



Teacher Guide

Messages for anyone with bones!

A collection of discussions and activities to help students in grades 5-8 build healthy bones through healthy eating and physical activity.

After completing Bone Zone, student will:

- Learn the role of calcium in strong bones and teeth
- List foods that are calcium-rich
- Demonstrate how they can consume adequate amounts of calcium-rich foods for bone health
- Describe how physical activity and good nutrition benefit bones
- Explain why the tween and teen years as the prime bone building years for life.

The activities in BONE ZONE link to the BC Health and Career Education curriculum. Students will use brainstorming, problem solving, critical thinking, organizing, decision making, goal setting, communication, and cooperative learning skills. They will record information they collect from print and media sources, and set personal goals and plans for a healthy lifestyle.

Time: 2 hours

Materials Provided

- Teacher guide
- Three BONE ZONE episodes, 3-5 minutes each (available for order as a DVD [\$15] or free online from http://bcdairyfoundation.ca/resource_catalogue/calcium_teaching_materials)
- Master copies of the following:
 - o BONE ZONE Student Handout
 - o Station instructions
 1. How much calcium is in different foods (including calcium worksheet and calcium-rich foods list)
 2. Invent a jumping game! instructions
 3. Make a calcium-rich snack!
 4. Whiz Quiz (including answer key)
- Optional activities and extensions



Background Information for Teachers

The BONE ZONE episodes and class discussions in this guide provide an opportunity for students to take a more in-depth look at how to build healthy bones through calcium and physical activity. The pre-teen (tween) and teen years are the most critical time for building bone. In fact, most people reach their maximum bone mass before age twenty.

Adequate calcium in the diet is necessary for children and teenagers to build the strongest bones possible. Children and youth aged 9-18 need 1300 mg of calcium every day. The most recent information on what Canadian youth are eating suggests that only 37% of boys and 17% of girls aged 9-13 consume enough calcium in their diet.¹

Another key factor in building strong bones is weight-bearing physical activity. Children and youth aged 5-17 need at least 60 minutes of moderate to vigorous activity every day which should include bone strengthening activities at least 3 times per week such as walking, running, jumping. Findings from the "Health Behaviour in School-aged Children" study suggest that only ~60% of boys and ~50% of girls in grades 6-8 have adequate activity levels.²

In summary, calcium and physical activity are important during the critical bone building years of tweens and teens. However, most Canadian youth do not get enough calcium in their diet or physical activity in their lives. The BONE ZONE episodes and activities will help students learn why calcium and physical activity are important for building strong healthy bones and will provide students with the information and skills they need to get enough calcium in their diet.

1. Calcium intakes (expressed as mg/d) from food sources, by age group and sex, Canada excluding territories, from the Canadian Community Health Survey, 2004.
2. Janssen, Ian. "Healthy Living and Healthy Weight." In *Healthy Settings for Young People in Canada*. W. Boyce, M. King, & J. Roche (Editors). Ottawa, Ontario: The Public Health Agency of Canada, 2008.



Getting Ready

1. Review the Teacher Guide and student handout.
2. Make necessary photocopies
 - o Instructions for each activity station
 - o Class set of:
 - BONE ZONE student handout
 - Calcium Worksheet
 - Whiz Quiz
3. Set up TV with DVD player OR a computer/speakers with DVD player and projector OR computer/speakers with Internet access and projector
4. Set up Activity Stations

Here is a list of what you need for each of the following stations.

How much calcium is in different foods?

- o Desk/table work space
- o Station instructions
- o Calcium-Rich Foods List
- o Calcium worksheet for each student
- o Optional props (1 cup and ¼ cup size measuring cups, 8 fl.oz. glass, empty 175 mL yogurt container, 1 teaspoon and 1 Tablespoon measuring spoons)

Invent a jumping game!

- o Space for jumping (outside, hallway)
- o Station instructions



Getting Ready (Continued)

Make a calcium-rich snack!

