

Milk & Your Bones

Subject Area: Science

Unit Title: Nutrition and Your Bones

Grade Level: 4th & 5th grade

Objectives: Each student will gain an understanding of the structure of bones and the nutrients needed to maintain bone strength.

Colorado Content Standards to be covered:

SCIENCE:

Standard I - Students understand the processes of scientific investigation and design, conduct, communicate about, and evaluate such investigations.

Standard III - Life Science: Students know and understand the characteristics and structure of living things, the processes of life, and how living things interact with each other and their environment.

Anticipatory Set: Read the following statement to your students and ask them to write “true” or “false” on a sticky note....Your bones are solid.

Materials:

- sticky notes (or scraps of paper)
- 1 toilet paper tube
- 1 piece white construction paper
- tape
- 1 sponge
- 1 red licorice whip

Input:

Dairy Does a Body Good

It's important to feed your body well. Your skeleton is made up of 206 bones. These bones need calcium and other nutrients each day. The foods you eat provide these nutrients. Calcium-rich foods come from dairy products such as milk, cheese and yogurt. Other foods that have calcium include sardines with bones and dark, green leafy vegetables.

Bones serve as a “bank” for calcium. Your body deposits calcium in your “bone bank,” which increases your bone density. Dense bones are strong bones. You are much less likely to break bones that are packed with calcium. If you don't eat enough calcium, your body withdraws the calcium from your “bone bank.” Having a good supply of calcium stored in your bones means that there will be plenty for growing and rebuilding bones. Your body also uses calcium to help nerves work, muscles contract, blood clot, and for the cells in your body—including your brain—to function!

In addition to calcium, dairy foods contain these important vitamins, minerals and nutrients:

- Phosphorus works with calcium to strengthen bones. Eighty-five percent of the phosphorus in

the body is found in bone.

- Vitamin D promotes calcium and phosphorus absorption. Vitamin D helps deposit these minerals in bones and teeth, making them stronger.
- Vitamin A helps maintain vision and skin. It also promotes growth of cells and tissues throughout your body.
- Protein builds and repairs all your body tissues, skin, muscles, bones and organs.
- Riboflavin helps produce energy in all the cells of your body.
- Vitamin B12 builds red blood cells that carry oxygen from the lungs to working muscles.

During the teen years, 15 percent of adult height is reached, and nearly half of adult skeletal mass is gained. Because of this growth, you need four servings of nutrient-dense dairy foods each day. These include milk, flavored milk (chocolate, strawberry and more), cheese and yogurt. No matter which you choose, they all taste great.

Checking for Understanding: At the end of this section choose one of the following for a quick check: ask the students to partner share and think, pair and share, do a quick 3 word write up as an exit slip, do a quick sketch or give each other a quick thumbs up or down to check for understanding. Determine the level of mastery for each student and provide individual remediation as needed.

Procedures/Activities:

Peek-A-Boo Bone

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. 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; 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!

Closure:

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. Repeat the anticipatory statement and review that bones are not solid, but filled with blood vessels and marrow.