of milk a day, and 200,000 in her lifetime. In fact, a cow's udder can hold 25-50 pounds of milk! Diary is Virginia's third largest agricultural commodity.

Procedure

1. Pass out templates and have students cut them out.
2. Pass out 11 x 17 paper. Fold in half horizontally “hamburger-style.”
3. Line up straight edge of template with the fold. Trace and cut out.
4. Use sponge brushes to make black spots on *one half* of the cow. Use the pink for the ear.
5. Close cow along the fold and press lightly to transfer paint.
6. Open cow up to see the whole and ask students to describe their observations. Point out that the spots are symmetrical across the fold.
7. Let dry and add eyes and black yarn for hair. You may also use a black marker to draw the nose.

Extension

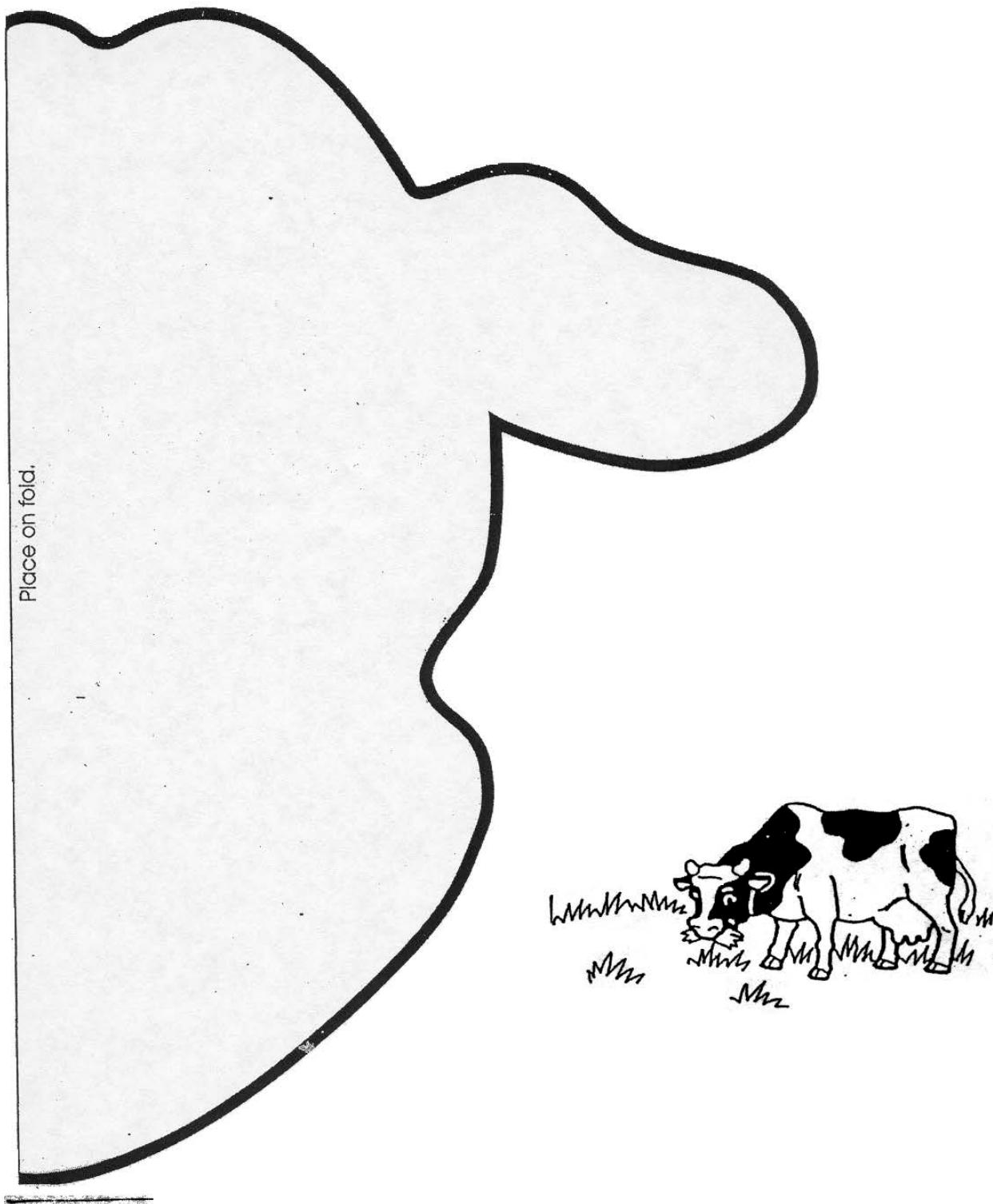
Farmers use ear tags to track breed lines in cows. Have students make their own ear tags for their cows, using their birthday as the number.

References

Original lesson adapted from Alabama Agriculture in the Classroom.



Sym-MOO-try Cow Template



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Bone Up on Calcium

Standards of Learning

Science 4.1

Health 4.1

Objective

Students will:

- Conduct an experiment to demonstrate the benefits of calcium on bones

Materials

- 2 chicken bones
- Vinegar
- Milk
- 2 jars with lids
- Science journals to record observations

Background Knowledge

Milk and other dairy products are excellent sources of calcium, which helps build strong bones and teeth. The My Plate food guide recommends that you get at least 3 servings of dairy a day. Doing so can improve bone mass, which is especially important during childhood and adolescence when bone mass is being built. Vitamin D helps the body absorb calcium, which is why milk is typically fortified with vitamin D.

Procedure

1. Share the My Plate food guide and point out that milk and other dairy products are a part of a healthy diet. Ask students to share their favorite dairy products.
2. Now ask students if they know why milk “does a body good.” Explain that dairy products are an excellent source of calcium, and that calcium is essential for healthy bones.
3. Show students the two chicken bones, tell them that you will be placing one in a jar of vinegar, which is an acid, and one in milk, which has calcium. Ask them to make predictions of what they think will happen to the bones.
4. Place one bone in a jar of vinegar and one bone in a jar of calcium. Place a lid on each jar.
5. Remove the bones after 2 days and try to bend the tips. Have students record what happens then return the bones to the jars.
6. Wait an additional 2-3 days and remove the bones. Try to bend along the middle. Then try to cut with scissors. Which one is softer? Have student record observations. The bone that was placed in the vinegar has become brittle after the acid caused it to lose calcium.



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Butter Lab

Standards of Learning

Science: K.1, 1.1, 2.1, 3.1, 4.1, 5.1, 5.4

Objective

The student will conduct an experiment to observe the chemical reaction and changes in property as milk is turned into butter.

Materials

- Heavy whipping cream (room temperature)
- Measuring cup or teaspoon
- Marbles
- Small (2oz) baby food jar with lid (or plastic salad dressing container with lid)
- Timer
- Science notebook or recording sheet

Background Knowledge

Milk fresh from the cow has both cream and milk mixed together. The cream is less dense than the milk, so the cream rises to the top where it can be skimmed off. The milk left behind after the cream is skimmed off is called skim or fat-free milk. Whole milk that you might buy in the grocery store is homogenized to keep the milk and cream mixed together.

Butter is a dairy product made when cream is churned to separate the buttermilk from the butterfat. Churning the cream forces the fat globules to slam into one another. If they hit each other with enough force, they will stick together, the fat collection becoming bigger and bigger with each extra globule. After enough churning, the fat globules form a chunk of butter. What remains is a watery liquid with small butter grains floating in it. This is called “buttermilk” and is drained off and saved for other purposes. The butter is pressed and kneaded into a solid mass to remove any remaining pockets of buttermilk or water. Butter remains a solid when refrigerated, but softens to a spreadable consistency at room temperature, and melts to a thin liquid consistency at 32–35 °C.

Procedure

1. Organize students into groups. Provide each group with 2 small jars, one marble, a scale, measuring cup and timer.
2. Each group will begin by measuring 1 ounce (one fluid ounce equals 6 teaspoons) of cream into their jar.
3. After checking to see that the jars are sealed tightly, the groups will start their timers and begin shaking their jars. Group members may take turns shaking and you may want to play music to encourage their movement. While they are shaking remind students to be observing the properties of the contents of their jar. What does it sound and look like at the beginning, middle, and end?
4. The jar's contents will go through 3 stages – beginning as a liquid, then becoming a solid as the fat and milk solids stick together, lastly the solution will separate into a liquid and a solid, with the butter on the bottom and the buttermilk on top.
5. They should stop their timers and record the time when they have solid butter at the bottom of the jar and buttermilk on top.
6. Next tell them you will be adding a marble to the next trial as an agitator. Have them form hypotheses on whether this will affect the time it takes for the cream to become butter. Repeat the steps above and record their observations and findings.



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7. You may choose to provide crackers to taste their freshly made butter.

Extension

Have students compare and contrast how butter was made before modern technology to how butter is made today.

Credit

Lesson adapted from Oklahoma Agriculture in the Classroom.

