

Teacher's Guide

AG IN THE CLASSROOM—HELPING THE NEXT GENERATION UNDERSTAND THEIR CONNECTION TO AGRICULTURE

Resources

Western Dairy Council
12000 N Washington, Suite 200
Thornton, Colorado 80241
303-451-7711, 800-274-6455
www.wdairyCouncil.com, info@wdairyCouncil.com

Colorado Milk Marketing Board
1776 S Jackson Street, Suite 600
Denver, Colorado 80205, 303-757-7418

check out these websites:
www.nutritionexplorations.org, www.moomilk.com
www.nationaldairyCouncil.org, www.3ADay.org

Other resources from Western Dairy Council:

The following nutrition education resources are available from Western Dairy Council at a minimal cost. You may view and order the materials at www.wdairyCouncil.org.

- Food Models -185 serving-size food picture cards
- Comparison Cards- nutrient bar graphs of 108 different foods
- Flavored Milk: More Than Just Great Taste – brochure providing nutritive value of flavored milks

Other Reading:

Becoming Felix

by Nancy Hope Wilson

published by Farrar Straus Giroux, 1996
Not once in his 12 years has JJ been called Felix, the name he inherited from his grandfather, along with dairy farming and his talent for clarinet. JJ's passion for both the farm and music create a struggle within. As the demands of the dairy farm and jazz band increase, so does the tension between him and his best friend Steven. Can Steven understand what it means to be a farm kid? When JJ's dad takes a job away from the dairy farm, JJ's struggle grows and fortunately so does his self-knowledge. He finds unexpected strength in his family heritage and his friendship with Steven, and soon discovers that he's truly becoming Felix.

Comments, questions, suggestions and feedback about the Colorado Reader are welcome.

Contact: Colorado Reader Publisher:
Colorado Foundation for Agriculture
Bette Blinde, Director, P.O. Box 10, Livermore, CO 80536
Phone (970) 881-2902, Fax: (970) 881-2587

Some commonly asked questions about milk:

Why is milk important?

Your students need the calcium and other nutrients from milk to help their bones grow both in length and density.

The calcium recommendations for 9- to 18-year-olds is 1300 milligrams of calcium a day. Unfortunately, a majority of 9- to 13-year olds are not meeting the recommendation. That's unnecessary, because it's so easy to get calcium. All your students need are 4 a day—4 servings of milk, cheese, or yogurt to get the calcium they need for strong bones and teeth.

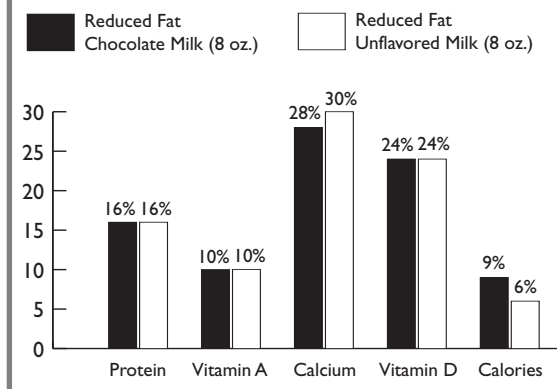
During the pre-teen and teen years, nearly half of all bone is formed and about 15% of their adult height. These years are a critical time for consuming calcium-rich foods and by far the most common and abundant source for calcium is milk and other dairy products.

My students prefer to drink chocolate milk with lunch. Isn't white milk better for them?

Because flavored milk tastes so good, many children (and adults) don't realize that it's good for them too.

Compare white milk and chocolate milk. They're both excellent sources of calcium, vitamin D and protein. (So are strawberry, banana, and other flavored milks.) Active children can easily use the 60 or so extra calories that a cup of flavored milk supplies.

Percent Daily Values



A recent study at the University of Vermont which included 3000 children suggested that children who drink flavored milk were more likely to meet their daily calcium requirements compared to their peers. And another recent study found that flavored milk drinkers not only consumed more calcium, but their overall nutrient intakes were higher than their peers. All without increasing their total added sugar and fat.

There's a milk for every taste—whole, reduced fat, lowfat, and fat free. Each is rich in calcium, protein and vitamin D. So it doesn't really matter what type of milk your students drink—as long as they drink it!

Page 1: Reading Answers

1. How many glasses of milk does one cow produce per week?

350 - 700 glasses

2. How do dairy farmers use technology on their farm?

**milk their cows,
keep records for
each cow**

(continued on page 2)

(continued from page 1) Use this activity as an introduction to a lesson on bone health.

