

# B.O.N.E.S.

## WIN Kids Curriculum for 5<sup>th</sup> and 6<sup>th</sup> grade

Designed for classrooms, community youth groups, and other educational settings



### Lesson Objectives

- Understand calcium's role in bone health, particularly for growth.
- Investigate low-fat sources of calcium, such as calcium-rich beverages.
- Evaluate different types of milk.



### Wellness IN (WIN) the Rockies Principles

- Follow MyPyramid.
- Take pleasure in eating.



### Health Standards

#### Content Area - Nutrition and Dietary Behavior

National Health Standards 1 (concepts), 6 (decision-making) and 7 (advocacy)

Wyoming Health Content and Performance Standards 1, 6 and 7

Montana Health Enhancement Content Standards 1 and 5

Idaho Grade 5 Health Performance Standards 941 and 942

Idaho Grade 6 Health Performance Standards 951 and 952

Note: Suggested standards can be met depending upon lesson components selected and assessed. Potential assessment tools are designated with a ✓.



### Approximate Length

- Two class sessions, 30 minutes each
  - First Session: Overview and How Much Calcium
  - Second Session: Milk Challenge and Label Line Up



### Materials and Preparation

Handouts (1 per student):

The Milk Challenge: Evaluation Form

WIN the Home: Create a WINNING Smoothie

8 beverage label cards (cut apart)

Directions for activity listed in Overview #3 (prepare ahead)

10 pounds of white flour

Measuring cups

Clear plastic re-sealable bags (gallon, quart and sandwich sizes)

Miniature marshmallows, white packing peanuts, or white beads

Plastic bag with 130 marshmallows (or packing peanuts or beads) labeled "Daily calcium needed - 1,300 milligrams."

18 food picture cards (cut apart), rubber food models, and/or sample foods & containers

Milk in solid/opaque pitchers, labeled with symbols for the Milk Challenge (be aware of possible food allergies or lactose intolerance)

Small plastic cups (white, 3-ounce size)





## Background for Educator

What are boys and girls drinking these days? Surveys indicate they are drinking less milk and more soft drinks.

- \* in 1996, compared to 1977, 6 to 11 year old boys drank 24% less milk and girls drank 32% less milk
- \* from 1989 to 1995, children 2 to 17 increased soft drink intake about 40%

Since approximately 97% of maximum bone density is reached by age 18, children and adolescents need to get plenty calcium and vitamin D during their bone-building years. Kids ages 9 to 18 years need 1,300 milligrams of calcium per day which is equivalent to about four servings from the dairy food group. Calcium not only builds bones and teeth; it also aids in nerve function, muscle contraction and blood clotting.

A cup of milk provides about 300 milligrams of calcium and a cup of yogurt supplies 300 to 400 milligrams of calcium. Cheeses vary, with most having 100 to 200 milligrams of calcium per ounce. Calcium-rich dairy products also supply protein, riboflavin, magnesium, potassium, and vitamins A, D, and B12.

Calcium is also found in smaller concentrations in roasted soybeans, canned salmon or sardines with bones, baked beans, cooked greens (turnip, spinach, mustard, dandelion), and almonds. However, some plant sources contain oxalates and other substances that bind calcium and reduce the amount available for absorption.

When too little calcium is available from the diet, the body takes what it needs from the only source available – bones. This weakens bones and increases the risk for osteoporosis later in life. Osteoporosis is a bone-thinning disease that leads to more than 1.5 million bone fractures per year. While 80% of osteoporosis sufferers are women, over 2 million men struggle with it as well. In addition to calcium, bone health is enhanced by routine, weight-bearing exercise such as walking, jogging, dancing and weight lifting.

The **1% or Less Campaign** aims to reduce saturated fat consumption and heart-disease risk by encouraging adults and children over the age of two years to switch from whole or 2% (reduced fat) milk to 1% (lowfat) or skim (nonfat) milk. While all milks are good sources of calcium and vitamin D, whole and 2% milk also provide saturated fat. Two out of three children who drink milk in school lunch choose whole or 2%. Promoting 1% and skim milk in schools can help reduce children's saturated-fat intake and encourage life-long healthy eating habits.

The American Dietetic Association, American Academy of Pediatrics, American Medical Association and a National Institutes of Health expert panel recommend calcium-rich foods as the preferred sources of calcium. Food is recommended over supplements because food tastes better, people can easily forget to take a pill, and food supplies many nutrients in addition to calcium. When supplementation seems necessary, consult a physician and select one that meets U.S.P. (United States Pharmacopeia) standards to ensure it is easily absorbed and to guarantee its purity.



# Lesson Script: Session One

## Bone Health and Calcium Overview

1. (*On the board write B O N E S vertically with space to the right of each letter.*) What do you know about bones? (*Let students share what they already know.*) Today we are going to learn more about bones and about calcium, a mineral in bones. Find a partner and stand together.

2. (*With each letter, ask students to make the letter with their partner using their bodies. Then discuss each point. Write the phrases or key words on the board.*)

**B** - Build bones and teeth with plenty of calcium, a mineral found in food.

**O** - Osteoporosis is a disease also known as “porous bones” where bones become weak; calcium can help prevent this disease.