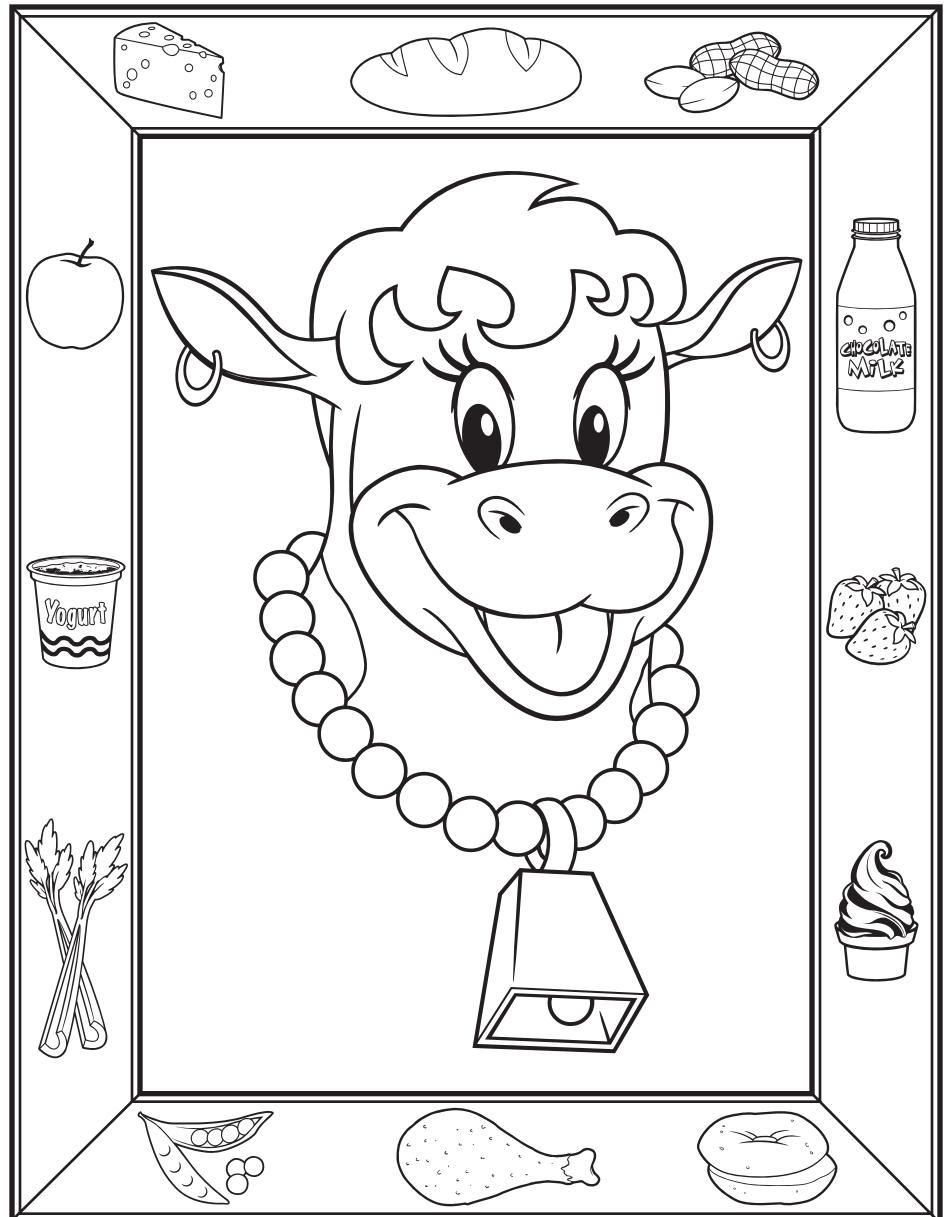
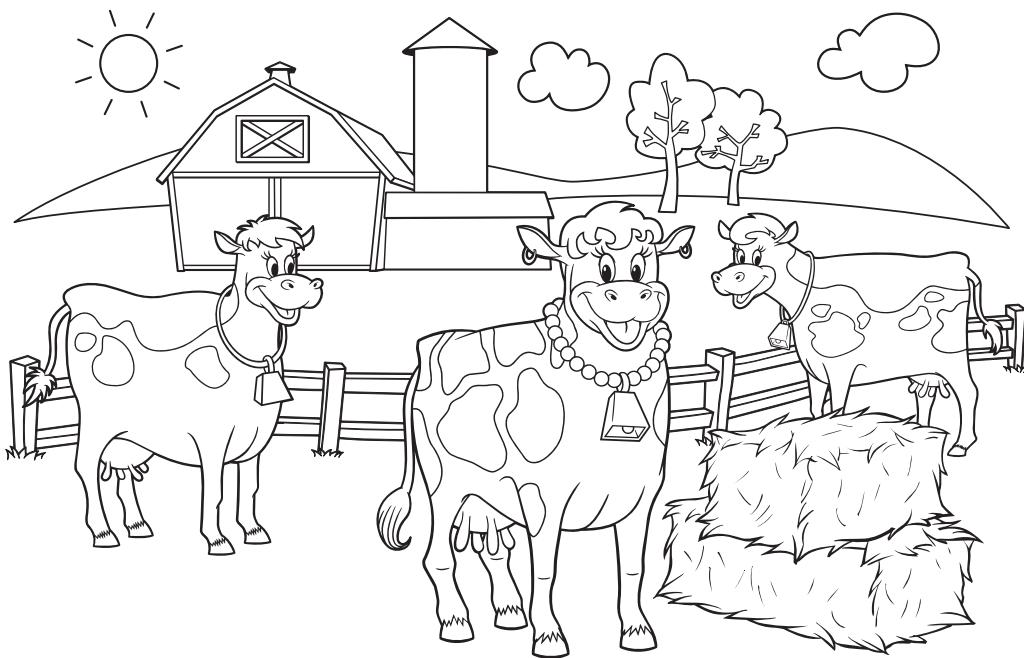


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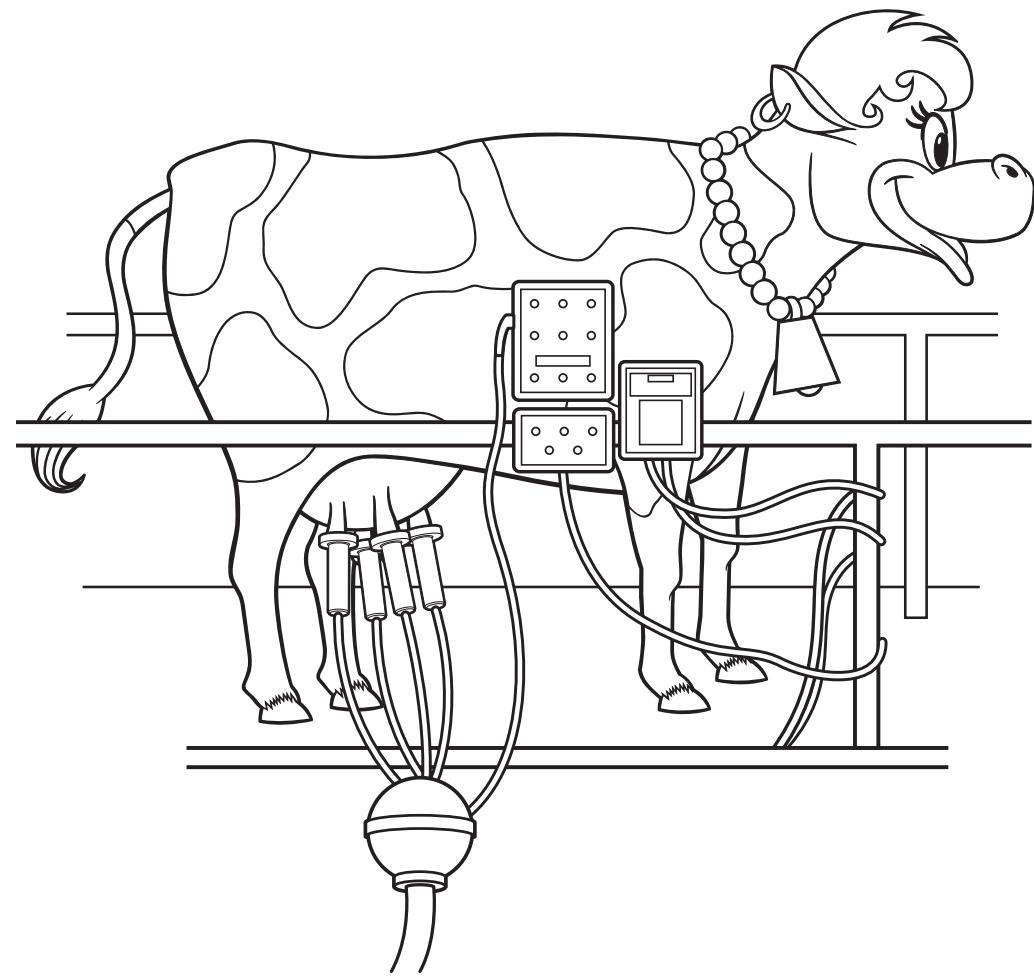
THANK GOODNESS FOR COWS

ACTIVITY 2

Name _____



Milk Group foods help build _____
_____.



At least two times every day, I go to the milking barn.
There I am milked. My milk goes into a big tank
that keeps it cold.



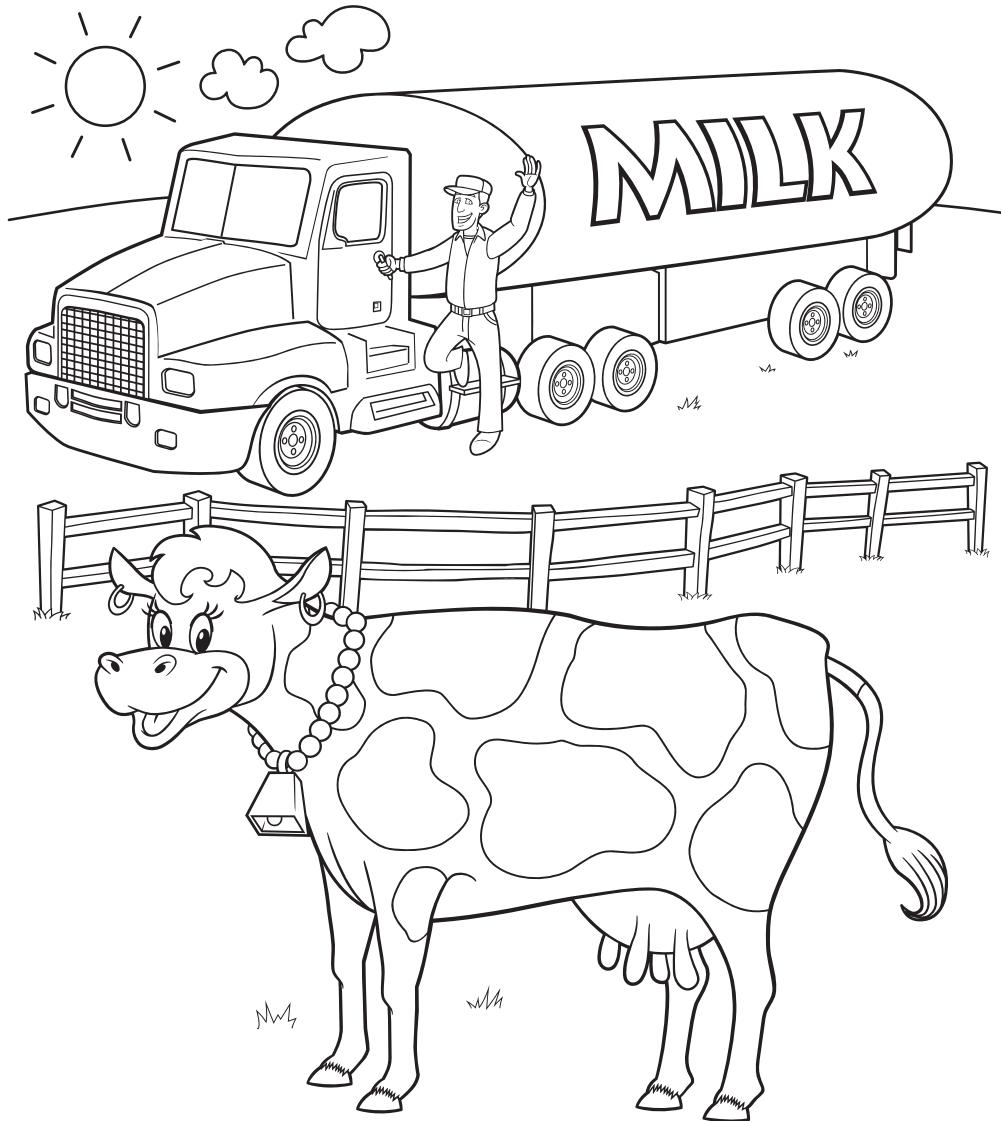
Foods in the Milk Group help you stay healthy.
Milk Group foods are a good source of calcium.
Calcium helps build strong bones and teeth.



Milk is also used to make other foods.

- Yogurt is made from milk.
- Frozen yogurt is made from milk.
- Pudding is made from milk.

All these foods are in the Milk Group.



