Cows, Calcium, And Cheese:

Nutrition Activities for the K-9 Classroom

Activity Guide

cabotcheese.coop
Dairy Calcium

The Super Nutrient
Calcium is a mineral that your body uses to build bones and teeth, regulate muscle contractions, help prevent osteoporosis, reduce levels of hypertension, and lower the risk of colon cancer.

Why Dairy Foods?
Dairy foods provide calcium in a form that your body can use, which is key to a healthy diet. Dairy foods also provide nutrients, such as protein, phosphorus, and riboflavin.

Where do I Get Natural Calcium?

Milk
8 oz. glass
300mg calcium

Yogurt
8 oz. cup
250mg calcium

2 oz. serving
400mg calcium

How Much?
The Institute of Medicine recommends different dairy intake for each age group, as shown below.

<table>
<thead>
<tr>
<th>AGE</th>
<th>MG/DAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-8</td>
<td>800</td>
</tr>
<tr>
<td>9-18</td>
<td>1,300</td>
</tr>
<tr>
<td>19-50</td>
<td>1,000</td>
</tr>
<tr>
<td>51+</td>
<td>1,200</td>
</tr>
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</table>

Play with your food

Muffin Heads
Top-toasted English muffin halves with a thin layer of spaghetti sauce and slices of Cabot Cheddar Cheese; broil until the cheese is melted and top with a silly vegetable face!

A whole-grain muffin is a good choice, topped with nutritious cheese and good-for-you tomato sauce, which contains the protective anti-oxidant lycopene.

Fruit Dunks
Surround a dish of low-fat lemon or vanilla yogurt with colorful toothpick-speared fruits.
Sweet calcium-rich yogurt makes nutritionally important high-fiber fruits irresistible!

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• Nearly half the children ages 3-5 aren’t getting enough calcium
• 50% of your bones are being built in the teen years
• 3 out of 4 boys and girls do not get enough calcium
Dear Educator:

The dairy farm families who own Cabot Creamery are pleased to offer “Cows, Calcium, and Cheese: Nutrition Activities for the K-9 Classroom” in their continuing efforts to support health and agricultural education for our children.

Designed by teachers, students, nutritionists, farmers, and other experts, the activities and learning tools provided with this guide are intended to help educate students about where their food comes from, how it is processed and marketed, and how food nutrients impact their health.

This edition provides a multi-media experience to provide your classroom with visuals and handouts. It also allows us to connect you to our website, where we will keep you current with the latest health industry research and information, games and activities, resources, and moovelous recipes.

“As a teacher, I plan to use these activities because they develop hands-on exploration linking real life experience with learning.” – Marylou Wasko, Family and Consumer Science Teacher.

Our goal is to inspire your students through the spirit of discovery as each of these activities strives to begin from what students know, build on that knowledge and increase their understanding of that subject. Whether they want to visit a farm, make a cow pizza, convince friends that their favorite snack is the healthiest treat, or compose a rap song about the importance of calcium and exercise to their bones and body, we are confident that you will use this activity kit to support and enhance your goals and educational standards.

In using this new kit, you are supporting the critical need to weave health and the understanding of where our food comes from into your lesson plans. We thank you for your interest.

Sincerely,

The Farm Families who own Cabot Creamery Co-operative
Moo Chas Gracias!

Please feel free to copy any of the information in this book for educational purposes.

We thank the following cool “critters” for their assistance in compiling this information:

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USDA Team Nutrition
The Cooking Light Healthy Kids Challenge program

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## Cows

**Social Studies**

1. **How Now Brown Cow – Make a “Cow Pizza!”** – *K-5th Grade*  
   Handouts on website: cabotcheese.coop/nutrition-activities

2. **Beyond the Bovine: Jobs On and Off the Farm** – *K-5th Grade*  
   Watch the “Beyond the Bovine: Jobs On and Off the Farm” with this activity - video can be found at: cabotcheese.coop/nutrition-activities

3. **Create a Dairy Day** – *K-4th Grade*  
   Handouts on website: cabotcheese.coop/nutrition-activities

## Calcium

**Science•Language Arts•Health•Physical Education• Technology**

1. **Linking Calcium to Health** – *K–8th Grade*  
   Handouts on website: cabotcheese.coop/nutrition-activities

## Cheese

**Science**

1. **The “Udderly” Fascinating Truth About Lactose and the Foods We Eat** – *5-9th Grade*  
   Handouts on website: cabotcheese.coop/nutrition-activities

2. **Make Dairy Foods in Your Classroom** – *K-9th Grade*  
   Watch “The Story of Cabot” with this activity - video can be found at: cabotcheese.coop/nutrition-activities

**Language Arts**

3. **Trick or Treat Your Friends to a Quick ‘n Healthy Snack** – *K-5th Grade*  
   Handouts on website: cabotcheese.coop/nutrition-activities

## Cabot Creamery Co-operative

**Co-operatives, More Than Just Cooperation!** – *K-9th Grade*  
Watch “The Story of Cabot” with this activity - video can be found at: cabotcheese.coop/nutrition-activities

Download “Co-ops for Community” Patch Booklet at cabotcheese.coop/community-scout-patch-program

## Resources

*All available at: cabotcheese.coop/nutrition-activities*

- Glossary of Vocabulary Words
- Print and Internet Resource Guide
- Udderly Wonderful Tips & Tidbits
  *all handouts are available at cabotcheese.coop/nutrition-activities*
- Helpful guide to assess student performance
- Tips for Families
- Fun with Calcium
- MyPlate
Before You Begin – Explore and Examine

Have you ever been to a working dairy farm? Contact a local dairy farmer and ask for a classroom visit. (Your local farm bureau or state department of agriculture will have a listing of farms near you.) Resources listed on the website are also helpful for understanding life on the farm. After seeing the video, what questions would you have for a farmer? Examples: What chores would a child of 6, 8, or 11 years old have on a dairy farm? What would a typical day in June look like on a dairy farm? In January? How do you name a registered cow? How does a person learn to be a farmer? Make a list of questions to ask a farmer.

