

National Health Education Standard

STANDARD 1*

Students will comprehend concepts that enhance personal, family, and community health.

Learning Objectives

After completing this lesson, students will be able to meet the following objectives:

- **Explain** the importance of calcium for health.
- **Name** the quantities of calcium in various foods.
- **Identify** combinations of food that will provide the recommended daily amount of calcium.
- **Recognize** poor substitutes for foods that provide calcium.

Activity Overview

This activity will provide the following learning opportunities:

- Create discussion and raise awareness about young peoples' calcium needs for tweens (ages 9–12) and teens—namely that tweens and teens need more calcium than adults (1,300 milligrams per day for tweens and teens versus 1,000 milligrams per day for adults).
- Help students recognize good sources of calcium.
- Demonstrate the importance of making good food choices. Students will experience how their calcium intake can be negatively affected when their diet contains too many substitutes for foods that provide calcium.
- Reinforce basic math concepts and strategic thinking skills.

This activity has two parts:

- Classroom activity
- Classroom discussion

This activity is geared toward youth ages 11 to 13.

Planning Considerations

If you are concerned that using dice would encourage gambling behavior, consider substituting extra-large stuffed toy dice for regular dice. Also, children with special needs may find numbered dice easier to comprehend than regular dice.

*Joint Commission on National Health Standards. (2007). *National Health Education Standards*, (2nd ed.). New York. McGraw-Hill.

Materials

- *Calcium Collector Food List* (provided)
- *Calcium Collector Score Card* (provided)
- *Calcium Collector Player Instruction Sheet* (provided)
- One pair of dice for every pair of students
- Pencils
- Scratch paper or calculators
- Optional: *Milk Matters Calcium Fact Sheet* and *Milk Matters Glossary of Terms* (found at <http://www.nichd.nih.gov/milk/teachers>)

Lesson Duration

- 45 minutes

Teacher Preparation Time

- 30 minutes

Teacher Preparation Activities

- Obtain pairs of dice—purchase or borrow (one pair of dice for every pair of students).
- Make enough copies of the handouts so that every pair of students has one set.

Task 1: Classroom Activity (Calcium Lesson)

Activity Steps:

1. **Ask** students if they know what calcium is and why it is important. (Refer to the *Milk Matters Calcium Fact Sheet* if you need additional background information about calcium and bone health to prepare this lesson. This fact sheet is available at <http://www.nichd.nih.gov/milk/teachers>).
2. **Listen** to their responses. If necessary, guide them to the following responses:
 - Calcium is necessary for building strong bones.
 - Bones grow fastest during the tween and teen years.
 - Tweens and teens ages 9 to 18 need the most calcium—1,300 milligrams (mg) of calcium every day—of all age groups.
 - If you don't get enough calcium during these years, you can't make up for it later. Once teens finish their growth spurts around age 17, 90% of their adult bone mass is established.
3. **Ask** students to name foods that are high in calcium.
4. **Listen** to their responses. If necessary, **guide** them to the following responses:
 - Many foods contain calcium. But low-fat and fat-free milk products—milk, yogurt, and cheese—are particularly excellent sources because they are high in calcium. Most milk is fortified with vitamin D, and

some milk products, such as yogurts, also have vitamin D (which helps the body absorb calcium). Because some milk products are also high in fat, it's important to choose low-fat or fat-free versions of these products.

- Milk products aren't the only sources of calcium. Because some people have trouble digesting milk products, and others choose not to consume them, some food companies are adding calcium to foods that don't naturally have it. You can now buy calcium-fortified soy beverages, orange juice, and breakfast cereals. These products may serve as calcium sources for people who don't eat or can't digest milk products.
- Another way to get calcium is by eating non-dairy foods that naturally have smaller amounts of calcium than milk products. For example, dark green leafy vegetables (such as broccoli, bok choy, kale, turnip greens, and collard greens), cooked dried beans (such as white beans, soybeans, and garbanzo beans), almonds, figs, and canned salmon with bones contain calcium. Some vegetables that contain calcium, such as spinach, have lower bioavailability, which means the calcium in them is poorly absorbed by the body. So, you would need to eat more of these foods to ensure your body gets enough calcium.

Task 2: Classroom Activity (Game)

Activity Steps (For Teachers):

1. **Divide** students into pairs for this game. It is possible for a group of three to play the game if the class contains an odd number of students. If a group of three students is playing, then each student in the group plays against the student to his or her left.
2. **Distribute** one pair of dice, one food list, one scorecard, and one player instruction sheet to each group of students and, if necessary, pencils, scratch paper, or calculators.
3. **Explain** the object of the game and how to play.

Object of the Game:

Be the first student to collect 1,300 calcium points (mg of calcium).

How to Play:

- To begin, each player rolls one die—the student who rolls the higher number goes first.
- Player 1 rolls the dice.
- Using the lower of the two numbers rolled, Player 1 looks at the category of foods that matches the number.
 - Player 1 should select a food from the list and add the calcium points to his/her scorecard.
- **Suggestions:**
 - As you are explaining the game, show the students the side of the die that corresponds to each category number in the food list. For example, point to Category 1 and show a die with a 1.
 - Scratch foods off the food list:
 - No matter what number is rolled, make sure to scratch a selected food off of the list after a player has added its points so that another player cannot use it later.