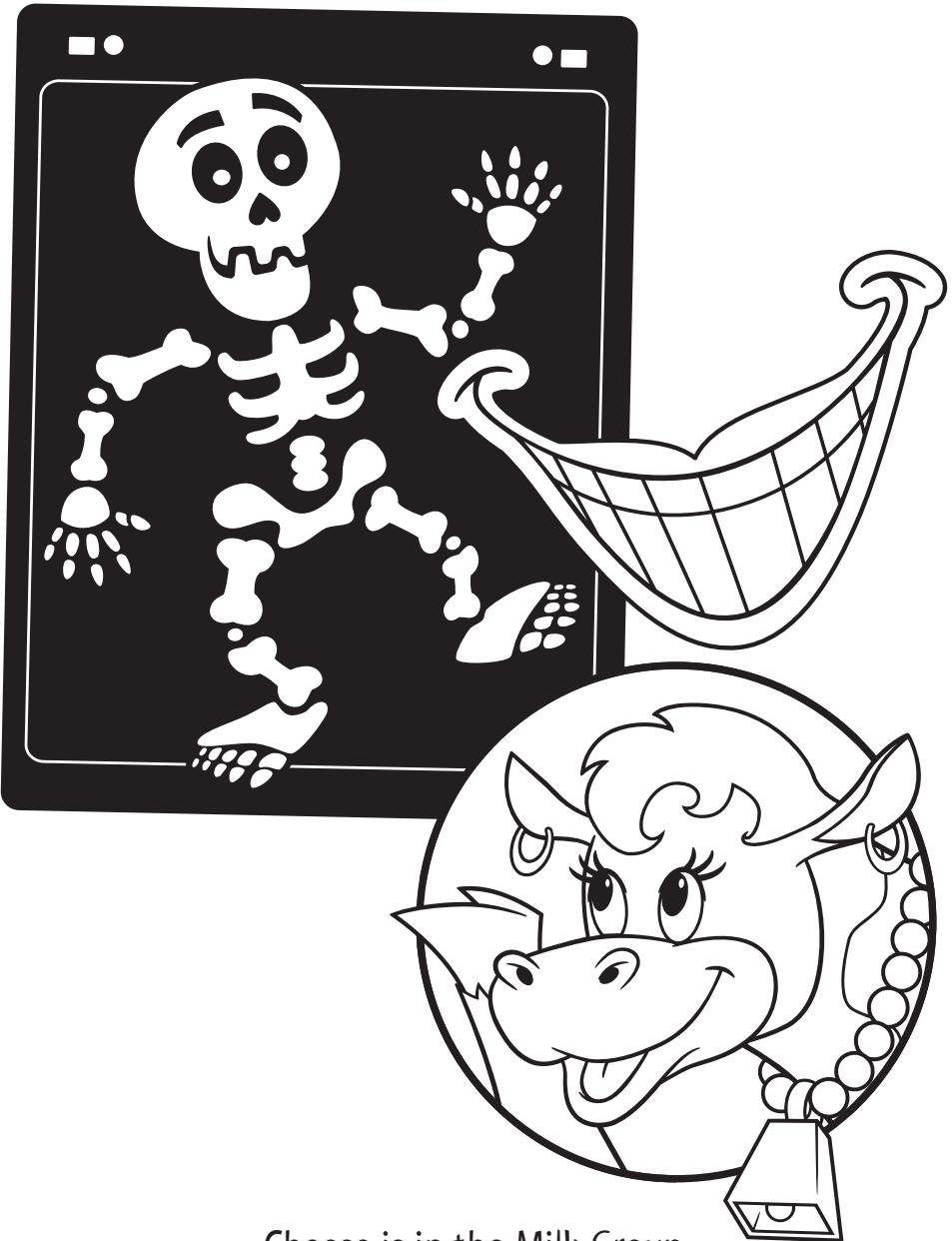
A special truck comes to the farm.

The milk from the tank is piped into the truck.

The truck drives my milk to the dairy plant.



At the factory, my milk is put into bottles and jugs. Cows only make white milk. But at the factory, chocolate or strawberry flavoring is added to some of my milk.



Cheese is in the Milk Group. Cheese has calcium, which helps build strong bones and teeth.

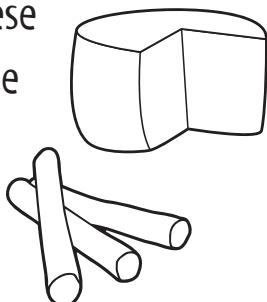
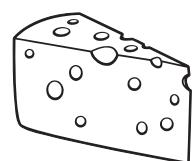


There are many kinds of cheeses.

Check all the cheeses you like:



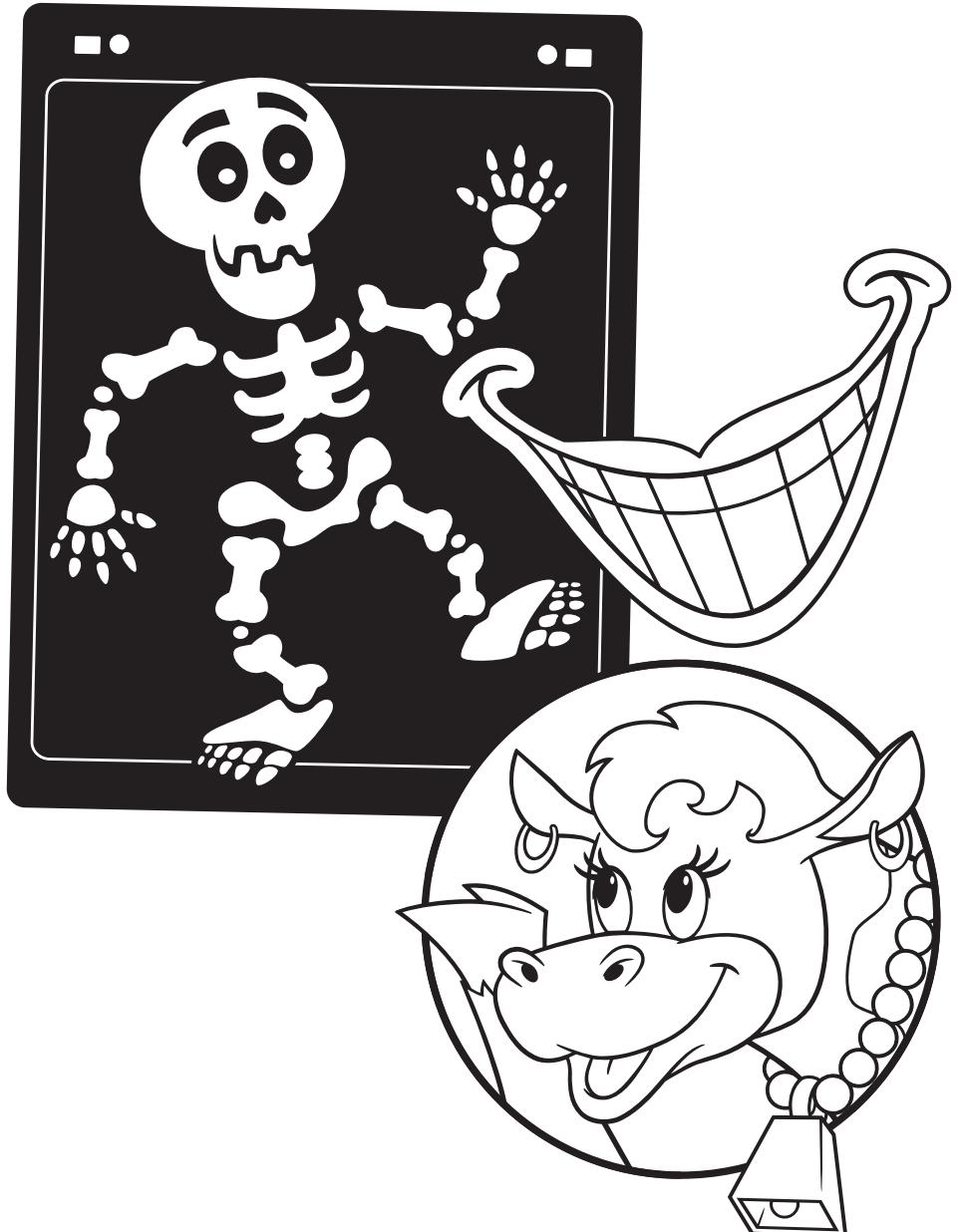
- American cheese
- Cheddar cheese
- Swiss cheese
- String cheese



My milk leaves the factory in ice-cold trucks.

Milk goes to stores. Milk goes to schools.

Milk goes to restaurants.



Milk is in the Milk Group.
Milk has calcium, which helps build
strong bones and teeth.



Not all my milk is for drinking.
Some milk is used to make cheese.
At the cheese factory, milk is stirred with other ingredients
in a tank. The cheese mixture is poured into a mold.
Then it is chilled for many weeks.

Building Healthy Bones

Standards of Learning

Health 3.1, 4.1, 5.2

Objective

Students will:

- understand the amount of calcium in bones by making visual representations.
- learn about the increase in calcium in the bones during various stages of life.
- understand the importance of a calcium-rich diet.

Materials

- 10 pound bag of flour
- Measuring cups
- Clear re-sealable storage bags (plastic)

Background Knowledge

Milk provides a package of nine different nutrients, including calcium, vitamin D, potassium and protein. Choosing 3 servings of low-fat and fat-free dairy foods every day helps build strong bones and teeth and helps maintain a healthy heart. Low- fat or fat-free white and fat-free flavored milk is ideal to replace fluids and fuel up after strenuous exercise.

The educator will lead an interactive discussion on the importance of drinking milk followed by a game of “last player standing.” After learning about calcium-rich foods and the importance of enjoying dairy every day, the students will break into five small groups with each group completing the “calcium in our bones” measurement activity for a selected stage of life.

FLOUR AS BONE DEVELOPMENT:

The amount of flour represents the amount of calcium in our bones at various stages of life.

- 1/4 cup flour = newborn skeleton
- 3 & 1/2 cups flour = 10 year old skeleton
- 7 cups flour = 15 year old skeleton
- 11 cups flour = healthy adult skeleton
- 6 & 1/2 cups flour = adult with osteoporosis

Procedure

1. Start the lesson by playing a game of “last player standing.” Ask the entire class to stand up. Instruct students as follows:
Who had milk with dinner last night?
If not, sit down.
Who had milk with breakfast this morning?
If not, sit down.
Who ate yogurt with breakfast today?
If not, sit down.
If any players are left standing ask:
Who had 3 servings of dairy yesterday?
2. Divide students in 5 groups. Assign each group one of the 5 stages of life for “Calcium in Your Bones” demonstration (see Background Knowledge). Explain process for



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demonstration. Students will measure flour as representation of calcium in your bones at each stage of life and share their findings.

Extension

Have students keep track of their dairy foods consumed for one week and present the results in a graph.

Credit

The Dairy Alliance



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Be Smart, Drink Smart

Standards of Learning

Health 3.1, 4.1, 5.2

Objective

Students will:

- learn the importance of limiting sugar in their diet.
- learn how to determine the amount of sugar in a beverage using the food label.
- compare the amount of sugar in various beverages and learn which beverages are lower in sugar.
- learn the key nutrients provided in milk and why it is the beverage of choice.

Materials

- Demonstration beverages
 - White Milk
 - Chocolate Milk
 - Fruit Drink
 - Cola
 - Sports Drink
 - Bottled Water
- Sugar Cubes (2.5 g each)
- “How Much Sugar is in My Drink” Worksheet
- “Guess the Added Sugar Amount” Worksheet

Background Knowledge

Milk provides a package of nine different nutrients, including calcium, vitamin D, potassium and protein. Choosing 3 servings of low-fat and fat-free dairy foods every day helps build strong bones and teeth and helps maintain a healthy heart. Low- fat or fat-free white and fat-free flavored milk is ideal to replace fluids and fuel up after strenuous exercise.

The educator will explain that the topic of discussion is healthy drink options. Students will learn why they need to be concerned with the different types of sweetened beverages available. The students will learn how to determine the amount of added sugar in popular beverages and the importance of limiting added sugar in the diet. The students will also learn the key essential nutrients in dairy and why it is important to consume three servings daily.