PUT UP the “Cows to Cheese, Calcium, and You” Poster showing how milk goes from a cow to cheese to you. Talk through the pictures, writing questions down to ask the farmer or answer them yourselves after taking a virtual tour of a dairy farm at agclassroom.org/kids/tours_modern.htm

The Cow Digestive System

Do you know how many pounds of food a cow can eat in a day? How many pounds a person can eat in a day?

• A cow can eat almost 100 pounds of food a day!

• She can drink a bathtub full of water every day! Dairy cows are especially dependent on water, because about 87% of their milk is water. Without water, cows milk production drops quickly!

• With such a huge appetite, cows need a gigantic stomach to digest all that food and water. For example, a cow that weighs 1,200 pounds may have a stomach size to hold 300 pounds! Compare that with an adult human stomach that can hold about 5 cups!

• Cows can do remarkable things with the food they eat and the water they drink. Their bodies are like a COWFACTORY with the ability to transform grain, forages, and water into delicious, nutritious milk!

Use “Peek Inside a Cow” and the “CowFactory” handouts to help understand a cow’s digestive system.

The Human Digestive System

How long is the adult intestine? How many parts does a human stomach have? Look at the “Peek Inside a Cow” handout found on website: cabotcheese.coop/nutrition-activities

Science Factfile

• When you eat, your body digests the food so that your cells can use it to make energy.

• Acids and enzymes eat away at the surface of food to break it down.

• The small intestine is where food is broken down into molecules tiny enough for body cells to use.
• In the villi are tiny tubes called vessels that carry blood. Food molecules are taken into these blood vessels. Once the food is in the blood, it can travel all over the body.

Explore and Examine
What does a human eat?
Use www.choosemyplate.gov website to discuss human foods. List all the toppings and ingredients for your favorite pizza. What food groups do the ingredients belong to? Is this a 5-star meal?

5-Star Meal
To help increase awareness about the importance of nutritious ingredients for pizza, rate your favorite pizza ingredients with the following criteria.
The best pizza is a 5-star meal.
⭐ The meal provides at least one choice from two or more different food groups.
⭐ It has only one item containing fats, oils, or sweets.
⭐ It includes high-fiber foods (whole-grain, cereals, fruits, nuts, or veggies).
⭐ Its fat content has been reduced.
⭐ You can actually make it yourself.

Can you think of other star criteria to add?

Doing the Activity – Make a Cow Pizza!

At the Farm:
What does a cow eat?
Ask the farmer to focus on the nutrition of a cow at the farm. Build “cow pizzas” with the food for one cow for one day in actual amounts. Use hula hoops or draw circles in the dirt to represent the pizza plate. Build four very large pizzas filled with protein, vitamins, and minerals using hay, nutrient mix, grain, chopped corn, grass, and water and/or whatever else the farm uses for feed.

In the Classroom:
If the farmer comes to the classroom, ask him or her to bring samples in plastic bags, so students can pass them around. Ask the farmer to talk about balancing rations, “Total Mixed Rations” and other feed practices, find cow nutrition information on the web, or use other materials to make a cow pizza.

Also, if the farmer is coming into the classroom, mail him or her a copy of your activities ahead of time. Remember to ask any questions you listed earlier after viewing the video.

Process and Assessment
What do cows eat that people don’t eat? What do people eat that cows don’t eat? Compare and contrast the human and cow stomachs. Talk about how they are different and how their purpose is the same. Review the answers to the questions you asked the farmer and talk about what they meant to you. Write a paragraph and draw a picture that shares something special about your experience.

Extended Activity Ideas
Each year, Americans consume nearly 3 billion pizzas. Each American eats an average of 46 slices or 23 pounds of pizza annually. Each day, Americans eat enough pizza to cover nearly 110 football fields.
• Research where in the world the idea of pizza came from and why. Is pizza popular all over the world?
• Ask a representative from a local pizza parlor to come to your class and talk about best-selling pizzas and favorite ingredients. Maybe they will bring some dough to work with during your time together.
• Make a pizza with your cafeteria staff at school using ingredients from your 5-star pizza.
• Can you make your own “cow facts” cow? This activity will revisit vocabulary and facts that the students have learned. Directions for “cow facts” cow. Cut out a large cow shape from black cloth; cut white spots out of white tagboard; with marking pens ask the students to write facts, vocabulary, or thoughts about cows on the “spots.” Have the students place them on the “cloth cow” using Velcro® to make a class Holstein!
• Have a pizza recipe contest in your class. Invite parents or others to be the taste testers and have a pizza party.
Beyond The Bovine – Jobs On and Off The

**Knowledge, Skill, and Value**
- Discover answers to questions about careers in agriculture.
- Increase knowledge in range of careers available.
- Work as a team to create a presentation.
- Understand and value the connections between school and careers.

