LEARN ABOUT

The Skeletal and Muscular Systems

FIND OUT

- the basic parts that make up the whole body
- how the skeletal and muscular systems work

VOCABULARY

cell
tissue
organ
cardiac muscle
smooth muscle
striated muscle

Structures of the Body

The body is like a wonderful machine that needs very little help to keep running smoothly. When it does go wrong, it often can repair itself. The more the body is used, the stronger it gets. Have you ever wondered how this "machine" is put together?

Your body is made up of the basic building blocks of life—**cells**. Every cell in your body has a certain job. There are many types of cells, including bone cells, muscle cells, blood cells, and nerve cells.

Cells of the same type work together to form **tissue**. Bone cells make up bone tissue. Muscle cells make up muscle tissue.

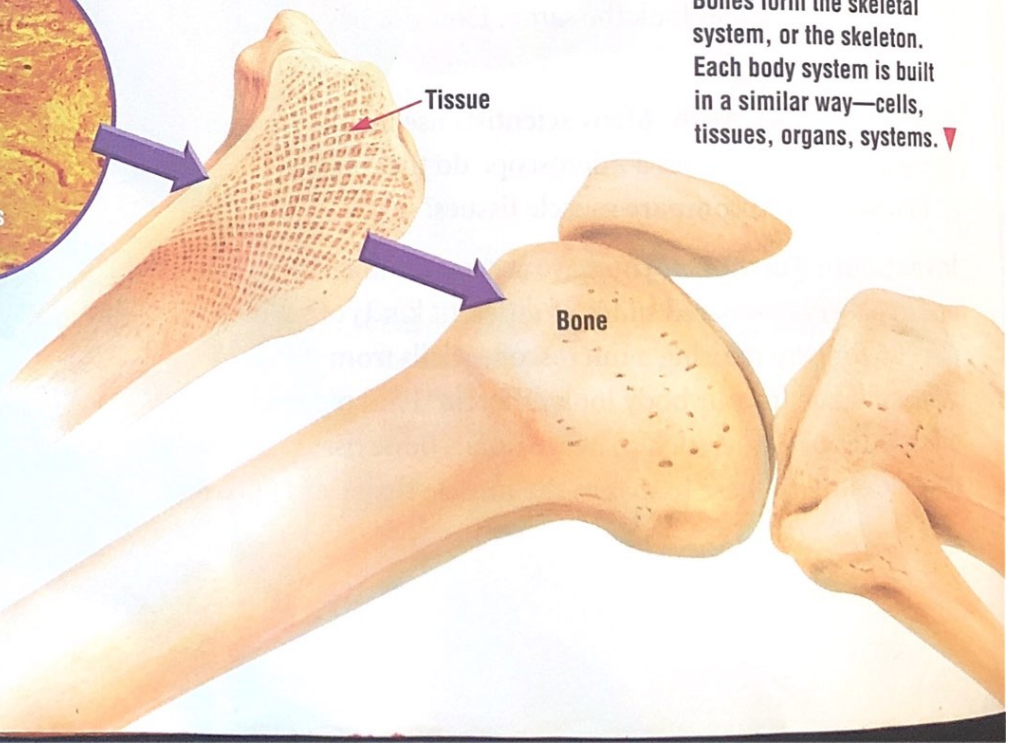
Tissues of different kinds work together in **organs**. Organs are body parts that do special jobs. Bone tissue and other tissues form organs called bones. Muscle tissue and other tissues form organs called muscles.

Groups of organs that work together form *systems*. Your body has many systems. Bones working together make up the skeletal system. Muscles working together make up the muscular system.