Procedure

1. Introduce topic of choosing healthy beverages: Explain that choosing healthy beverages to drink is just as important as choosing healthy foods to eat. Beverages can easily provide excess calories and sugar.
2. Ask each student to state their favorite drink. Then, ask them if they think their drink is healthy or unhealthy. Record the results on the board for others to see.
3. Discuss the negative health effects of too much added sugar in the diet: Excess “empty” calories in the diet leads to overweight and obesity, undernourishment, cavities and other health problems. Everyone needs to choose the right types of beverages to keep their bodies healthy.
4. Set up the demonstration beverages on the table. Show the students one sugar cube.



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- Ask students to guess the number of cubes in each beverages.
5. Pass out and complete worksheets – “Guess the Added Sugar Amount” and “How Much Sugar is in My Drink?”
 6. Use “ReThink Your Drink” to discuss answers. Shift around sugar cubes with demonstration beverages as necessary.

Credit

The Dairy Alliance



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RETHINK YOUR DRINK.

For **NUTRITION**, other beverages don't even come close.



FAT FREE
MILK

	% Daily Value
Calcium	30
Vitamin D	25
Phosphorus	20
Riboflavin	20
Protein	16
Vitamin B-12	13
Potassium	11
Vitamin A	10
Niacin	10
Vitamin C	4

Sugar 12 g
(Includes 6.1 tsp added sugar)

Calories 85
Serving Size = 8 ounces



FAT FREE
CHOCOLATE
MILK

	% Daily Value
Calcium	30
Vitamin D	25
Phosphorus	20
Riboflavin	20
Protein	16
Vitamin B-12	13
Potassium	11
Vitamin A	10
Niacin	10
Vitamin C	4

Sugar 22 g
(Includes 2.4 tsp added sugar)

Calories 137
Serving Size = 8 ounces



ORANGE
JUICE

	% Daily Value
Calcium	2
Vitamin D	0
Phosphorus	4
Riboflavin	6
Protein	2
Vitamin B-12	0
Potassium	12
Vitamin A	2
Niacin	4
Vitamin C	140

Sugar 21 g

Calories 120
Serving Size = 8 ounces



FRUIT
PUNCH

	% Daily Value
Calcium	2
Vitamin D	0
Phosphorus	0
Riboflavin	2
Protein	0
Vitamin B-12	0
Potassium	2
Vitamin A	0
Niacin	0
Vitamin C	2

Sugar 28 g
(Includes 6.1 tsp added sugar)

Calories 120
Serving Size = 8 ounces



SWEETENED
Iced Tea

	% Daily Value
Calcium	0
Vitamin D	0
Phosphorus	10
Riboflavin	0
Protein	0
Vitamin B-12	0
Potassium	2
Vitamin A	0
Niacin	0
Vitamin C	0

Sugar 32 g
(Includes 7.6 tsp added sugar)

Calories 130
Serving Size = 12 ounces



WATER

	% Daily Value
Calcium	0
Vitamin D	0
Phosphorus	0
Riboflavin	0
Protein	0
Vitamin B-12	0
Potassium	0
Vitamin A	0
Niacin	0
Vitamin C	0

Sugar 0 g

Calories 0
Serving Size = 8 ounces



SPORTS
DRINK

	% Daily Value
Calcium	0
Vitamin D	0
Phosphorus	0
Riboflavin	0
Protein	0
Vitamin B-12	80
Potassium	2
Vitamin A	0
Niacin	30
Vitamin C	2

Sugar 22 g
(Includes 5.3 tsp added sugar)

Calories 120
Serving Size = 12 ounces



cola

	% Daily Value
Calcium	0
Vitamin D	0
Phosphorus	4
Riboflavin	0
Protein	0
Vitamin B-12	0
Potassium	0
Vitamin A	0
Niacin	0
Vitamin C	0

Sugar 33 g
(Includes 8.9 tsp added sugar)

Calories 140
Serving Size = 12 ounces



diet
cola

	% Daily Value
Calcium	2
Vitamin D	0
Phosphorus	4
Riboflavin	0
Protein	0
Vitamin B-12	0
Potassium	0
Vitamin A	0
Niacin	0
Vitamin C	0

Sugar 0 g

Calories 0
Serving Size = 12 ounces



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GUESS THE ADDED SUGAR AMOUNT

DIRECTIONS:

Draw a line from the drink to the amount of added sugar you think it contains.

Cola (12 oz.)



Zero teaspoons

Fat Free Milk (8 oz.)



5.3 teaspoons

Water (8 oz.)



2.4 teaspoons

Fat Free Chocolate Milk (8 oz.)



6.7 teaspoons

Fruit Drink (6.75 oz.)



Zero teaspoons

Sports Drink (12 oz.)



7.9 teaspoons



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HOW MUCH SUGAR IS IN MY DRINK?

Label: 20 oz cola

1. How do I find out how many total grams of sugar are in the bottle?

(# grams of sugar/serving)

X

(# servings/bottle)

=

(grams of sugar/bottle)

(HINT: #grams X #servings = grams of sugar/bottle)

2. How do I find out how many teaspoons (tsp) of sugar are in the bottle?

(# grams of sugar/bottle)

÷

4.2 (grams of sugar/tspoon)

=

(teaspoons of sugar/bottle)

(HINT: 1 teaspoon of sugar = 4.2 grams)



Nutrition Facts

Serving Size: 20 oz

Amount per Serving

Calories 240 Calories from Fat 0

	% Daily Value *
Total Fat 0g	0%
Saturated Fat 0g	0%
Monounsaturated Fat 0g	
Polyunsaturated Fat 0g	
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 75mg	3%
Potassium 0mg	0%
Total Carbohydrate 65g	22%
Dietary Fiber 0g	0%
Sugars 65g	
Protein 0g	0%

Est. Percent of Calories from:

Fat 0.0% Carbs 108.3%

Protein 0.0%



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Caring for Cows & Nourishing Communities



#UndeniablyDairyVFT Virtual Field Trip Companion Activity October 2017

Overview

Dairy foods are recommended as part of healthy eating patterns in part because of the important nutrients they deliver including calcium, phosphorus, and vitamins like A, D and B12 and protein. To help provide this nutrient-rich food to people in a sustainable and responsible way, dairy farmers partner with experts in their community such as veterinarians, nutritionists and technologists.

The Undeniably Dairy Virtual Field Trip (VFT) takes students behind-the-scenes to show them key ways farmers and the dairy community bring dairy foods from the dairy farm-to-table, while contributing to sustainable food systems that are good for the land, animals, people and the planet. Join us as we find out about the advances on today's farms.

Grade Level: 5-8 grade

Objectives

Students will:

- Identify sustainable and environmentally-friendly farm practices
- Describe new and innovative approaches to dairy farming
- Explain the positive impacts of farming on society
- Summarize new learning to share information with others on social media

Essential Questions

- How do dairy farms support sustainability?
- How are current dairy farm practices significant to the well-being of communities and society?

Pre-Virtual Field Trip Activity

Dairy foods are an integral part of our diets, but how often do we think about how these foods are produced and where they come from? Before setting off on the Undeniably Dairy Virtual Field Trip, engage student interest through a true or false activity about dairy foods and farming.

Materials:

- True or False Statements sheet (1, for the teacher)

Procedure:

Teacher Prep: Prior to the VFT, list on separate sheets of chart paper each of the 5 topics (Care of the animals - health, diet, living conditions; Role of Experts (nutritionist, veterinarian); Use and creation of resources; Technology; Working with local farmers and businesses (farm-to-table); Sustainability - use of



resources). Display the chart papers around the room so all students can read them. Also, write #UndeniablyDairyVFT on the board.

1. Pointing to the phrase #UndeniablyDairyVFT, explain to students that on the **Undeniably Dairy Virtual Field Trip** they will learn about the day to day life on the farm as well as the innovations and technologies farmers use. Note that many of us have ideas about how milk, cheese and yogurt are produced and their connection to farming, but may have little awareness of how dairy farming practices have changed over the years.
2. Say, “Before setting off on our virtual field trip, let’s check to see what we already know about dairy products and farming!” Using the True or False Statements sheet, work together to determine whether a statement is true or false; record the group’s decision for each statement.
3. Have volunteers read the headings on the chart paper aloud. As students watch the VFT, remind them to look out for the key ideas and concepts, which will be needed in the activity that follows the trip. Watch field trip at www.discoverundeniablydairy.com.

Post-Virtual Field Trip Activity

As we saw on the “Undeniably Dairy” Virtual Field Trip, dairy farmers are leaders in managing the land and caring for their animals. Selecting crops that grow best in their climate, responsibly using resources and establishing relationships within their community, dairy farmers strive toward continued progress and innovations to contribute to sustainable food systems.

Materials:

- Chart paper (6 pieces)
- Computers, laptops or tablets
- Internet access
- Strips of paper (5 per small group)
- Markers (table group)
- Glue or tape

Vocabulary

- Farm-to-table
- Stewards
- Sustainable

Procedure:

1. Ask students to share information from the VFT they found surprising, interesting or personally relevant. Review the True or False Statement sheet from the pre-VFT activity to determine if any responses need to be changed. Say, “We learned so much about innovative and sustainable practices in dairy farming. I think we should share what we learned with others!”
2. Point out to students that, on the virtual field trip (VFT), many references were made to **#UndeniablyDairyVFT**. Ask students, “What is the purpose or meaning of this hashtag?” If needed, explain that a hashtag - the symbol # before a group of words or phrase - is commonly used on social media sites to identify or summarize a particular topic. Hashtags can be used to share information, connect people around a topic or movement and quickly bring attention to trending topics.



3. Say, “For example, think of the following hashtag examples: #OceanHero, #HardWork and #BackInMiddleSchool. What do you think is the key idea of each?” Ask students if any of them have used or viewed hash-tagged topics themselves; ask a few students to share those experiences.
4. Explain that #UndeniablyDairyVFT (read as “hashtag undeniably dairy V F T”), gives a clue about the key idea or message of the VFT. Tell students they are going to collaborate to create their own hashtags based on a topic from the VFT and write short, “tweet-like” statements to share key concepts with others.
5. Divide class into five small groups. Referring to the prepared topic chart paper, read each topic aloud and then assign each to a group.
 - Care of the animals - health, diet, living conditions
 - Role of experts; jobs on the farm (nutritionist, veterinarian)
 - Technology
 - Working as a team and with the community
 - Sustainability – responsible use and protection of resources
6. First, have students discuss with their group members what they learned from the VFT (specifically, about their assigned topic). Then, ask them to identify questions they still have about their topic (or additional information they would like to learn). Ask each group to share their questions with the whole group; record students’ ideas on chart paper so everyone can view them.
7. Guide students to work together in their groups to research answers to their questions and/or gather additional information about the assigned topic. Allow about 10-15 minutes of class time for this part of the activity. Circulate among the groups to offer support, as needed. Encourage students to conduct additional research and investigation outside the class period.
8. Say, “Think about what you learned from the VFT and from your research. You’re going to share what you’ve learned with others, but first you’ll work together to come up with a quick way to bring attention to your topic by creating your own hashtag! Your hashtag should help draw attention to and build excitement around your topic. For example – and you can’t use mine! – if I were assigned to the topic “care of the animals,” I might create the hashtag #HappyCows.” Share the following guidelines for constructing hashtags:
 - No more than 5 words
 - Must begin with the # symbol
 - Each word should be capitalized
 - No spaces between words
 - Use appropriate language
9. Provide each group with paper strips (one for each student), glue or tape and markers. Using their paper strips, students write 5 statements that briefly explain or summarize the 5 most important pieces of information related to their assigned topic. Remind students they should follow each statement with their hashtag and #UndeniablyDairyVFT.
10. When finished, have students share their hash-tagged “paper tweets” with each other, then create a display of their #UndeniablyDairyVFT “paper tweet storm” using the sheets of chart paper you prepared. If school and district policy allow, have students post their statements on social media, using the hashtags they created and #UndeniablyDairyVFT.