**Time Needed**
Two class periods

**Materials Needed**
- **In the Classroom:**
  - All handouts can be found at cabotcheese.coop/nutrition-activities
  - Beyond the Bovine Place Map handout for each student to use with video.
  - Does School Matter? Survey

**Poster**
Cows to Cheese, Calcium, and You

**Resources**
See Career Exploration Resources in the handouts: cabotcheese.coop/nutrition-activities

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**Before You Begin – Explore and Examine**

1. Watch “Beyond the Bovine: Jobs On and Off the Farm” on the website (cabotcheese.coop/nutrition-activities). Watch again with Beyond the Bovine Place Map. Note: a magnifying glass icon in the video comes up in four places as an indicator to pause and discuss each career cluster, beginning with questions on Place Map. Encourage students to ask their own questions and write them down to consider later.

2. Review the “Farm Facts” below, as well as the “Cows to Cheese, Calcium, and You” poster (which can be found in the kit or on the website at cabotcheese.coop/nutrition-activities) for more information during the video.

3. Use the “Does School Matter?” handout on website (cabotcheese.coop/nutrition-activities) to help process the knowledge gained in class and focus on individual student interests in follow-up presentations.

4. For more farm information, view the “Story of Cabot” video here: cabotcheese.coop/nutrition-activities

**Farm Facts**

**An American Farmer is...**
- A Business Person
- An Accountant
- A Family Member
- A Financial Planner
- A Community Leader
- An Environmentalist
- An Animal Caretaker
- A Computer Programmer
- A Mechanical Engineer
- An Entrepreneur
- A Soil Conservationist

*Source: American Farm Bureau Federation Farm Facts.*

**Mechanic: Farm Machinery and Equipment Needing Repair**

- Combine
- Spreader
Quality Assurance and Manufacturing Facts – Cheesemaking

Unprocessed milk is tested for: butter fat, protein content, and total solids.

See “Cows to Cheese, Calcium, and You” poster included in kit.

Sales and Marketing – Communication and Design

The art and experience of marketing and sales are tested over time through trial and error, using data collected from many sources. Certainly, the “who, what, when, where, and why” questions are used for ensuring that the targeted audience has the information it needs. The best way to answer questions on how one knows what a customer will buy and what attracts a customer to your product is to create a marketing piece and test it yourself. Design a brochure, label, or advertisement using a topic or event happening at school (cafeteria menus, course offering, or extracurricular events). Make copies and pass them out with a survey. Use the survey results to create a list of criteria to assess your presentation.

Customer Service

Suggested Activity: Create a scenario that you think a customer service representative would have to deal with, such as a customer who is angry over a spoiled shipment or lost order. Make a list of qualities and skills that you think the customer service representative would need to handle this scenario correctly. Present the scenario as a one-act play to the class, shown in two different ways, and ask the class which one addressed the customer’s concerns the best and why.
Create Your Own Dairy Day

In Vermont, we celebrate “Dairy Day” in June on the lawn in front of our Capitol in Montpelier. You too can celebrate Dairy Day to help keep children in touch with where their food comes from.

SET-UP
Create ten stations around a school yard, classroom, or gymnasium. Ask local farmers to come in to staff the stations or ask parents to volunteer.

Resources:
- Posters
  - Cows to Cheese, Calcium, and You
  - Take the Calcium Challenge

- Materials Needed
  All handouts can be found at cabotcheese.coop/nutrition-activities
  - Healthy snack recipes
  - Fun with calcium
  - Fun dairy facts

STATIONS:
1. Dairy Products Come from Dairy Farms
Show the “Beyond the Bovine” video on cabotcheese.coop/nutrition-activities to students; use the Video Place Mat handout as a guide to help them reflect on what they saw in the video.

2. We Get Milk from Cows
Set up the “Cows to Cheese, Calcium, and You” Poster to illustrate the cows-to-cheese process. Let the kids try their hand at milking, using “udders” made from surgical gloves. Fill the gloves with water (add white tempera paint for color) and poke a hole in the tip of each finger to allow the “milk” to flow when students give a squeeze.

3. Foods Made from Milk are Called Dairy Products
Create a poster with color pictures of dairy products and make copies of these pictures on heavy card stock (two cards for each product, about 3x3 inches each). Discuss the names of each product and determine which ones the children have tasted. Use the cards to play a “memory” game. Turn all cards face down and let children turn over cards to match pairs. Encourage them to say the name of each product as they turn the cards over.
9. Thank a Cow Today!
Young children will enjoy having their picture taken to remember their Dairy Day experience. Provide dress-up clothes (e.g., bandana and straw hat) and let them have their pictures taken with a cow (or hugging a stuffed cow toy). Make buttons that say “Kiss a Cow” for them to wear home. Coloring books with pictures of farms, cows, and dairy products could also be available to take home and help them remember what they learned. (Refer to cabotcheese.coop/youthful-matters.)

Special thanks to Linda Baron of Beacon School District in New York for suggesting and writing this activity.