✓ **What are organs made up of?**

Bone cells form bone tissue. ▼

Bone tissues form bones, one of the organs in the body. ►



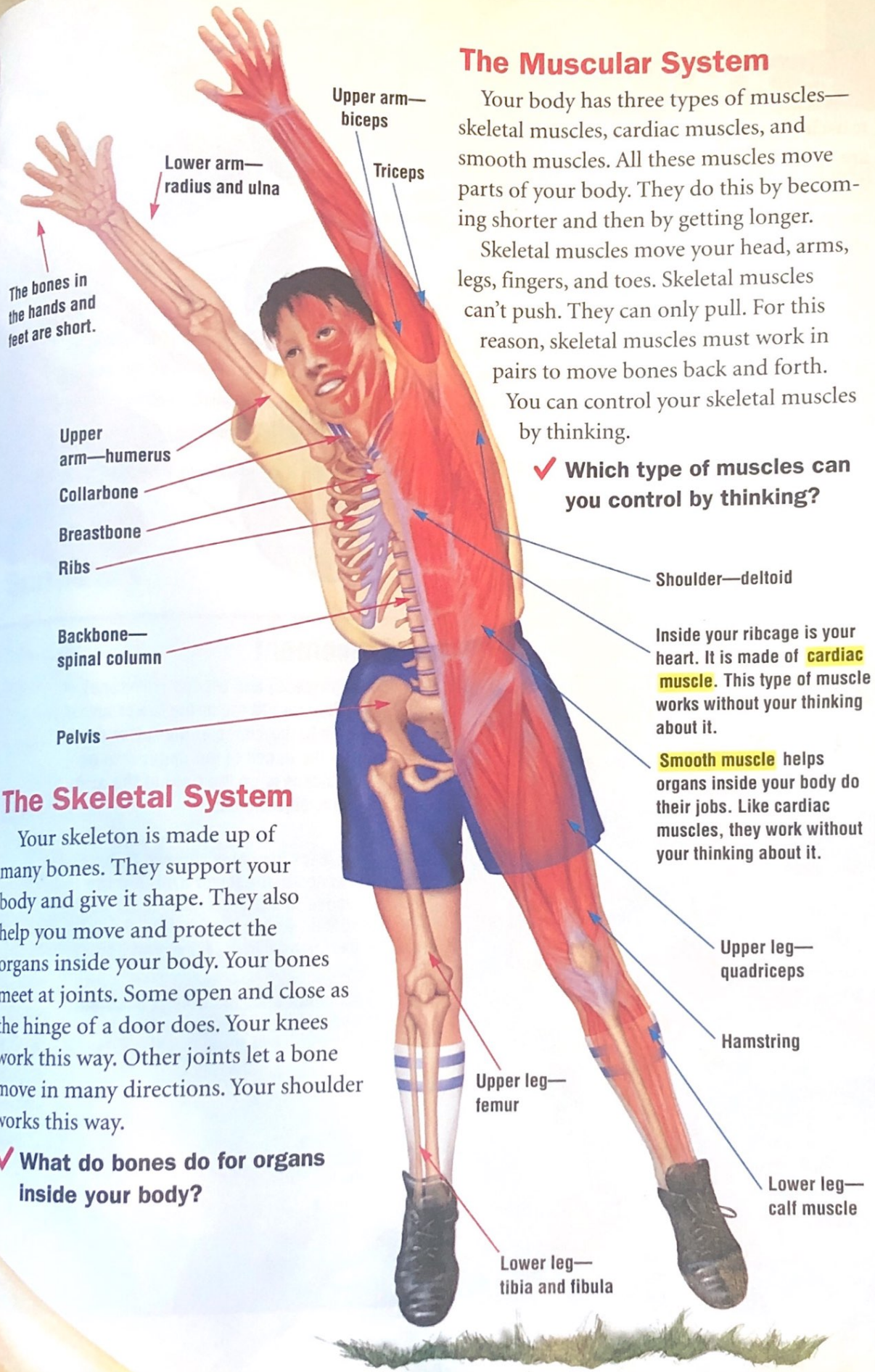
Bones form the skeletal system, or the skeleton. Each body system is built in a similar way—cells, tissues, organs, systems. ▼

The Muscular System

Your body has three types of muscles—skeletal muscles, cardiac muscles, and smooth muscles. All these muscles move parts of your body. They do this by becoming shorter and then by getting longer.

Skeletal muscles move your head, arms, legs, fingers, and toes. Skeletal muscles can't push. They can only pull. For this reason, skeletal muscles must work in pairs to move bones back and forth. You can control your skeletal muscles by thinking.