Additional Resources:

- DairyGood.org: [Dairy a to z](#)
- National Dairy Council: <https://www.nationaldairy council.org/>
- Undeniably Dairy: <https://dairygood.org/undeniably-dairy>
- National Dairy Council: Home | National Dairy Council. (n.d.). Retrieved from <https://www.nationaldairy council.org/>
- Undeniably Dairy | Dairy Good. (n.d.). Retrieved from <https://dairygood.org/undeniably-dairy>
- Welcome to Western Dairy Association | Western Dairy Association. (n.d.). Retrieved from <https://westerndairyassociation.org/>

National Standards:

NGSS Science Standards

- MSLS4.D: Biodiversity and Humans. Changes in biodiversity can influence humans' resources, such as food, energy, and medicines, as well as ecosystem services that humans rely on—for example, water purification and recycling. (*secondary to MS-LS2-5*)
- MSESS3.C: Human Impacts on Earth Systems Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise.

CCSS Language Arts

- LITERACY.RST.6-8.2. Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.



True or False Statements

Statement	Class Response
Dairy farmers work with their community to help produce the dairy foods we eat and drink.	
A cow's diet consists of grass alone.	
Farm to table includes locally grown foods.	
Dairy farmers track how many times a day their cows chew.	
Part of being a sustainable dairy is recycling water.	

Answers

1. True. Dairy farmers work closely with a variety of community members to help produce dairy foods, including crop farmers, members of a CO-OP, and even local hardware stores.
2. False. Dairy farmers work with animal nutritionists to ensure that cows have a balanced diet or ration that provides all the nutrients they need to maintain their health and help them produce nutritious milk. In addition to grass, cows also eat alfalfa and food that humans can't digest like cottonseed, almond shells and citrus pulp.
3. True. Farm to table involves all the steps involved to get the food from the farm to the table in a sustainable way. This includes understanding where and how your food is grown and many times those foods are locally grown and delivered. Many dairy farms are less than 100 miles from the lunch or dinner table.
4. True. Farmers use technology to track how much time a cow chews, eats, sleeps and the amount of milk they produce to ensure the cow is healthy.
True. Dairy farmers manage their water use in variety of ways including using technology to monitor how much water their crops need so they're using just the right amount.



THINK YOUR DRINK

When it comes to nutrition **MILK** delivers! **8**<sub>fluid oz.
serving comparison</sub>

AVAILABLE IN SCHOOLS

Low-fat milk 1%	
% Daily Value	
Total Fat	4
Saturated Fat	8
Total Carbohydrates	4
Protein	8 g 16 ✓
Vitamin A	10 ✓
Vitamin C	0
Vitamin D	30 ✓
Vitamin B ₁₂	20 ✓
Riboflavin	25 ✓
Phosphorus	25 ✓
Folate	4
Calcium	30 ✓
Sodium	4
Potassium	10 ✓
100 CALORIES	0 tsp ADDED SUGARS

Fat-free Chocolate Milk	
% Daily Value	
Total Fat	0
Saturated Fat	0
Total Carbohydrates	7
Protein	8 g 16 ✓
Vitamin A	10 ✓
Vitamin C	2
Vitamin D	25 ✓
Vitamin B ₁₂	20 ✓
Riboflavin	25 ✓
Phosphorus	20 ✓
Folate	2
Calcium	30 ✓
Sodium	7
Potassium	12 ✓
120 CALORIES	1.5 tsp ADDED SUGARS

Orange Juice	
% Daily Value	
Total Fat	0
Saturated Fat	0
Total Carbohydrates	10 ✓
Protein	2 g
Vitamin A	2
Vitamin C	140 ✓
Vitamin D	0
Vitamin B ₁₂	0
Riboflavin	6
Phosphorus	4
Folate	10 ✓
Calcium	2
Sodium	0
Potassium	13 ✓
120 CALORIES	0 tsp ADDED SUGARS

Water	
% Daily Value	
Total Fat	0
Saturated Fat	0
Total Carbohydrates	0
Protein	0 g
Vitamin A	0
Vitamin C	0
Vitamin D	0
Vitamin B ₁₂	0
Riboflavin	0
Phosphorus	0
Folate	0
Calcium	0
Sodium	0
Potassium	0
0 CALORIES	0 tsp ADDED SUGARS

AVAILABLE OUTSIDE SCHOOLS

Low-fat Chocolate Milk	
% Daily Value	
Total Fat	4
Saturated Fat	7
Total Carbohydrates	8
Protein	8 g 16 ✓
Vitamin A	8 ✓
Vitamin C	2
Vitamin D	25 ✓
Vitamin B ₁₂	10 ✓
Riboflavin	35 ✓
Phosphorus	25 ✓
Folate	2
Calcium	30 ✓
Sodium	7
Potassium	12 ✓
160 CALORIES	3 tsp ADDED SUGARS

Vanilla Almond Beverage	
% Daily Value	
Total Fat	4
Saturated Fat	0
Total Carbohydrates	5
Protein	1 g
Vitamin A	10 ✓
Vitamin C	0
Vitamin D	25 ✓
Vitamin B ₁₂	50 ✓
Riboflavin	25 ✓
Phosphorus	2
Folate	0
Calcium	45 ✓
Sodium	6
Potassium	3
90 CALORIES	4 tsp ADDED SUGARS

Sports Drink	
% Daily Value	
Total Fat	0
Saturated Fat	0
Total Carbohydrates	5
Protein	0 g
Vitamin A	0
Vitamin C	2
Vitamin D	0
Vitamin B ₁₂	0
Riboflavin	0
Phosphorus	2
Folate	0
Calcium	0
Sodium	4
Potassium	1
60 CALORIES	3 tsp ADDED SUGARS

Cola	
% Daily Value	
Total Fat	0
Saturated Fat	0
Total Carbohydrates	8
Protein	0 g
Vitamin A	0
Vitamin C	0
Vitamin D	0
Vitamin B ₁₂	0
Riboflavin	0
Phosphorus	2
Folate	0
Calcium	0
Sodium	0
Potassium	0
100 CALORIES	6 tsp ADDED SUGARS

Percent Daily Values are based on a 2,000 calorie diet. Nutrients are highlighted if they contain at least 10% of the Daily Value. Percent Daily Values and Calories are rounded according to FDA rules for labeling. For purposes of comparison, all nutrients are those contained in 8 fluid ounces.

Nutrient values for products vary and are shown for illustration purposes only. Nutrient values shown are representative of products as reported in the USDA National Nutrient Database for Standard Reference (SR 28), except for fat-free chocolate milk. USDA NDB No.: Low-fat milk 01082; Low-fat chocolate milk 01104; Vanilla almond beverage 14016; Orange juice 09209; Sports drink 14460; Cola 14148; Water 14411. Fat-free chocolate milk nutrient data is from TruMoo Nutrition Facts Panel (<http://www.trumoo.com/products>), and is provided as representative of the nutritional contents of fat-free chocolate milk typically offered in schools. Actual nutrient data may differ based on the particular fat-free chocolate milk product offered.

Sugars in beverages can include intrinsic and/or added sugars. Milk and orange juice naturally contain intrinsic sugars that are not considered "added sugars." Added sugars were calculated using the following information: 8 oz. of milk contains 12 g intrinsic sugar (lactose); 8 oz. of orange juice contains 21 g intrinsic sugars; all sugars in 8 oz. vanilla almond beverage (15 g), sports drink (13 g), and cola (16 g) are "added sugars."

BOOK SUGGESTIONS

Clarabelle by Cris Peterson

Cows by Robin Nelson

Cows on the Farm by Mari Schuh

Dairy on MyPlate by Mari Schuh and Gail Saunders Smith

Hooray for Dairy Farming! By Bobbie Kalman

Louis Pasteur and Pasteurization by Jennifer Fandel

Milk and Cheese by Nancy Dickmann

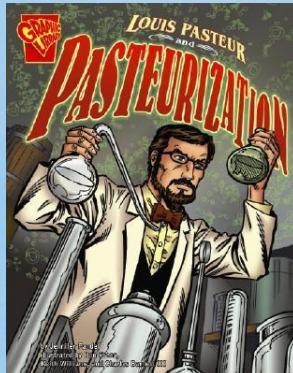
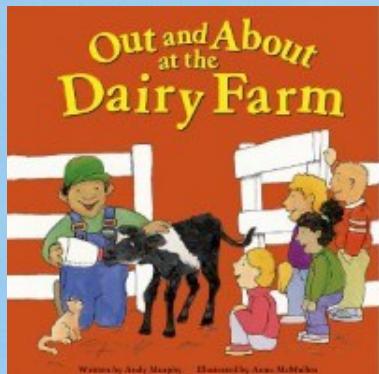
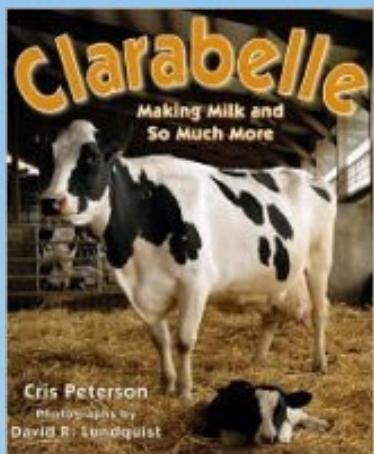
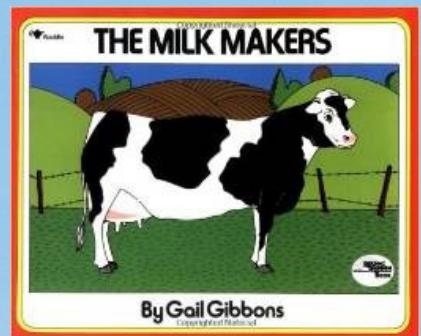
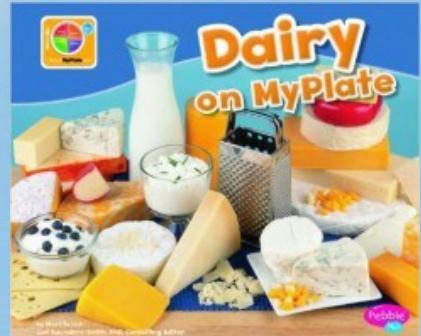
Milk: From Cow to Carton by Aliki

The Milk Makers by Gail Gibbons

Out and About at the Dairy Farm by Andy Murphy

Producing Dairy and Eggs by Jane Bingham

What's for Lunch? Milk by Claire Llewellyn



Irresistible Ice Cream

Dairy cows provide milk for people to drink, but it also goes into other kinds of food like cheese, yogurt, butter, and ice cream. In this activity, students will be learning where milk comes from and how it is an ingredient in ice cream. After reading the book, the students will make ice cream, whether you want them to do it individually with your guidance or make one big portion for the class to participate in the making.