4. Eat Three Servings of Dairy Products Each Day for Good Health
Display empty containers of milk, cream, cottage cheese, yogurt, ice cream, and cheese. Explain that we need three servings of dairy products like these to maintain good health. Play “What’s Missing?” Review the names of the products and hide them behind a screen (e.g., cardboard covered with a black and white cowhide design). Remove three of the items and place them in a grocery bag, then let the children try to remember which ones are missing from the group. Provide copies of the Dairy Chart*. Students can chart how much dairy food they get daily and how much they exercise.

*See Cabot’s Fun with Calcium on website: cabotcheese.coop/nutrition-activities

5. Dairy Products Help Build Strong Bones
Set up the Skeleton poster from the kit. Have children feel the bones in their fingers, arms, and legs and discuss why they need strong bones. Snap a wooden skewer to demonstrate how bones break if they are weak and explain that dairy products help keep bones strong because they contain the mineral calcium. Let them make a “bone builder” snack by threading cubes of cheese onto skewers. For added fun, add bone shaped paper cutouts to top of skewers.

6. Dairy Products Help Keep Teeth Strong
Discuss why we need strong teeth and how dairy products help keep them strong. Make a healthy “pizza smile” snack. Slice open an English muffin. Spread with tomato sauce and arrange small slices of cheese on top and bottom to resemble teeth. These can be toasted if cooking facilities are available.

7. Dairy Products Are Good for Your Muscles and Heart
Why do we need muscles? Show how your muscles work by using them to make butter! Fill a jar with heavy cream and let the children sit in a circle while they shake and pass the jar until a butter ball forms. Then spread it on crackers and enjoy!

8. Dairy Products Taste Good, Too
Have samples of cheese, yogurt, and ice cream available. Make yogurt or ice cream smoothies and hand out recipes for them to take home to make their own smoothies or cheese snacks. See snack recipe handout on cabotcheese.coop/nutrition-activities
2. Linking Calcium to Health

Cows, Calcium, and Cheese: Nutrition Activities for the K-9 Classroom

Knowledge, Skill, and Value

- Know what products are made from milk.
- Know about foods in the milk group at choosemyplate.gov.
- Conduct a science experiment.
- Value how the nutrient calcium keeps bones and teeth healthy and strong.

Time Needed

Variable

Materials Needed

In the Classroom:
Chicken bones, vinegar, tap water, jars, soda, milk, animal or human baby teeth. See handouts on website
- Calcium Health Facts
- Blank Nutrition Fact Label
- MyPlate
- Calcium Cow-Q-Later

Poster
Take the Calcium Challenge

Vocabulary Words
(see Glossary found in handouts on website)
- Calcium
- Cheese
- Churn
- Cow
- Cultured
- Curds & whey
- Homogenization
- Mammal
- Milk
- Pasteurization
- Real seal
- Yogurt
- Fortified
- Vitamin

Resources
cabotcheese.coop/nutrition-activities

Before You Begin – Explore and Examine

Which dairy products do you like most? List them on the board (for example: flavored milks, yogurt, buttermilk, sour cream, ice cream, cheese, butter).

Bring in some empty cartons of milk. Use the Nutrition Facts on each product label to learn about the nutrient content of that food.

Milk products provide varying amounts of protein, fat, saturated fat, cholesterol, carbohydrate, vitamins, and minerals. Of all milk products, milk, yogurt, and cheese are the best sources of calcium.

Did You Know?

If you eat three dairy servings a day (of either milk, cheese, or yogurt), you are most likely meeting your calcium requirement. nationaldairycouncil.org/health-and-wellness

Doing the Activity

Tooth Experiment—K-4th Grade

Take one tooth and put it in a glass of milk. Take another tooth and put it in a glass of soda. Refrigerate. Leave for two days. Compare and observe how tooth enamel is affected. Examine the Nutrition Facts on the product label from a carton of milk and a can of soda. Students can develop a chart to compare the two labels. Ask students to share their opinions about which beverage is healthier and why.

- Share some Calcium Health Facts on the handout
- Hang up the Skeleton Poster included in this kit

How Calcium Builds Strong Bones

Chicken Bone Experiment—5th-8th Grade

Why do we need our bones? (Bones are the foundation for our muscle and soft tissue; they hold the body up, so you can move and play). What else is important for growing strong bones? (Exercise to keep building strength in our bones; and eat certain types of food to nourish our bones and blood supply.) What happens to bones that don’t get enough calcium? What would happen to bones if they had no calcium in them? Let’s find out! Conduct this simple science experiment and make some observations that can help answer these questions.

a. Put one chicken bone in a jar with tap water.
   Put another chicken bone in a jar with vinegar.
   Place the lids on the jars.

b. Remove the bones after two days and try to bend the tip of each bone. What does the class notice? Place bones back in jars.

c. Remove the bones two or three days later and bend them in the middle. Try to cut them with scissors. Which one is softer?
One of the bones becomes brittle because it lost calcium (due to the vinegar). Can you cut the bone?

**Process and Assessment Questions**

1. Check the chicken bones.
2. What is happening to the bone soaked in vinegar?
3. As the vinegar leaches out the calcium from the chicken bone, is the chicken bone stronger or weaker?
4. What conclusions can you draw from your observations?
5. Do animals with strong bones drink milk? Where do they get calcium?
6. Have you ever broken a bone? Tell us about it.
7. Using what you have learned from this experiment, consider doing one of the following:
   - Draw a picture of someone without any calcium in his or her bones.
   - Write an advertisement for radio listeners about calcium.
   - Write a story about calcium and health for your local newspaper.