If a player rolls doubles, choose one of these options:

- The player can select an item from the food list and add calcium points as determined by the number rolled; then the player rolls again.
- The player can select an item from Category 5 or 6 and add its calcium points to his or her score; the player does not roll again.

Task 3: Classroom Discussion

Discussion Questions:

1. What foods from the list are higher in calcium than others? Which ones were you surprised about?
2. Are the foods on the higher lists more “valuable” to eat, just as they are valuable in the game? Why or why not?

Assessment

Here are some ideas for testing students’ achievement of the learning objectives. More ideas are available at [URL to a full list on MM Web page for teachers]:

- Instruct students to create posters showing meals that have high calcium content or advertisements to their peers that “sell” snacks that provide calcium.
- Give students a take-home assignment in which they create breakfast, lunch, and dinner menus for two days that provide 1,300 milligrams of calcium for each day.
- Consider a true/false or multiple-choice quiz to test students’ knowledge about which foods are good sources of calcium and which are not. Conduct the quiz orally and reward correct answers with snacks that provide calcium, such as low-fat or fat-free chocolate milk or low-fat or fat-free fruit yogurt.

Resources

More information about calcium and bone health can be found in *Milk Matters: For Strong Bones...For Lifelong Health*.

You can read this booklet or order free copies at <http://www.nichd.nih.gov/publications/pubskey.cfm?from=milk> or by calling 1-800-370-2943.

Food List

Category 6	Calcium Points (Milligrams of Calcium)
Canned sardines with bones (3 oz.)	325
Cheese pizza (1 slice)	182
Fruit yogurt, low-fat (1 cup)	345
Milk, fat-free (1 cup)	306
Milk, 1% low-fat (1 cup)	290
Orange juice with added calcium (1 cup)	351
Plain yogurt, fat-free (1 cup)	452
Ricotta cheese, part skim (1/2 cup)	335
Sesame seeds, whole, toasted, and roasted (1 oz.)	280

Category 5	Calcium Points (Milligrams of Calcium)
American cheese, low-fat and fat-free (2 oz., about 3 slices)	323
Cheddar cheese, low-fat and fat-free (1 1/2 oz.)	307
Cottage cheese, low-fat (1/2 cup)	69
Milk, fat-free (1 cup)	306
Milk, 1% low-fat (1 cup)	290
Soy beverage with added calcium (1 cup)	368
Soybeans, cooked (1 cup)	130
Swiss cheese, low-fat and fat-free (1 1/2 oz.)	336

Category 4	Calcium Points (Milligrams of Calcium)
Baked beans (1 cup)	154
Blackstrap molasses (1 Tbsp.)	172
Bok choy, boiled (1 cup)	158
Broccoli, raw (1 cup, chopped)	43
Collard greens, frozen, boiled (1/2 cup)	179
English muffin, whole wheat (1 muffin)	175
Frozen yogurt, soft-serve vanilla (1/2 cup)	103
Macaroni and cheese (1 cup)	92
Salmon, canned with bones (3 oz.)	181
Spinach, cooked from frozen (1/2 cup)*	146
Tofu, firm, with added calcium sulfate (1/2 cup)	253
Tomato soup prepared with fat-free milk (1 cup)	159
Turnip greens, frozen, boiled (1/2 cup)	125

Category 3	Calcium Points (Milligrams of Calcium)
Almonds (1 oz., approx 23 nuts)	70
Black beans, boiled (1 cup)	46
Broccoli, cooked (1 cup, chopped)	62
Orange (1 medium)	70
Parmesan cheese, grated (1 Tbsp.)	55
Red kidney beans, boiled (1 cup)	50
Sardines (2 sardines)	92
Swiss chard, boiled (1/2 cup)*	51
Tortilla, corn (6")	42
Tortilla, flour (7")	58

Food List (continued)

Category 2	Calcium Points (Milligrams of Calcium)
Cheese puffs (3 oz.)	48
Cupcake, chocolate, with frosting, low-fat (1 cupcake)	15
Fruit punch juice drink, from frozen concentrate (8 oz.)	17
Potato chips (3 oz.)	7

Category 1	Calcium Points (Milligrams of Calcium)
Chocolate bar (Mr. Goodbar™) (1 bar)	54
Chocolate chip cookies made from refrigerated dough (2 cookies)	6
Glazed doughnut (yeast) (1 doughnut)	0
Microwave popcorn with butter (1 cup)	11
Soda (Bottled carbonated beverage with caffeine, 16 oz.)	10

*Calcium from these foods may not be absorbed as well as from some other greens.

Player Instruction Sheet

Object of the Game

Be the first to collect 1,300 calcium points (milligrams of calcium).

How to Play

- To begin, each student rolls one die—the student who rolls the higher number goes first.
- Player 1 rolls the dice.
- Using the lower of the two numbers rolled, Player 1 looks at the category of foods that matches the number.
 - Player 1 should select a food from that category and add the calcium points to his or her scorecard.
- Player 2 rolls the dice and repeats the process.

Special Instructions

- Scratch foods off the food list:
No matter what number is rolled, make sure to scratch a selected food off of the list after a player has added its points so that another player cannot use it later.
- If a player rolls doubles, choose one of these options:
 - The player can select an item from the food list and add calcium points as determined by the number rolled; then the player rolls again.
 - The player can select an item from Category 5 or 6 and add its calcium points to his or her score; the player does not roll again.