You will need:

Gallon sized baggies

Pint sized baggies

Ice

Vanilla

Sugar

Milk

Rock salt

*all ingredients should be enough for each student to use

Spoons

Napkins

How to:

1. Discuss with children how ice cream is made and how the milk in ice cream comes from dairy cows. Dairy products are full of vitamins which help maintain bone strength.
2. Work with children as you explain this activity and make sure they do each step with you so everybody is on the right track. Each student should have the large and small sized baggies and ingredients within groups.
3. Fill the large bag full of ice and add 6 tablespoons of rock salt. Seal the bag.
4. Put a $\frac{1}{2}$ cup of milk, $\frac{1}{4}$ teaspoon of vanilla, and 1 tablespoon of sugar into the small bag and seal it.
5. Place the small bag inside the large one and seal it again carefully.
6. Shake the bag until the mixture is ice cream, which takes about 5 minutes. (This will be very cold so you may want to have children use paper towels to hold the bags.)
7. Wipe off the top of the bag, open, and enjoy!

Suggested Books:

Cow by Jules Older

Milk to Ice Cream by Inez Snyder

Ice Cream: The Full Scoop by Gail Gibbons



For more resources to connect children to agriculture visit AgInTheClass.org.

Moo Mask

The most widely recognized dairy cow is the Holstein, which has black and white spots. The spots are similar to people's fingerprints in that no two cows have the same pattern of spots. Dairy farmers milk their cows at least twice a day. One cow produces 90 glasses of milk a day, and 200,000 in her lifetime. In fact, a cow's udder can hold 25-50 pounds of milk! Diary is Virginia's third largest agricultural commodity.

You will need:

What's For Lunch? Milk by Claire Llewellyn

3 large paper plates

Crayons, colored pencils and/or markers

Any color construction paper

Stapler

String

How to:

1. Read *What's for Lunch? Milk* to a group of children.
2. The first plate will be the cow's mouth/body. Draw a mouth and spots on the plate.
3. Cut a large circle out of the second plate.
4. Color spots and cut out two eye holes on the second plate.
5. Use the third plate for the ears by cutting the plate first in half; then in quarters; and finally in eighths.
6. Using two pieces from the third plate, color and staple to the top of the second plate.
7. Create an ear tag from a piece of construction paper and use the child's birth date for the numbers. For example, 742 means July 24th.
8. Finally, staple a string to the sides of the mask so the child can wear his or her mask.

Suggested Books:

Animals on the Farm by Raintree Publishing

My Trip to the Farm by Mercer Mayer

What's for Lunch? Milk by Claire Llewellyn



For more resources to connect children to agriculture visit AgInTheClass.org.

Paper Plate Cow

It's a good thing cows have 4 stomachs, because they spend almost 7 hours a day eating. Cows eat about 100 pounds of feed or grass and drink about 50 gallons of water a day. Fifty gallons of water is about the amount in a full bathtub. Teach children these fun facts while making a cow plate.

You will need:

large white paper plate
small white paper plate
black construction paper
pink construction paper
black marker
glue
hole punch
white or black pipe cleaner or yarn

How to:

1. Flip both plates upside-down. Glue small plate near the bottom of the large plate.
2. Cut black spots from construction paper. Glue on cow.
3. Cut large oval from pink construction paper. Glue on small plate (see picture for placement). Use black marker to make eyes, nose, and mouth.
4. Cut small ovals (you may also trace your thumb) from black and pink construction paper. Glue behind small plate as ears.
5. Punch hole at top of large plate. Thread pipe cleaner or yarn through to make a tail. You may also use the tale to hang and display your cow.



ADDITIONAL RESOURCES

THE DAIRY ALLIANCE

The Dairy Alliance provides a wealth of resources for classrooms, such as lesson plans (several of which are featured in this unit), worksheets, and a virtual dairy farm tour. You can even check out virtual field trips to a dairy farm. Visit the link below for more information and resources —

[HTTPS://THEDAIRYALLIANCE.COM/DAIRY-IN-SCHOOLS/](https://thedadairyalliance.com/dairy-in-schools/)

DAIRY NEWSLETTER

DAIRY READER



What's Growing On In Virginia?

AGRICULTURE IN THE CLASSROOM

SPRING 2015 / VOLUME 26 NO. 1

THIS ISSUE

- | | |
|---|------------------|
| 3 | Cow Symmetry |
| 5 | Calcium Benefits |
| 7 | AITC Highlights |



Dairy is good for you and then some

The former dairy industry advertising slogan "Milk Does a Body Good" still holds true today.

Milk products contain essential vitamins and minerals that are good for your health. One cup of milk has 30 percent of your daily calcium requirements, 25 percent of necessary vitamin D, 17 percent of your protein needs and 10 percent of the required vitamin A.

And in Virginia, dairy does the economy good too! It is the third largest agriculture sector, with \$396.6 million worth of products sold annually, according to the 2013 National Agricultural Statistics Service. There were 640 commercial dairy farms in the state that year, and the top four dairy-producing counties were Rockingham, Franklin, Augusta and Pittsylvania.

Dairy cows can be found across the state, and they come in all varieties and colors. The most well-recognized dairy cows are black and white Holsteins, but red and white Holsteins are growing in popularity as well. As you travel across the state, you also will see brown Swiss, red and white Ayrshires, orange and white Guernseys and fawn-colored Jersey cows.

Dairy cows are like magicians, because they turn grass and grains into milk! A cow eats feed and then the ingredients are broken down in her four stomach compartments. The digested feed moves to the small intestine, and nutrients are absorbed into the bloodstream and carried to the udder. Milk is produced in the cow's udder from milk fat, milk protein and sugar.

Only female dairy cows can produce milk. Females are called heifers, and after two years they have their first calves. Once a heifer has a calf, she is called a cow. All female dairy cows must have a calf to produce milk. Cows are milked for about 305 days following the birth of a calf and then rest for about two months before beginning the cycle again. A new lactation cycle begins when the next calf is born.

Male dairy cattle are called bulls or steers.

In 2013, each dairy cow in Virginia produced an average of 7 gallons of milk a day, enough to make 6 pounds of cheese or 2.8 pounds of butter. According to NASS, the total amount of milk produced in the state that year was 202.6 million gallons!

Cows are milked two to three times a day, in the morning and the evening. Automated milking machines take 4-6 minutes to milk each cow. Robotic milking machines are becoming more popular and can milk cows even faster. The milk is then stored in a bulk tank at the farm before it is picked up to be taken to a processing plant.

(continued on the next page)



The black and white markings identify this dairy cow as a Holstein. These may be the most well-recognized breed of dairy cow.



These Holsteins are being milked in a robotic milking parlor. Such operations are becoming more commonplace.

In 2012, Virginia was home to seven commercial milk processing plants, in Rockingham County, Lynchburg, Springfield, Newport News, Richmond, Winchester and Franklin County.

In Virginia, almost all of the milk produced in 2013 was used and consumed in the form of fluid milk dairy foods. To produce this much milk, an average cow consumes 40 gallons of water and as much as 85 pounds of feed a day - a combination of hay, grain and silage, which is fermented corn or grass.

There were 640 licensed commercial dairy farms in Virginia in 2013 with an estimated 94,000 milk cows. The average Virginia dairy farm has a herd of about 147 milking cows.

Beef cattle are raised for their meat, and dairy cows are bred to produce milk. However, while dairy cows are bred to produce milk, the steers are raised for meat just like beef cattle.

Milk sold through co-ops

In Virginia, most dairy farmers belong to cooperatives, and their milk and its products are distributed through those co-ops.

Co-ops market their members' milk products at competitive prices and pool their collective buying power to purchase agricultural equipment and supplies for them. Some co-ops have staff to help members with milk production, getting equipment loans and sharing their concerns with elected officials.

Raw milk often is sent to a co-op's processing plants, where it can be made into whole, lowfat and reduced-fat milk as well as buttermilk, flavored milk and eggnog. Some co-ops also operate manufacturing plants that use milk to produce butter, ice cream, cheese and condensed milks that are sold as ingredients for baby food and frozen dinners.

One of the larger cooperatives that Virginia dairymen belong to is the Maryland and Virginia Milk Producers Co-op Association. Started in 1920, this co-op is owned and operated by nearly 1,500 dairy families from Pennsylvania to Alabama, with its headquarters in Reston, Va. It markets member milk throughout the mid-Atlantic and Southeast regions and operates three fluid processing plants, including Marva Maid; one manufacturing plant; a farm supply equipment division; and a majority interest in Valley Milk LLC.

Virginia dairymen are members of other milk cooperatives, including Cooperative Milk Producers in Blackstone; Cobblestone Milk Cooperative in Chatham; and the Southeast division of Dairy Farmers of America. All four cooperatives have been ranked in the nation's Top 50 milk cooperatives by Hoard's Dairyman magazine. Dairy Farmers of America was No. 1, Maryland and Virginia Milk Producers Co-op Association was ranked 13th, Cobblestone came in at 37 and Cooperative Milk Producers was 44th in the nation. Dairy Farmers of America supplies milk and milk products to Food Lion and Kroger stores nationally. Kroger has a processing facility in Lynchburg, so Virginia milk is taken there and sold in Virginia Kroger stores.

Bonus Activities:

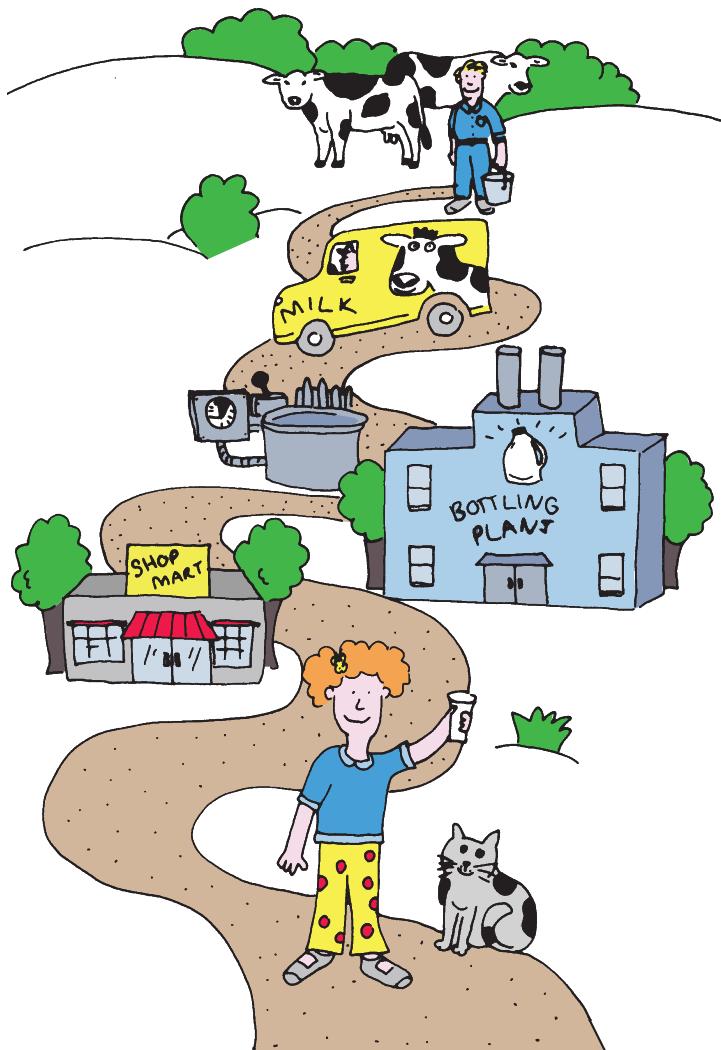
Butter Making:

Fill a small container halfway full with heavy cream. Put the lid on, and start shaking the container. After 10-15 minutes you will be able to strain the buttermilk off from the solid butter. Students may then try it on a cracker.