**Wrap-Up Activity and Discussion**

- 4 to 8 year olds need 800 mg of calcium a day,
- 9 to 18 year olds need 1,300 mg of calcium a day.

Use the chart below and ask students to calculate what combinations of foods (or pick one food) they would choose to eat and still meet their daily calcium requirement.

<table>
<thead>
<tr>
<th>Milk Group</th>
<th>1 cup 1% low-fat milk</th>
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<tbody>
<tr>
<td>1 cup</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 cup plain low-fat yogurt</td>
<td>415</td>
<td></td>
</tr>
<tr>
<td>1½ oz swiss cheese</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>1½ oz cheddar cheese</td>
<td>306</td>
<td></td>
</tr>
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<tr>
<th>Meat Group</th>
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<td>1½ cup</td>
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<td></td>
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<tr>
<td>3 oz canned salmon with bones</td>
<td>203</td>
<td></td>
</tr>
<tr>
<td>3 oz shrimp</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>1/2 cup calcium-set tofu</td>
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<table>
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<th>Vegetable Group</th>
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<tbody>
<tr>
<td>1/2 cup</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/2 cup cooked kale</td>
<td>90</td>
<td></td>
</tr>
<tr>
<td>1/2 cup cooked broccoli</td>
<td>36</td>
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<table>
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<tr>
<th>Fruit Group</th>
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</thead>
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<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/4 cup dried prunes</td>
<td>21</td>
<td></td>
</tr>
</tbody>
</table>

Using the Calcium Cow-Q-Later available at [cabotcheese.coop/nutrition-activities](http://cabotcheese.coop/nutrition-activities), have students chart their own daily calcium consumption. Are they getting enough?

Discuss how all of this information has helped students understand the importance of calcium to their health. Assess their knowledge by using a culminating activity, such as the Calcium Challenge – use the handouts on the website: [cabotcheese.coop/nutrition-activities](http://cabotcheese.coop/nutrition-activities).

**Extended Activity Ideas**

1. Find out how many pounds of milk make one pound of cheese. Look up the recommended serving size of cheese and find out how many grams of protein and calcium it contains. Make a small poster that promotes cheese based on these facts.
2. Research the history of a popular ice cream or cheese brand. Write a story about how the creators of this product got started in the business and how they developed their product.
3. Visit a processing plant or invite a cheesemaker or ice cream maker into your class to share information about how they process dairy products from milk.
4. Do a dance, create an exercise, or write your own song/poem to emphasize how important movement is for building and keeping bones strong every day.
5. Have students research how other areas of their bodies besides their bones and teeth benefit from calcium intake and present it to the class.
6. Younger students can work with you and the health, art, or gym teacher to trace their bodies on big paper and draw in the skeleton. Like an x-ray, have them label the bones, color them, and hang the drawings around the classroom. Ask students to list foods containing calcium somewhere on the cutout.

**Fat Fact**

In a year-long study, when 48 girls ages 9-13 ate more yogurt and cheese and drank more milk, their bones got significantly stronger without gaining weight or body fat.
Science

3. Cheese

Cows, Calcium, and Cheese: Nutrition Activities for the K-9 Classroom

5th-9th Grade Activity

The “Udderly” Fascinating Truth About

See Lactose Intolerance Sheet on website
www.cabotcheese.coop/nutrition-activities

What is lactose?
Lactose is a carbohydrate that is made from two small sugars bonded together. The two sugars are glucose and galactose. Although they may look the same at a quick glance they do differ in significant ways. When these two simple sugars are bonded together they make a molecule of lactose.

The Lactase enzyme splits these two molecules apart back into the two simple sugars. That is why we get positive test results for glucose after we use the enzyme on products that contain lactose.

What is Lactose Intolerance?
Lactose intolerance is the inability to digest significant amounts of lactose, the predominant sugar of milk. This inability results from a shortage of the enzyme lactase, which is normally produced by the cells that line the small intestine. Lactase breaks down milk sugar into simpler forms that can then be absorbed into the bloodstream. When there is not enough lactase to digest the amount of lactose consumed, the results, although not usually dangerous, may be very distressing. While not all persons deficient in lactase have symptoms, those who do are considered to be lactose intolerant.

Common symptoms include nausea, cramps, bloating, gas, and diarrhea, which begin about 30 minutes to 2 hours after eating or drinking foods containing lactose. The severity of symptoms varies depending on the amount of lactose each individual can tolerate.

Some causes of lactose intolerance are well known. For instance, certain digestive diseases and injuries to the small intestine can reduce the amount of enzymes produced. In rare cases, children are born without the ability to produce lactase. For most people, though, lactase deficiency is a condition that develops naturally over time. After about the age of 2 years, the body begins to produce less lactase. However, many people may not experience symptoms until they are much older.

Between 30 and 50 million Americans are lactose intolerant. Certain ethnic and racial populations are more widely affected than others. As many as 75 percent of all African Americans and American Indians and 90 percent of Asian Americans are lactose intolerant. The condition is least common among persons of northern European descent.

Researchers have identified a genetic variation associated with lactose intolerance; this discovery may be useful in developing a diagnostic test to identify people with this condition.