**N** - Needed daily, calcium also assists in nerve function, muscle contraction and blood clotting.

**E** - Enjoy weight-bearing activities such as, walking, jogging, or dancing to strengthen bones. Weight-bearing activities are where your body works against gravity. Let’s try a couple:

\* jog in place for 1 minute

\* hold a book in your hands, put your hands above your head and lift the book 15 times

**S** - Strong bones and teeth need calcium, even when you are a grown adult.

3. (*Divide into five teams. Distribute supplies and directions for each team to make one of the items below.*) Following your team’s directions, measure flour and place into a sealable plastic bag. Double-bag in case one breaks. Label the bag with the stage of life information.

1/4 cup flour = calcium in an average newborn’s skeleton

3 ½ cups flour = calcium in an average ten year old child’s skeleton

7 cups flour = calcium in an average fifteen year old teenager’s skeleton

11 cups flour = calcium in an average adult’s skeleton

6 ½ cups flour = calcium in an average adult woman’s skeleton with detectable osteoporosis (30 to 40% bone loss)

4. The flour represents a rough estimate of the amount of calcium in bones, by weight, in the body at different life stages. Share your information with the rest of the class. ✓  
(*Discussion.*)

## How Much Calcium is in There?

1. Calcium is important for bone health. Kids your age need 1,300 milligrams of calcium on an average day. But what does that mean? How do you get this much calcium?

2. (*Hold up bag with 130 mini-marshmallows or packing peanuts or beads. The packing peanuts or beads eliminate confusion about marshmallows containing calcium*) In this bag there are 130 marshmallows. Marshmallows do not contain calcium; we are just using them to visually represent calcium. If each marshmallow represents 10 milligrams of calcium, this bag shows 1,300 milligrams of calcium.

3. As teams, make bags to show the calcium content in some common food items. ✓  
*(Divide supplies and foods among groups. Use the picture cards, rubber food models, or actual food labels.)* Each marshmallow represents 10 milligrams of calcium. Place the appropriate number of marshmallows in sandwich-sized bags to represent milligrams of calcium in the food. Label the bag with the number of marshmallows, milligrams of calcium and a letter. *(Assign letters to food items for matching game.)*

<b>Food item</b>	<b>Common Serving</b>	<b>Milligrams of Calcium*</b>
yogurt	8 ounces or 1 cup	300 mg
milk, 1% or lowfat	8 ounces or 1 cup	300 mg
hard cheeses such as Cheddar, Colby or mozzarella	1 ounce cube or slice	190 mg
American cheese	1 ounce cube or slice	160 mg
canned sardines with bones	1 ounce	110 mg
vanilla ice cream	½ cup	95 mg
milk chocolate candy bar	1 ½ ounces	85 mg
cottage cheese	½ cup	70 mg
macaroni and cheese	½ cup	60 mg
baked beans	1/3 cup	50 mg
orange	1 medium	50 mg
spinach leaves, fresh	1 cup	30 mg
bread	1 ounce slice	30 mg
broccoli, fresh	½ cup	20 mg
baked potato	½ of a potato	20 mg
cauliflower, cooked and drained	½ cup	15 mg
soda, cola-type	12 ounces	10 mg
cream cheese	1 tablespoon	10 mg

\* These amounts are rounded and represent averages from the USDA Nutrient Database. When available, you can use the food label. If milligrams are not listed, determine calcium from the label by adding a zero to the percent daily value. A food that provides 8 percent of the daily value for calcium would have 80 milligrams of calcium. This trick works only for calcium since the daily value is based on 1000 milligrams.

4. Once complete, place all the bags and food items together. Let's play a matching game. Can you pair the food item to the bag of marshmallows? *(Discussion.)* What foods contain more or less calcium than you thought?



# Lesson Script: Session Two

## Milk Challenge

1. Enjoyment of food is influenced by all our senses – sight, sound, touch, smell and taste. Today we are going to have a taste test with different types of milk. Do you think you can tell different milks apart?

2. (*Select at least 3 products you want to use. Keep milk ice-cold in solid, opaque containers, like pitchers, labeled with symbols to match the **Milk Challenge Evaluation Form**. Assign kids with allergies or dislikes to be helpers.*) We are going to sample the following:

- \* skim or nonfat milk
- \* 1% or lowfat milk
- \* 2% or reduced fat milk
- \* whole milk
- \* chocolate 1% milk
- \* chocolate whole milk

3. (*Distribute the **Milk Challenge Evaluation Form** and cups.*) Label each cup with one of the symbols from each of the pitchers. You need one cup per pitcher and an extra cup for water to drink between tasting. Pour a small amount of each milk into the corresponding cup. (*As an alternative, students can do this blindfolded with a partner.*)

4. Start with one of the milks. Follow these steps:

- \* Look at the appearance and note what you see (milky, white)
- \* Smell the milk and note what you smell (sweet, creamy)
- \* Put some milk in your mouth and note what it feels like (thick, silky, smooth)
- \* Swallow the milk and note what you tasted (sweet, chocolatey)
- \* Take a guess at what type of milk you just evaluated

5. Repeat this process with each sample. Use water to rinse your mouth between samples.

6. Once complete, let's see how you did. (*Review with students' observations and guesses.*) How many in our class guessed them all right? In the bottom row of your handout, record any comments you have about this experience. ✓

7. This activity helps us learn how to evaluate different food items. We use more than just our tongue to enjoy foods and beverages. It also shows us that many people cannot tell different types of milk apart. (*Share the percentage in your class that could not tell the milks apart.*) All types of milk, from nonfat to whole, contain important nutrients for our bodies. However, whole and 2% or reduced fat milk contain more calories and saturated fat. Adults and children over the age of two years are encouraged to switch from whole or 2% milk to lowfat 1% or nonfat (skim) milk.