For companion worksheets to complement your butter making, visit naitc-api.usu.edu/media/uploads/2014/06/17/BetterButter.pdf

From Cow to Cup:

Great care is taken to provide you with each glass of healthy, delicious milk. Beginning with the farmer who milks the cows twice a day using automated equipment and then continuing to the specially designed milk truck that picks up the milk from the farm and keeps it cold on the way to the processing plant. At the plant the milk is tested, pasteurized and processed so that it is ready to go to the store and then into your cup.



LESSON PLAN >> PRESCHOOL

Sym-MOO-try Cow

SOL:

Math: 3.17, 4.14, 5.15
Health: 3.1, 4.1, 5.2

Objective:

to identify a line of symmetry; define and investigate symmetry using paper folding; and identify half versus whole.

Materials:

- "11 x 17" white paper
- scissors
- cow template
- sponge paint brushes
- black and pink tempera paint
- glue
- black marker
- optional: black yarn and "googly" eyes

Background Knowledge

The most widely recognized dairy cow is the Holstein, which has black and white spots. The spots are similar to people's fingerprints in that no two cows have the same pattern of spots. Dairy farmers milk their cows at least twice a day. One cow can produce up to 90 glasses of milk a day; 200,000 in her lifetime. In fact, a cow's udder can hold as much as 50 pounds of milk! Dairy is Virginia's third largest agricultural commodity

Procedure

1. Pass out templates, and have students cut them out.
2. Pass out "11 x 17" paper. Have students fold sheets in half horizontally.
3. Line up the straight edge of the template on the fold. Trace, and then cut it out.
4. Use sponge brushes to make black spots on one half of the cow. Use the pink for the insides of the ears and the nose.
5. Close the cow along the fold, and press lightly to transfer the paint.
6. Open the cow up to see the whole, and ask students to describe their observations. Point out that the spots are symmetrical across the fold.
7. Let the paint dry, then add eyes and black yarn for hair. You also may use a black marker to draw the nose.

Extension

Farmers use ear tags to track breed lines in cows. Have students make their own ear tags for their cows, using their birthdays as the tag numbers.

—Original lesson adapted from Alabama Agriculture in the Classroom.



Sym-MOO-try Cow Template



LESSON PLAN >> ELEMENTARY SCHOOL**SOL:**

Science: 4.1
Health: 4.1

Objective:

to conduct an experiment to demonstrate the benefits of calcium on bones.

Materials:

- 2 chicken bones
- vinegar
- milk
- 2 jars with lids
- journals to record observations

Bone Up on Calcium

Background Knowledge

Milk and other dairy products are excellent sources of calcium, which helps build strong bones and teeth. The My Plate food guide recommends that you get at least three servings of dairy each day. Doing so can improve bone mass, which is especially important during childhood and adolescence, when bone mass is being built. Vitamin D helps the body absorb calcium, which is why milk typically is fortified with vitamin D.

Procedure

1. Share the My Plate food guide, and point out that milk and other dairy products are part of a healthy diet. Ask students to share their favorite dairy products.
2. Now ask students if they know why milk “does a body good.” Explain that dairy products are an excellent source of calcium, and that calcium is essential for healthy bones.
3. Show students the two chicken bones, tell them that you will be placing one in a jar of vinegar, which is an acid, and one in milk, which has calcium. Ask them to make predictions of what they think will happen to the bones.
4. Place one bone in a jar of vinegar and one bone in a jar of milk. Place a lid on each jar.
5. Remove the bones after two days, and try to bend the tips. Have students record what happens, then return the bones to the jars.
6. Wait an additional two to three days, and remove the bones. Try to bend them in the middle. Then try to cut them with scissors. Which one is softer? Have students record their observations. The bone that was placed in the vinegar should have become brittle after the acid caused it to lose calcium.



The MyPlate graphic shows a plate divided into five sections: Fruits (top left), Grains (top right), Vegetables (bottom left), Protein (bottom right), and a separate circular "Dairy" section to the right of the plate.

ChooseMyPlate.gov

FOCUS ON FRUITS
Fruits may be fresh, canned, frozen, or dried, or 100% juice. Make half your plate fruits and vegetables.

VARY YOUR VEGETABLES
Include dark green, red, orange, beans and peas, starchy, and other varieties.

MAKE AT LEAST HALF YOUR GRAINS WHOLE
Eat more whole grains such as whole wheat, bulgur, oatmeal, whole cornmeal, and brown rice.

GO LEAN WITH PROTEIN
Choose from a variety of meat, poultry, seafood, beans and peas, eggs, soy foods like tofu, nuts and seeds.

GET YOUR CALCIUM RICH FOODS
Choose fat-free or low-fat milk, yogurt and cheese.

NATIONAL NUTRITION MONTH 2012
GET YOUR PLATE IN SHAPE
ChooseMyPlate.gov

SIMPLY GOOD NUTRITION
by Chiquita



Getting your daily recommended servings of milk helps build the strong bones that keep you active.

LITERARY CORNER

Clarabelle: Making Milk and So Much More,

Cris Peterson, Boyds Mills Press

ISBN: 1620915901

Cows, Robin Nelson, Lerner Publications

ISBN: 0761340572

Cows on the Farm, Mari Schuh, Capstone Press

ISBN: 0736809929

Milk: From Cow to Carton, Ailiki, Harper Collins

ISBN: 0064451119

Out and About at the Dairy Farm, Andy Murphy,

Picture Window Books, ISBN: 1404801660

Milk and Cheese (Healthy Eating), Nancy

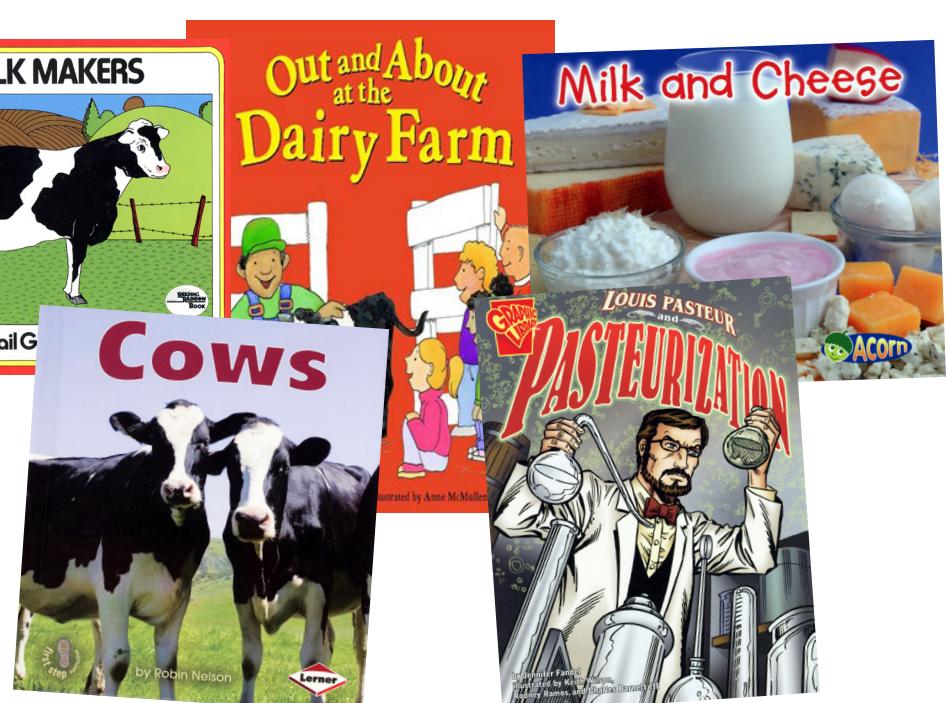
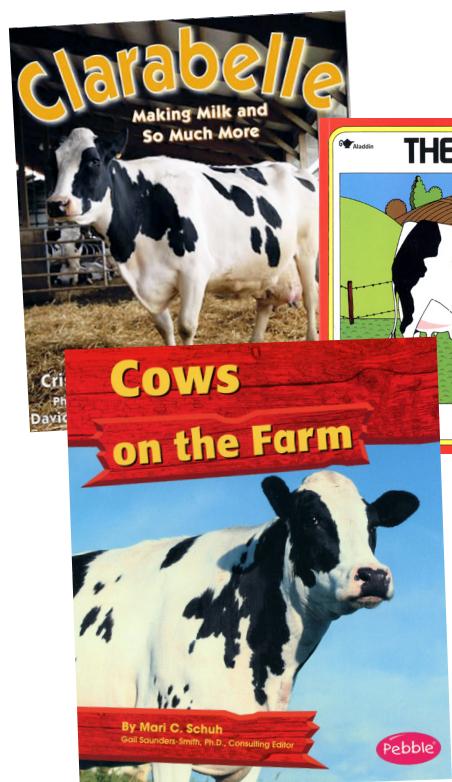
Dickmann, Heinemann, ISBN: 1432939890

The Milk Makers, Gail Gibbons, Aladdin

ISBN: 0689711166

Louis Pasteur and Pasteurization, Jennifer Fandel,

Capstone Press, ISBN: 0736878963



AITC Program Highlights

Attend the National AITC Conference this June

Join us for "Unbridled Possibilities" at the 2015 National Agriculture in the Classroom Conference in Louisville, Ky. The conference, scheduled for June 16-20, is sure to be packed with engaging workshop sessions, speakers and tours. It will send you home with new and exciting ideas you can integrate into your classroom. For more information, visit agclassroom.org/conference2015/.

AITC grant success stories

AITC has continued its mini-grant program by giving more than \$10,000 to schools and teachers for agriculture-themed programs and projects. From hatching chickens to growing their own salad ingredients, students across the state have been able to benefit from this program. The next grant window opens this summer, and the application deadline is in September. For more information and an application, visit AgInTheClass.org.

Online agriculture map

AITC is excited to introduce our latest resource, the online agriculture map. An extension of our perennially popular agriculture maps, the online map allows teachers and students to view brief videos for each region of the state. Students will learn about the geography of each region, along with information about the agricultural products found there.



What's Growing On In Virginia?
Virginia Foundation for Agriculture in the Classroom
P.O. Box 27552, Richmond, Virginia 23261

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Virginia State Dairymen's Association



Maryland & Virginia
Milk Producers Cooperative Association, Inc.

COOPERATIVE MILK PRODUCERS



www.southeastdairy.org



Dairy Farmers of America



About the Newsletter

What's Growing On In Virginia? is a semiannual publication for Virginia educators and those who want to connect children with agriculture through education.

Program Coordinators: Tammy Maxey, Lynn Black

Editorial Staff: Kathy Dixon, Pam Wiley

Graphic Designers: Maria La Lima, Bill Altice

For additional information and activities, visit our website at
AginTheClass.org or call 804-290-1143

DAIRY USES:

milk, cheese, yogurt, ice cream, butter, sour cream, cream cheese, cottage cheese, coffee creamer, baby formula

WHAT IS DAIRY?

Dairy cows are amazing animals. They can turn grass and grains into milk! Heifers are female dairy cattle and after two years, they give birth to their own calves. Once a heifer gives birth, it is called a cow. All female dairy cows must have a calf to produce milk. The gestation (pregnancy) period for cows is nine months. Newborn calves weigh about 80-100 pounds. Male dairy cattle are called bulls and do not produce milk.