The Lab
The following lab can be used as a traditional lab or set up purely as an inquiry lab. The focus of it will depend on the focus of your unit of study. Depending on the level and background of the student, you can present this as a problem about how to help people with Lactose Intolerance. In an inquiry application it would be up to the student to develop a way to test for the presence of lactose in various dairy products. They may also suggest a possible solution to their problem. Again how much information you give them at the onset will depend on the student’s background. I used it as an inquiry following a unit on enzymes. A sample procedure is provided with the lab.

Objective:
Test different dairy products for the presence of lactose.

Before the Activity:
Discussion
1. What is lactose? (Lactose is a double sugar made up of a glucose and a galactose molecule.)
2. What is lactose intolerance?
3. What is an enzyme?
4. How does the lactase enzyme work?
5. Why do some dairy products contain lactose and others don’t?

Materials needed
1. Lactose intolerance information sheets
2. A variety of liquid dairy products
3. Diastix™ brand glucose test strips
4. 3 Lactaid™ enzyme tablets
5. Thermometer
6. Distilled water
7. Warm water bath at 37°C

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Sample Procedure

1. Choose which dairy products you wish to test for lactose.
2. Since you are looking for a rise in glucose levels, it may be best to dilute your sample with distilled water. This may take some trial and error to get the dilution correct.
3. Place all your samples in labeled beakers.
4. Place the beakers in the warm water bath until they reach 37°C.
5. Separately crush 3 Lactaid™ enzyme tablets and set aside for later.
6. Remove 3 Diastix™ glucose indicators and, following the directions for testing, test each beaker for the presence of glucose.
7. Record glucose values in the table below.
8. Add one crushed Lactaid™ enzyme tablet to each beaker, stir and wait 2 minutes.
9. Retest all beakers and record levels in the chart below.

<table>
<thead>
<tr>
<th>Dairy product</th>
<th>Before enzyme Glucose in mg/dl</th>
<th>After enzyme Glucose in mg/dl</th>
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Discussion

Review the results of your testing. Which products contained lactose and which did not? Did any of these results surprise you? What suggestion would you give someone who is lactose intolerant for eating dairy?

Activity designed and tested by Dennis Delena, biology teacher Williamstown, VT.
Now that students understand the value of dairy nutrition for their bones, try making some of these recipes to taste in class as you discuss all the ways we can link calcium to health. Remember, always wash your hands before working with food.

Making Yogurt

**Ingredients:**
- Time: 20 minutes (prep) 6-8 hours (total)
- 1 quart of milk – whole or skim made from non-fat dry milk
  (add 1/3 cup dry milk for more creamy yogurt)
- 1 tablespoon of plain nonpasteurized yogurt (starter)
- mixing bowl

**Directions:**
1. Bring milk to boil.
2. Cool milk to luke warm temperature.
3. Add starter, stir well.
4. Pour milk into serving containers.
5. Incubate for 6-8 hours.

During this period, bacteria will multiply, ingest the milk sugar (lactose), and thicken the milk turning the mixture into yogurt. Refrigerate, add fruit or other flavorings, and enjoy.

**Discussion:**
Yogurt is very high in calcium. Compare the difference in calcium content between one cup of yogurt and one cup of another dairy product (example: one cup low-fat plain yogurt contains 415 mg of calcium, the same amount of low-fat milk contains 297 mg).

**Video**
Watch the “Story of Cabot” on website cabotcheese.coop/nutrition-activities
Making Cottage Cheese

Ingredients:
1 gallon 2% milk
1/2 cup vinegar
1 teaspoon salt

Directions:
1. Heat the milk to 190°F. If you do not have a thermometer, you can turn off the heat just before the milk boils.
2. Add the vinegar and allow the mixture to cool.
3. When cool, pour the mixture (which now consists of curds and whey, as in Miss Muffet food) into a colander and drain off the whey.
4. Pour the curds into a bowl, add salt, and mix well. You may wish to use less salt or more; it is simply a matter of taste. (You can also add a little cream for a silky texture.)

Discussion:
What you have just made is really cheese, but you have short-circuited the process in several ways. The vinegar provides the acid that causes the milk to curdle and produces the acid flavor. The traditional method of producing the acid is to use a culture of acid-producing bacteria, which is more complicated and takes longer. But, as the bacteria is alive, the cheese will continue to improve in flavor with age. Which is not relevant in a cheese you’re going to eat right away.

We have made small curd cottage cheese, because we left out another ingredient called rennet which is an enzyme that produces a harder curd. Rennet was originally made from calf stomachs but is now synthesized and available in liquid or tablet form.

Because both the bacteria and rennet can be destroyed by temperature, the traditional process requires several ripening steps at lower temperatures and a curd-cooking step at a higher temperature. Because vinegar is inactive, we went immediately to the cooking stage and saved a lot of time.

Finally, the difference between soft cheese and hard cheese is that the latter requires pressing the drained curds in a cheese press, drying the pressed cheese, and then aging for several months.

Butter Up!

Ingredients:
1/2 pint whipping or heavy cream
plastic jar or glass jar with lid
salt

Directions:
1. Place 1/2 pint of whipping or heavy cream at room temperature in a plastic or glass jar with a lid (1/2 pint of cream will make about 1/4 pounds of butter).
2. Shake the jar in a figure 8 motion for five to ten minutes. Let everyone get a chance to shake it.
3. When a lump of butter forms, pour the contents of the jar into a colander to separate the butter from the buttermilk.
4. Eat the butter on bread or crackers. Taste the buttermilk. A pinch of salt can be added to butter.
5. Refrigerate leftovers.