Bone up on Basics: True or False

Questions	Answers
Bones are dry and dead.	False. Bones are alive. They start to grow even before you are born. As you grow your bones grow. Foods such as milk and yogurt have calcium. Calcium helps bones to grow strong and healthy.
Bones have blood inside.	True. Bigger, longer bones, such as the leg bone, have space inside. The spaces are filled with bone marrow. Red bone marrow makes red blood cells.
Bones give your body shape, support and protection.	True. Without bones you would flop around like a wet noodle. Bones hold up your body and protect internal organs such as your heart.
A baby has about 350 bones but an adult has only 206.	True. Wiggle the tip of your nose. It feels rubbery because it is made of cartilage. Babies' bones are soft and are made mostly of cartilage. As a baby grows, the bones fuse together and harden. For example, a baby's skull has many bone parts that fuse together later.
Bones that break cannot heal.	False. If you cut your skin, a scab forms and the skin begins to heal. If you break a bone, an inside scab or clot forms to stop the bone from bleeding. Then the body works to rebuild the bone and help it to heal.
A giraffe has more bones in its neck than a human being has in his or her neck.	False. Both giraffes and human beings have seven bones in their necks. However, each giraffe neck bone is ten inches long!
The pinkie finger is the smallest bone.	False. The smallest bone is found inside the ear. This bone is so small (3mm) that it can fit on the fingernail of your pinkie!

Page 3: Answers

How well did you read?

Circle the right answer for each question below.

1. How many times a day are dairy cows milked?

1 2-3 4-5 6-7

2. After a cow is milked, the milk is stored in tanks that are...

hot cold

3. What process is used to break butterfat into very small parts?

pasteurization

homogenization

4. What kind of vehicle transports dairy products to grocery stores and schools?

hay wagon

refrigerated truck

Hands-on Activity: Rubber Bones

Objective: Illustrate calcium's role in bone strength.

What to do:

Assemble

- Two small jars, one with a lid
- Paper towels
- White vinegar
- 2 small clean chicken bones

1. Let each student handle a chicken bone and describe how it feels.
2. Put one bone in a jar of vinegar and place the lid on the jar.
3. Place the other bone in a clean empty jar. Do not put a lid on the top.
4. After one week, remove the bone from the vinegar. Ask the students to describe the changes.
5. Compare the air-dried bone to the bone soaked in vinegar.

Discuss:

When your diet does not provide enough calcium for everyday life functions (such as blood-clotting and regulating your heart beat), your body takes what it needs from your bones. Over time, this can weaken bones to the point where they break easily. Calcium, along with other nutrients, provides the raw materials the body needs to make bones strong. Fragile bones have less calcium, which weakens the structure.

Vinegar is an acid. In this demonstration, the acid leached calcium out of the chicken bone, making it soft and rubbery. Calcium is the building material bones need to help them stay strong

and hard. What would it be like to live with soft and rubbery bones in your body? Along with physical activity and overall good nutrition, eating calcium-rich foods can help keep your bones strong.

**Hands-on Activity:
Peek-A-Boo Bone**

Objective: Build a cross-section model of a bone showing the inside story of this living tissue.

**What to Do:
Assemble**

- 1 toilet paper tube
- 1 piece white construction paper
- tape
- 1 sponge
- 1 red licorice whip

1. Cover the toilet paper tube with white construction paper.
2. Lay the licorice on the sponge.
3. With the licorice inside, fold the sponge in half lengthwise and push it into the paper tube. Trim any licorice that hangs over the edge of the toilet paper tube.

Discuss

Discuss the model of a bone.

This model will help students understand what bones look like on the inside. The outer part of the bone, called the compact bone (represented by the paper and toilet paper tube), is the hardest part and it protects the bone. Blood vessels carry blood to and from the bone through tiny tubes in this layer. Inside the bone is something that looks like a sponge;

Page 4: Synonym Answers

SYNONYMS

Synonyms are two words that have the same meaning. Choose from the pot the synonyms for each of the words listed below and write it on the line.

- density compactness
- mass weight
- deposit add
- decrease reduce
- contract grow smaller
- absorption taking in
- clot thicken



in fact it is called spongy bone. Not only does the spongy bone strengthen bones, but the tiny holes throughout help make the bones lightweight. If bones were solid, they would be too heavy to drag around. Inside the spongy part of the bone is soft bone marrow. Bone marrow helps make the red blood cells that your body needs every day. The licorice in the model represents the bone marrow. Your bone marrow makes 200 billion blood cells a day. Now that's a busy bone!

Going Further:

Ask a butcher to cut a soup bone in half. Show the cross-section to the class. Help students identify components of the actual bone that were introduced in the model.

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Page 5: Nutrition Answers

QUESTIONS

If you drink 2 servings of chocolate milk and one serving of orange juice one day, what percentage of protein, vitamin C and calcium would you get?

32% protein, 164% vitamin C, 62% calcium

How many nutrients does a cola provide?

One cola provides 14% carbohydrates (sugar).

Depends on the three beverages chosen. Encourage students to choose beverages which will help them get near 100% of the calcium needed for one day.