- o Desk/ table work space
- o Station instructions
- o Ingredients and materials for making a calcium-rich snack
 - Access to running water and electricity
 - Dish soap, dish cloths and towels
 - Blender(s)
 - Dry measuring utensils (½ cup, 1 cup, teaspoon) and liquid measuring cup (1 cup)
 - Small cups (one per student)
 - Spoons (one per student)
 - Spatula(s)
 - Milk
 - Yogurt or buttermilk
 - Sugar or honey (optional)
 - Fresh or frozen fruit

Whiz Quiz

- o Desk/ table work space
- o Station instructions
- o Whiz Quiz copy for each student



Procedures

1. Introduce BONE ZONE (~ 5 minutes)

Introduce BONE ZONE as a set of episodes hosted by Mike and Kea. Tell the class the format includes brainstorming before watching the episodes, taking notes while watching, reviewing answers after watching and then completing activities at stations to apply the information they learned from the episodes. Point out that each episode has a 'key message' that they should be looking for while watching.
2. Watching the episodes and completing the student handout (~45 minutes)

For each episode:

 - A. Introduce the episode and complete the 'before watching' activity
 - B. Watch the episode
 - C. Review answers with class
 - D. Discuss the 'Big Picture'
3. Rotate groups of students through the stations (~60 minutes)

How Much Calcium Is In Different Foods?
Invent a jumping game!
Make a calcium-rich snack!
Whiz Quiz!
4. Wrap Up (~15 minutes)
 - A. Complete my BONE ZONE 'Action Plan' on back of BONE ZONE student handout
 - B. Share the games and recipes students created at the Activity Stations
 - C. Review the students' answers on the Calcium Worksheet
 - D. Review the Whiz Quiz (see teacher answer key)



The Bone Bank Episode

(~3 minutes running time)

Calcium is stored in the bones, your “Bone Bank”, where it builds bone density and strength. This episode explains why teens need to get enough calcium before bone growth stops in the early twenties. By learning about sources of calcium, teens can plan their food choices to consume an adequate amount.

Before watching, have the students brainstorm what they think might happen to their bodies if they do not have enough calcium in their ‘bone banks’. Make a list on page 1 of the BONE ZONE student handout. Ask them to think about things that might happen (osteoporosis – the disease of brittle bones, broken bones, more cavities, tooth loss).

In the episode, Mike takes us on a tour of the Bone Bank. He helps Kea, who comes to make a “deposit” of 300 mg of calcium (about the amount in a class of milk). Drinking the glass of milk, she “deposits” calcium to her growing bones. Mike encourages her to keep “saving” and tells her that bones are made of mostly calcium. A boy comes to the counter and asks to make a “withdrawal”. Mike is aghast and explains the “fine print” of the boy’s bargain with the Bone Bank: since bone growth continues until about age 20, the boy must ensure his bones reach their full potential of strength and density. Mike also stresses the importance of calcium for building strong teeth. He adds that physical activity and getting balanced meals work together to build up a healthy “bone bank balance”. The boy is now concerned about bone breaks and stress fractures and is encouraged to make more deposits to the Bone Bank.

After watching, have the students add to the list of things that might happen if they do not have enough calcium and physical activity every day.

Ask the class what the “Big Picture” of this episode was: What were the main points? The take home message? Possible answers include:

- Calcium is stored in the bones.
- Calcium is necessary for strong bones and teeth.
- The tween and teen years are prime bone building years. Almost half of your adult bone mass is formed during this time (early 20’s). Now is the time to build bone!
- Physical activity and healthy eating are also important for healthy bones.
- If we don’t have enough in the bone bank, we won’t reach our full potential and we might experience broken bones or stress fractures (tiny fractures in the bones) when we get older.



Skeletons In The Closet Episode

(~5 minutes running time)

This episode provides more information about bones, the effects of diet and nutrition on bones, and the role of physical activity in building strong bones.