Discussion:
Why is the butter not yellow in color?
Experiment making butter from cream at different temperatures – what was chilled vs. what is room temperature.
How is butter different from margarine?
Why is butter important to your health?
Before You Begin – Explore and Examine
What snacks do you like to eat at home? Make a list of them. Discuss why they are your favorite snacks. Do you like to experiment with making snacks, such as peanut butter and bananas? Is it a snack your friends would like to try?

Nutrition Discussion
What are the ingredients in these snacks? Make a list of them. Refer to choosemyplate.gov. Which food groups are the ingredients from? Observe and discuss (for example, how many ingredients have grains, dairy, meat, fruit, etc.).

3-Star Snacks
Healthy snacks can earn stars for meeting certain criteria. To help increase awareness about the importance of nutritious ingredients for snacks, rate some of the snacks you have talked about using the following criteria.

The Best Snack is a 3-Star Snack
⭐ The snack provides at least one choice from two or more different foods groups.
⭐ It has only one item containing fats, oils, or sweets.
⭐ It includes high-fiber foods (whole-grain, cereals, fruits, nuts, or veggies).
Can you think of other stars a healthy snack could earn? (Is it low-fat? Natural or processed?) Snacks can include drinks. Remember, soft drinks provide kids with lots of calories but no nutrients, while milk has nine essential vitamins and minerals.

Creating a Persuasive Message
Bring food advertisements to school. Provide magazines to cut ads from and any visuals that demonstrate how certain snacks are marketed to the consumer. Is there a favorite food commercial you remember from television or radio? List some of the reasons a particular ad or commercial made you want to purchase that product or food.

Appeal to the Consumer
Advertisements can influence whether or not people choose to buy certain clothing, appliances, cars, or food. Several advertising techniques are used to influence peoples’ buying behavior and to “sell” products. Advertising techniques are used to design ads to appeal to people in some of the following ways:
⭐ Appeal to health and happiness.
⭐ Appeal to your senses (tastes good, looks good, smells good, or feels good).
⭐ Appeal to your wallet (saves you money).
• Appeals to many (everybody loves it and wants it).
• Testimonial (a famous person says s/he likes it).
• Comparison (it is the better choice).

Can you name other ways? Create a list of things that you think an advertisement must have to be effective. Is it the color of the ad? The message? You can brainstorm this list by assessing one of the ads you cut out or brought from home.

Doing the Activity—Tying it All Together

The purpose of this activity is to share a recipe for a quick-n’-healthy snack and to create an advertisement that tricks or treats others into trying your delicious creation.

1. Divide class into small groups or let students work individually.
2. Choose a favorite snack to advertise. Remember your 3-Star criteria.
3. Students brainstorm a catchy name for their snack.
4. Students create their message. Draw an ad for a newspaper or magazine or write a script for a radio or TV station. Remember points about appeal.
5. Schedule a time for students to present their ideas to the class.
6. Choose a team of judges to review everyone’s advertisement copy. Judging form is provided.
7. Make the snacks and present advertisements to the class.
8. Have a Quick-n’-Healthy Snack Party. Share nutrition facts about the snacks if not part of advertisement.

Process and Assessment Questions

• Did you taste the snack?
• Was the snack you tasted a trick or a treat? In other words, did the advertisement fool you into thinking the snack tasted a lot better than it did or did it treat you to everything it promised?
• What were some of the ways you persuaded others to try your snack?
• Which ones worked and why?
• Which ones didn’t?
• Will you try any of these snacks at home?

Extended Activity Ideas

Research the ingredients of your snack and supply Nutrition Facts label with presentation (use blank Nutrition Fact label on Handout on website).

Interview a marketing or advertising representative with the class before you create the advertisements. Ask for tips on the most persuasive techniques.

Adapted from Community Nutrition Action Kit, Team Nutrition, USDA.
Co-operatives are groups of people working together to get something done. Also known as co-ops, they are businesses democratically owned and governed by their members; co-ops exist solely to serve the interest of their members. Co-ops are based on the values of self-help, self-responsibility, democracy, equality, equity, and solidarity. In other words, co-ops believe that individuals have the power to make things happen by working together and sharing the results of our efforts. Community is also key as co-ops support the communities in which members live and work.

So if you’ve ever been part of a group that held a bake sale, for example, you have an idea of what a co-operative is. After all, you and your friends got together, met new people, and ran a business. You also made some money! The money then went to benefit your group—maybe new band uniforms, a trip to camp, or a massive pizza party (extra cheese does not come cheap).

To organize the bake sale, you all decided beforehand where to hold it, how much to charge, and what type of produce to sell. And things went well—your group made money and your neighbors got nice, healthy snacks.

**Bold words are listed in glossary of vocabulary words in the resource section on website.**

**Co-operative Principles**

Co-ops are guided by the Rochdale Principles by which co-ops put their values into practice. These include:

1st Principle: Co-ops have voluntary and open membership.
2nd Principle: Co-ops are democratically member controlled.
3rd Principle: Members contribute equitably and control the co-op’s finances democratically.
4th Principle: Co-ops are autonomous and Independent.
5th Principle: Co-ops provide education, training, and information to their members.
6th Principle: Co-ops work together and help support other co-ops.
7th Principle: Co-ops support community.