## Label Line Up

1. You can use food labels to compare nutritional information about different foods. (*Divide into eight teams. Distribute **Beverage Labels**, one per team.*) Each of these labels is from a common beverage and each shows an 8-ounce serving.

2. Each team is a unit and must move and stay together. Without speaking, line yourselves up in order from most to least amount of calcium. (*Allow time to complete.*)

3. As a team, try and guess what beverage label you are holding. Share with the class.

A = skim or nonfat milk

B = 1% or lowfat milk

C = 2% or reduced fat milk

D = whole milk

E = 2% chocolate milk

F = cola-type soft drink

G = diet cola-type soft drink

H = sports drink

4. Without speaking, line yourselves up in order from most to least amount of sugar. Share with the class. Line up again from most to least amount of fat. Share with the class.

5. Everyone sit on the floor. Based on your label, do the following:

\* If your beverage contains protein and vitamins, **stand**. (*A through E*)

Milk is a nutrient-dense beverage that is a great part of a balanced eating plan.

\* If your beverage contains calories but no protein or vitamins, **stand on one foot**.

(*F and H*) Soft drinks and sports drinks provide calories with few nutrients.

Drinking too much of these can upset your nutritional balance.

\* If your beverage contains 10% sugar, **sit on the floor**. (*F*)

Regular soft drinks contain few nutrients while providing calories and sugar. They usually contain about twice as much sugar as sports drinks.

\* If your beverage contains no calories, protein or vitamins, **lie on the floor**. (*G*)

Diet soft drinks offer little for your body – some fluid, imitation sweeteners and often caffeine. For a refreshing beverage, try water.

➤ LANGUAGE Option: Write a paragraph responding to each question. ✓

What did you learn in this less that surprised you the most?

What is one thing from this lesson that you will tell others?

What are three things you can do to get more calcium every day?



## WIN the Home: Create a WINNING Smoothie

Distribute **Create a WINNING Smoothie**. Make the sample smoothies in class.

Encourage students to experiment at home with smoothies for an after-school snack, with dinner or as a dessert. They can bring their favorite recipes back to class. If supplies are available, a smoothie party could be held to try some of their recipes.

*Please note: pilot testing of lessons has determined that WIN the Home activities are most successful when students have time over a weekend to complete them, when a follow-up is conducted in class, and when students receive credit for completion.*



## WIN the Community: 1% or Less Campaign

➤ **1% or Less School Kit** – This kit includes activities and materials to educate and motivate students to choose lowfat or nonfat milk. Schools can conduct campaigns with one-day to one-week promotions being the most common. To order a kit, contact the following:

Center for Science in the Public Interest  
Suite 300, 1875 Connecticut Ave., NW  
Washington, D.C. 20009-5728  
(202) 332-9110      www.cspi.net



## Additional Ideas

➤ **Soy Milk Alternative** - Some people are not able to drink dairy milk due to allergies or digestion difficulties. An alternative is soy milk. (*Be aware that some people may be allergic to soy.*) Soy milk is a plant-based product made from soybeans. Fortified soy milks have added calcium. If students are interested in learning more, offer taste tests. MATH Option: Conduct nutrient and cost comparisons with soy milk and dairy milk products. ✓

➤ **Smoothie Cookbook** - Collect the smoothie recipes from **WIN the Home** and make a class cookbook. For a fund raiser, make and sell smoothies at a local event plus sell the cookbook!

➤ **Milk Vending Machine** - In locations where there are vending machines with soft drinks, investigate the feasibility of adding a milk vending machine or adding water and milk products in the existing machines. ✓ In youth settings, milk vending options have proven to be popular. Focus on varieties that are lower in fat and sugar.

➤ **Web Sites** - There are several web sites for youth, educators and parents with information and interactive activities related to bone health and calcium. As an educator or as a class you can visit them.

<[www.cdc.gov/powerfulbones](http://www.cdc.gov/powerfulbones)> Interactive web site sponsored by the National Bone Health Campaign. Promotes healthy and strong bones for girls aged 9 to 12 and includes bone health, food selection and links to other sites. Kids section offers games, quizzes and a downloadable calendar.

<[www.nutritionexplorations.org](http://www.nutritionexplorations.org)> Sponsored by the National Dairy Council, this web site includes interactive activities for kids, teacher resources, parent topics, and school food service information. Provides ideas related to milk vending options.



## Sources and Materials

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