Before watching, have the students brainstorm foods they think are high in calcium and make a list on page 2 of the BONE ZONE student handout.

In the episode, Mike is the host of the game show, Skeletons in the Closet, “where we dig deep and reveal all the secrets you ever wanted to know about what everyone keeps hidden away inside themselves! Yes folks, I’m taking about BONES!” The question and answer topics include: what bones are made of, how much calcium the average teen needs, at what age bones are formed, the role of physical activity in bone growth, and which foods are most calcium-rich. The contestants hit their buzzers and answer the questions.

After watching, have the students revisit their list of foods high in calcium. Be sure to ask if they learned any new information about what foods are high in calcium. Also check that they make any deletions of foods they listed that are not actually high in calcium. Use the Calcium-Rich Food List as your teacher answer guide.

Ask the class what the “Big Picture” of this episode was: What were the main points? The take home message? Possible answers include:

- Tweens and teens (aged 9-18) need 1300 mg of calcium every day for healthy bones.
- The teenage years are the most important for bone growth and strength.
- Dairy products, like cheese, yogurt and milk, are very good sources of calcium in our diet.
- One glass of milk has 300 mg of calcium.
- Weight-bearing activities (being active while standing) are also necessary for strong bones (note: swimming and bicycling do not count).
- Fortified beverages that have calcium added, like fortified soy beverage, are also calcium-rich.



The Bone Building Olympics Episode

(~4 minutes running time)

The final segment helps students make the connection between their daily choices and bone health. As Jim, Darcy and Lee participate in the Bone Building Olympics, Kea points out the implications of the athletes' choices on their calcium intake.

Before watching, read page 3 of the BONE ZONE student handout aloud to the class. Tell the students to think about these questions while they watch the episode. Encourage them to write in the answers while watching.

In the episode, Kea is the announcer at the Bone Building Olympics. She describes the rules of the competition and sets the scene. Each athlete (Jim, Lee, Darcy) is trying to be the first to consume 1300 mg of calcium. The Bone Building "events" are: the Breakfast Event, the Battle of the Beverages (where Mike, as the expert liquid assets commenter and former bone building champion offers his opinions), the Souper Dooper Event, Going to School, the Nut Glut and the Cheese Squeeze. The athletes choose to be physically active or not, and they select and eat various foods (choosing foods containing a range of calcium). Kea adds up their calcium intake on a scoreboard and awards points.

After watching, revisit the questions with the students. Encourage them to write in the answers on their BONE ZONE student handout.

Ask the class what the "Big Picture" of this episode was: What were the main points? The take home message? Possible answers include:

- Milk, yogurt and cheese are the best sources of calcium.
- The milk in cereal, cream soup and lattes and cheese in sandwiches counts towards your daily calcium intake.
- Chocolate milk has the same nutrition as regular milk including 300 mg of calcium.
- Other foods have small amounts of calcium (e.g. beans and almonds).
- Skipping meals makes it hard to get the amount of calcium you need in a day.
- Watching TV and playing on the computer does not help build bone.
- Chips have too much salt that can force calcium out of your body.

Wrap Up: My BONE ZONE Action Plan

Have the students complete the BONE ZONE Action Plan on the last page of the BONE ZONE student handout. Ask the class to share their answers.

Have the students share their ideas for their smoothie creations, Calcium Worksheet questions and jumping games.

Review the Whiz Quiz questions using the teacher answer key.



Optional Activities & Extensions

1. Many food advertisements are aimed at young people. To help your class become “ad wise” about nutrition, find and collect print ads with the following messages”

- Eat (or drink) this for quick energy!
- Eat (or drink) this because it tastes great!
- Eat (or drink) this if you want to be cool like us!
- Eat (or drink) this for because it is good for you!

Analyse each message: Is the ad telling the truth? What is the nutritional message – is it good or bad for growing bodies? What lifestyle do the images in the ad promote?