**Different Types of Co-operatives**

User-owner: Those who own and finance the co-operative get to use it.
User-control: Those who use the co-operative get to control it, too.
User-benefit: Those who belong get benefits based on how much they use the co-operative.

**What Can Co-ops Do?**

Depending on the needs of their members, co-ops can do any number of things. The following examples offer some ways in which co-ops work:
They can market members’ products to others.
Marketing means to distribute, or sell products. For example, a dairy co-operative takes raw milk from a farmer who is a member. It then pasteurizes the milk, puts it into jugs or cartons, and arranges to sell it. It also uses advertising to convince people to buy the milk, with slogans like “drink milk or your bones will fall apart.” Some specialty co-operatives just process the foods; they turn it over to another business to sell and advertise the product.

They can purchase supplies and goods and sell them at a reduced price to members.
Here’s an example. Let’s say you belonged to a DVD co-operative. You could get DVDs at a reduced rate. Plus, you’d also get money back at the end of the year, depending on how much music you bought. Cool!

They can provide needed services.
Okay, let’s try this example. Your mom wants her lawn mowed, but you bolt before she can get you to do it. So she joins a co-operative business that specializes in lawns and gardens. The co-op mows her lawn for a fee. She pays for it from your allowance account. Bummer for you, a deal for the co-op.

Start your own co-op!
Here are some steps to get you moving...
• Hold a meeting with others who are also thinking about forming a co-operative. Be sure to include a couple of adult mentors who can provide guidance as you start to grow.
• Form some smaller committees to get work done.
• Figure out the areas and markets where your products/services might be sold.
• Write a business plan. You can learn about them on the Internet, or have an adult who works at a bank help you.
To have a strong co-operative, you need strong leadership. You have to analyze markets and make decisions.
Learn about Cabot Creamery Co-operative by viewing the video titled: “The Story of Cabot” on cabotcheese.coop/nutrition-activities.

Cabot’s Co-operative Heritage
Cabot Creamery is a 1,100 farm family dairy co-operative with members in New England and upstate New York. We value our roots as a co-operative – and as a way of doing business.

So what does being a co-op mean? And why are we different?
Being a co-op, we are owned and operated by our members, which for Cabot are our farmers and their families.
As a co-operative, we emulate the Rochdale Co-operative Principles. We value community, quality, democracy, and local ownership. Our owners serve on school boards and select boards. They are volunteer firefighters, planning commission members, and Green-Up Day participants. As Vermont is a small, intimate state, owners are also involved in making a difference at the state level, promoting our “working landscapes,” revitalizing our downtown economies, and protecting our environmental resources that make Vermont, Vermont.
This is who we are and these are our strengths. Through our principles and actions, we support the places where we live and do business. This is what makes us different.

So why does this matter?
Because as a co-op, Cabot doesn’t work alone. We have co-operative partners throughout the country with whom we share these principles and values; co-operatives who also believe that the work they do is making a difference both in their communities and in this world.

Facts
• There are almost 50,000 co-operatives in the United States.
• About two of every five Americans use co-operatives.
• Members use the co-operative, too, which helps it grow strong.
• Credit co-operatives today make up half of all types of U.S. co-operatives.
• Over 300,000 Vermonters belong to co-ops, including food, electric, housing, agricultural, and credit unions.
• Vermont is home to the only co-op downhill ski area, Mad River Glen.

Did you know?
Cabot uses a triple bottom line (social, economic, environmental) approach to sustainability management based on creating/maintaining vital capitals to create human well-being. To our dairy farmers, sustainability means: Living within our means and ensuring the means to live. This supports the 7th Co-operative Principle: Co-ops support community because it ensures resources for future generations in the communities where Cabot lives and works. Find out more about Cabot’s Sustainability activities at cabotcheese.coop/sustain.
FREE! No Royalties for Drama Clubs & Groups

Updated Shakespeare, Fun, Limitless Casting Options!

Download scripts, artwork, program templates and tickets for these two proven hit shows that are stage-tested and teen-approved:

**Big Whoop About Zip**
(Much Ado About Nothing) for HIGH SCHOOL

**Midsummer City**
(Midsummer Night’s Dream) for MIDDLE SCHOOL

Feature Cabot as one of your sponsors and we’ll send “the world's best cheddar” cheese to help celebrate at your after-opening party!

www.cabotcheese.coop/free-books-and-plays

Growing Health & Wealth

This program encourages grandparents and parents to help their young ones understand the importance of healthy choices and money.

The Growing Health and Wealth Activity Kit was created for families of 6-10 year olds. Key themes include building STRONG BONES and bodies through exercise, dairy calcium and food along with building STRONG VALUES about money through ways to save, spend and share it.

www.cabotcheese.coop/growing-health-and-wealth-kit

Patch Booklets

The 3 Every Day Calcium Challenge Patch program encourages girls and boys to learn about the importance of calcium in a healthy diet.

The Co-op's for Community Patch program inspires girls and boys to learn more about the value of cooperatives as a better business model, builds leadership skills and supports community connections.

www.cabotcheese.coop/community-scout-patch-program

Healthy Fundraiser

Fundraising that makes a real difference. Every purchase of Cabot cheese for your fund-raising project supports two vital causes - your non-profit organization and our dairy farm families who own Cabot. Together we help each other. That’s called “win-win” - and we want to help you win big at your next fund-raiser.

www.cabotcheese.coop/healthy-fundraising

See More Activities at cabotcheese.coop/youthful-matters