Page 6: Bone Answers

YOUR SKELETON

When you were born, you had more than 300 bones in your body. Some bones, like the ones in your head and hands, grow together as you grow up. By the time you are 20 years old you will have 206 bones. Your bones connect to form your skeleton.

Look at the skeleton to answer these questions:

1. What is the longest bone in your body?

thigh bone - femur

2. Which bones protect our heart and lungs?

ribs

3. What are the bones in your spinal column called?

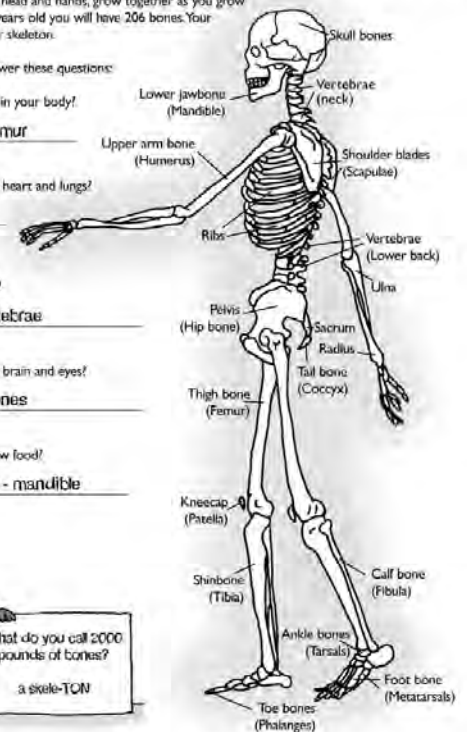
vertebrae

4. What bones protect your brain and eyes?

skull bones

5. What bone helps you chew food?

lower jawbone - mandible



(continued from page 4)

Page 7: More about Calcium

Not all calcium sources are created equal. Common substances found in certain foods bind calcium, making it hard for the body to use it as well as the calcium from dairy products. For your body to get the same amount of calcium as it gets from one cup of milk (or 1 cup of yogurt or 1.5 oz. of cheese) you would have to eat:

- 1 1/2 cups fortified soy milk
- or 2 1/2 cups cooked broccoli
- or 3 cups cauliflower
- or 4 cups pinto beans
- or 8 cups spinach
- or 5 oz of canned salmon with bones

What's a Serving of Dairy?



Milk: one serving is 8 ounces (1 cup)



Cheese: one serving is 1- 1.5 ounces of cheese or about 3-4 cheese cubes



Yogurt: one serving is one 6 or 8 ounce container of yogurt



Page 7: Letter Scramble Answers

Feed your bones

Everyone needs calcium. Calcium, along with vitamin D and exercise, helps make bones stronger. If you did not have calcium in your bones, they would be soft enough to tie into knots. Babies and children need calcium for growing bones and teeth. Adults need calcium to keep their bones strong.

Unscramble these foods that contain calcium.

likm _____
milk

eechse _____
cheese

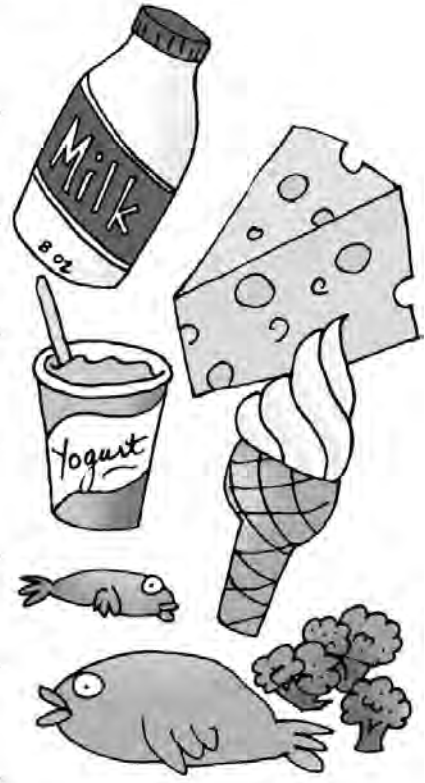
tgoury _____
yogurt

mearc ei _____
ice cream

ensrdias _____
sardines

mosaln _____
salmon

ccolbroi _____
broccoli



You need calcium every day. If you are 4 to 8 years old, you need 800 milligrams of calcium every day. From age 9 to 18, you need 1,300 milligrams of calcium every day.

Sally is 10 years old and needs 1,300 milligrams of calcium every day. By drinking three glasses of milk today, she has had 900 milligrams of calcium so far. What 2 snacks could Sally enjoy to help her meet her goal of 1,300 milligrams?

_____ yogurt, cheese

Page 8: Pizza Fraction Quiz Answers

Help baker Nancy make 4 whole cheese pizzas by drawing lines to connect the pieces that go together.