2. How’s your Bone Bank Account? With your group, research and bring to class pictures of foods you would need to create the following scenario:

Three people arrive at the Bone Bank. Each wants to make a transaction. One wants to deposit 300 mg of calcium, another 1300 mg, and one wants to make a withdrawal of 100 mg. The Bank Manager helps them out.

Have each player in your group take a part in the scenario and create a short skit. Practice and present the skit to the class.

3. Write a short story that starts with one of the scenarios below. Do the characters learn to change their attitudes and nutrition habits in time? How? Tell what happens to them when they are older.

Lisa doesn’t feel that she is athletic enough to play sports and her favourite beverage is pop.

Surinder thinks she is allergic to dairy products. She stops eating cheese, milk and yogurt.

Steve feels that milk is for babies. He plays on the basketball team and thinks sports drinks have all the nutrition he needs.

Resources:

http://bcdairyfoundation.ca/uploads/Nutrition/BCDF_Thirst_Brochure.pdf

<http://bcdairyfoundation.ca/uploads/Nutrition/sportnutrition.pdf>

http://bcdairyfoundation.ca/uploads/Nutrition/Milk_and_Lactose_Intol.pdf



Optional Activities & Extensions

The following websites can be used by students to explore topics further.

Bone Health (Calcium & Physical Activity)

The interactive Calcium Calculator™

Do you get enough calcium from the foods you eat? Try the online Calcium Calculator™ to find out and make a plan to improve if you need to.

<http://bcdairyfoundation.ca/interactive/calcium-calculator/>

Dairy Farmers of Canada

For games, information and other cool stuff for kids

<http://www.getaloadofmilk.ca/#/home>

General Healthy Eating & Physical Activity

Canada's Food Guide: Create My Food Guide

My Food Guide is an interactive tool that will help you personalize the information found in *Canada's Food Guide*. By entering personal information, such as age and sex, selecting various items from the four food groups and choosing different types of physical activities, you can create a tool that is customized just for you.

<http://www.hc-sc.gc.ca/fn-an/food-guide-aliment/myguide-monguide/index-eng.php>

Titanium Chef

Do your students have what it takes to compete in the Titanium Stadium? In this internet-based role-playing game, students discover, explore and compete to become the galaxy's greatest chef. Additional teacher resources can be found to support teaching Titanium Chef in the classroom.

<http://www.titaniumchef.ca/>

Other Useful Sites for Teachers

Osteoporosis Canada <http://www.osteoporosis.ca>

BC Ministry of Health <http://www.gov.bc.ca/health>

BC Dairy Foundation <http://www.bcdairyfoundation.ca>

Dairy Farmers of Canada <http://www.dairyfarmers.ca/>



Whiz Quiz Teacher Answer Key

The Bone Bank

1. The amount of calcium kids and teenagers need to have every day is:
a. 500 mg b. 600 mg c. 700 mg **d. 1300 mg**
2. Which food has more calcium per serving:
a. Ice cream **b. Yogurt**
3. Cheese helps prevent cavities:
a. True b. False
4. Chocolate milk is a great source of:
a. Vitamin A b. Calcium c. Protein **d. All of these**

Skeletons in the Closet

1. Calcium is necessary for the proper functioning of your:
a. Heart and blood b. Nerves and muscles c. Bone growth **d. All of these**
2. The body absorbs calcium better when it also has enough:
a. Vitamin A b. Vitamin B c. Vitamin C **d. Vitamin D**
3. Fortified soy beverage is a great source of calcium
a. True b. False
4. How much calcium is in a glass of milk:
a. 1300 mg b. 75 mg **c. 300 mg** d. There is no calcium in milk



Whiz Quiz Teacher Answer Key

Bone Building Olympics

1. Which kinds of physical activity are best for building bones?

Jumping, running, walking, yoga

2. Most of your bone is formed by age:

a. 10 years old b. 20 years old

3. Which has more calcium per serving:

a. Broccoli b. Cheese c. Almonds

4. How much calcium do you get in a can of pop:

Zero mg of calcium