Milk provides your body with calcium, which is needed for healthy bones and teeth. Calcium also helps our muscles and nerves work properly, and helps blood to clot. Milk products also provide us with carbohydrates, protein and Vitamin D. You should have 3 servings of nonfat or low fat milk and milk products each day. One serving of dairy is equal to 1 cup of milk, yogurt or ice cream and 1-2 ounces of cheese.



VOCABULARY

BULL: a male cow used for breeding.

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

CALF: a baby cow.

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

DAIRY: food group containing milk and milk products.

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

HEIFER: a female cow that has not had a calf.

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

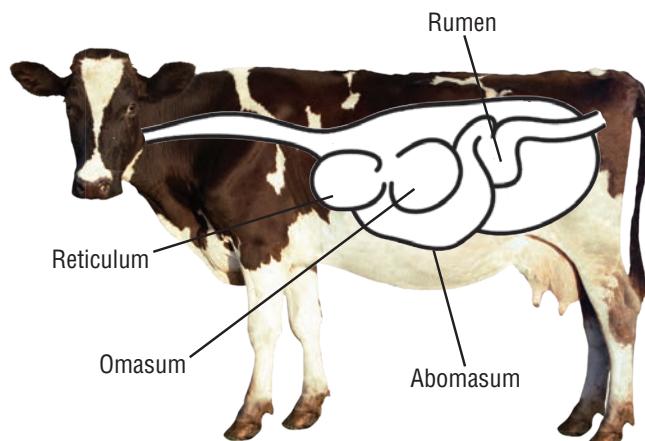
PASTEURIZE: process of heating and cooling milk to kill bacteria and protect its purity and flavor.

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

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

DO A DOUBLE TAKE

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



DAIRY

BREEDS:

Ayrshire, Brown Swiss, Guernsey,
Holstein, Jersey, Milking Shorthorn

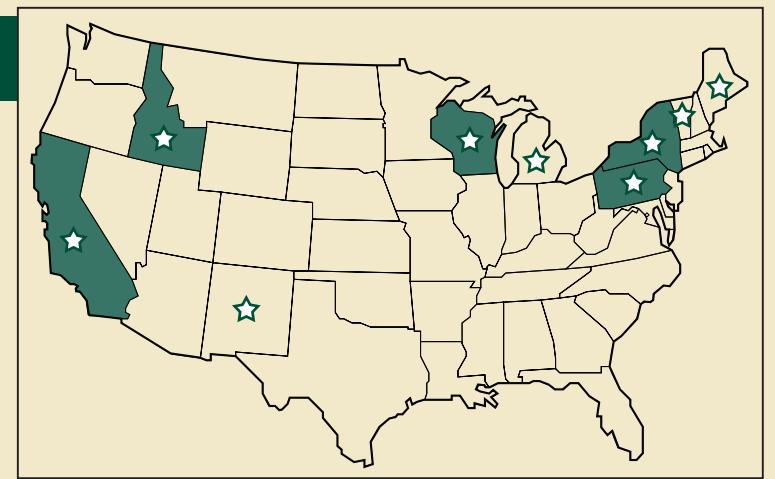
UNITED STATES MILK PRODUCTION

Top 5 milk producing states.

- | | | |
|---------------|-----------------|----------|
| 1. California | 2. Wisconsin | 3. Idaho |
| 4. New York | 5. Pennsylvania | |

★ States with dairy as their number one agricultural business.

- | | | |
|-----------------|--------------|-------------|
| 1. California | 2. Wisconsin | 3. New York |
| 4. Pennsylvania | 5. Idaho | 6. Michigan |
| 7. New Mexico | 8. Vermont | 9. Maine |



IMPORTANT DATES IN DAIRY HISTORY

1611

Cows arrive for Jamestown Colony.

1624

Cows reach Plymouth Colony.

1776

The first ice cream parlor in America opened in New York City.

1810

First cooperative creamery built.

1841

First regular shipment of milk by rail.

1861

Louis Pasteur establishes basis for pasteurization.

1878

First continuous centrifugal cream separator invented.

1884

First glass milk bottle was patented by Dr. Henry Thatcher.

1886

Automatic bottle filler and capper invented.

1895

Commercial pasteurizing machines for milk were introduced in the United States.

1899

Milk homogenizer patent obtained by Auguste Gaulin.

1914

The first tank trucks for transporting milk were put into service.

1932

Plastic-coated paper milk cartons were introduced commercially.

1942

Every other day home milk delivery began.

1948

Ultra high temperature pasteurization introduced.

1964

Plastic milk containers used commercially.

1974

Nutrition labeling on fluid milk begins.

1993

"Got Milk?" advertising campaign launched. It is considered one of the most important and successful campaigns in history.

UDDERLY
COOL

Most dairy cows are milked 2-3 times per day.

On average, one dairy cow can produce about 6.5 gallons of milk per day.

One dairy cow produces enough milk each day to fill about 99 school milk cartons.

One dairy cow produces enough milk to fill almost 50 milk chugs each day.

It takes 12 pounds of whole milk to make one gallon of ice cream.

The average American consumes 23.2 quarts of ice cream a year.

Most milk only travels about 100 miles to get from the dairy to your local grocery store.

On average, it takes only 48 hours for milk to travel from the farm to the store.

The average American eats over 31 pounds of cheese each year.

DAIRY

CAREERS:

dairy farmer, nutritionist, veterinarian, truck driver, salesperson, scientist

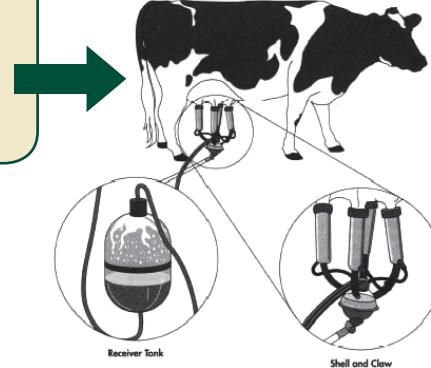
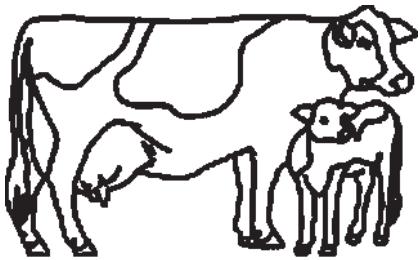
SPOTLIGHT ON CAREERS:

NUTRITIONIST — A **Dairy Nutritionist** studies the nutritional requirements of animals and advises producers about improved products and techniques that could enhance their animal production efforts. They also study the effects of management practices, processing methods, feed, or environmental conditions on quality and quantity of animal products, such as milk.

VETERINARIAN — A **Veterinarian** consults with farm or ranch owners and managers on animal production, feeding, and housing issues. They provide preventative care in order to keep animals safe and healthy. Veterinarians work with farm and ranch owners to identify their individual risk factors and then help tailor a health and security program to fit their needs.

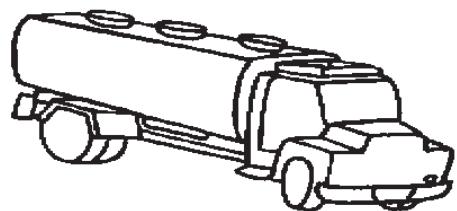
MOO-VING MILK

All female dairy cows must have a calf to produce milk.



Calves are separated from their mothers and bottle fed.

A healthy diet is important for a dairy cow. Dairy cows eat hay, silage and grain. Silage is fermented corn, wheat or hay with the stalks and leaves. Cows eat 50 pounds of silage as well as 40 pounds of feed and hay each day for a total of 90 pounds of food. They also drink 25-50 gallons of water each day. Most dairy cows are milked by machines.



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



At the dairy plant, milk is tested for butterfat content, flavor, odor, and bacteria. Then it is standardized and mixed with milk from other dairy farms so that it all tastes the same and has the same amount of cream. Homogenization and pasteurization take place before automated machines package the milk, and seal and stamp the expiration date on each milk carton or jug. It is then refrigerated until it is ready to be shipped.

DAIRY FUN FACTS:

MILK CONSUMED AROUND THE WORLD

COWS — Nine out of every ten glasses of milk consumed by people come from cows.

WATER BUFFALO — Water buffalo produce half of the milk consumed in India. Ghee, a kind of liquid butter, is made from water buffalo milk.

GOAT — Some people find goat's milk easier to digest than cow's milk. Fat globules in goat's milk are smaller than in cow's milk.

REINDEER — The fat content of reindeer milk is 22%, six times as much as cow's milk. It is the only source of milk for Laplanders in northern Scandinavia, because no other dairy animal can survive in such a cold, hostile environment. It takes two people to milk a reindeer - one to do the milking and the other to hold the reindeer's horns.

HORSE — Over 700 years ago, Mongolian warriors made a dried-out concentrated paste from horse milk. When they were on the march, they added it to water and drank it.

SHEEP — Milk from sheep has twice the fat content of cow's milk. Sheep milk is used to make French Roquefort and chevre cheeses.

CAMEL — In the hot desert, camel milk lasts longer than other types of milk. It can last for seven days at 86 degrees Fahrenheit (30 degrees Celsius), and will last for three months when properly refrigerated.

YAK — In the cold mountains of Tibet, people make yak butter tea. It tastes like a salty, creamy soup that has been whipped to a froth.

DAIRY STATISTICS

More than 60,000 U.S. dairy farms provide milk, cheese and yogurt to the U.S. and other countries.

About 99% of all U.S. dairy farms are family-owned.

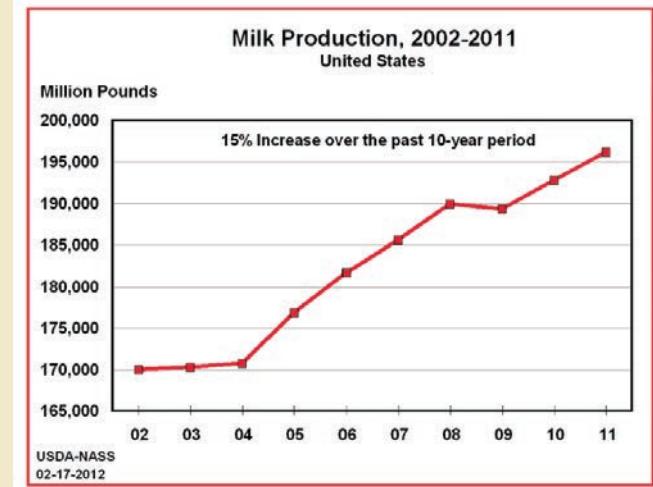
Each year, U.S. dairy farmers provide milk to make more than:

- 1.5 billion pounds of butter
- 10.5 billion pounds of cheese
- 1 billion gallons of ice cream

A typical dairy cow weighs 1,100 to 1,400 pounds.

A gallon of milk weighs 8-1/2 pounds.

UNITED STATES MILK PRODUCTION



SCIENCE AT HOME

MAKE YOUR OWN BUTTER AT HOME!

1. Place a half-pint of room temperature whipping or heavy cream in a plastic or glass jar with a lid. One half-pint of cream will make about 1/4 pound of butter.
2. Shake the jar for 5-10 minutes.
3. When a lump of butter forms, pour the contents of the jar into a colander to separate the butter from the buttermilk.
4. A pinch of salt may be added.
5. Enjoy on bread or crackers.



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