✓ **Which type of muscles can you control by thinking?**



The Skeletal System

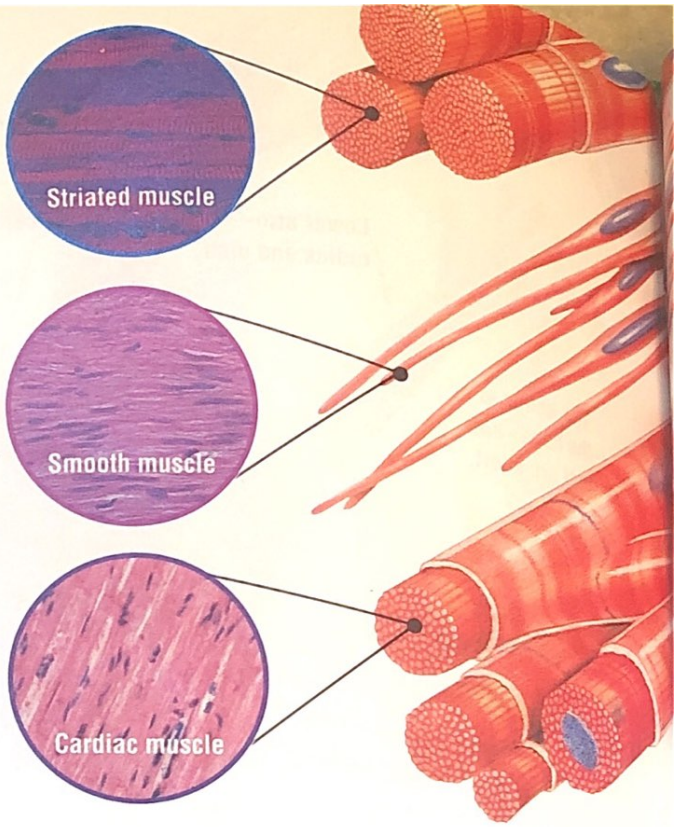
Your skeleton is made up of many bones. They support your body and give it shape. They also help you move and protect the organs inside your body. Your bones meet at joints. Some open and close as the hinge of a door does. Your knees work this way. Other joints let a bone move in many directions. Your shoulder works this way.

✓ **What do bones do for organs inside your body?**

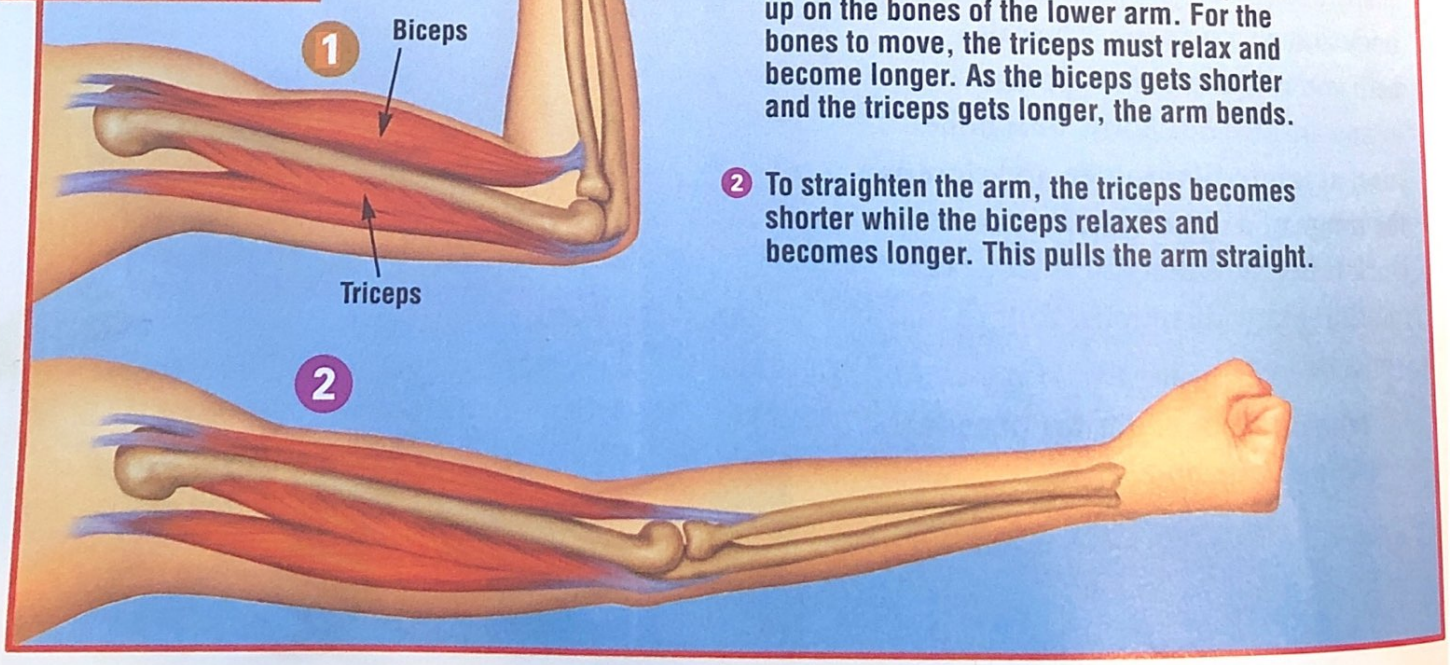
A Closer Look at Muscles

As you saw in the investigation skeletal muscles have light and dark stripes. They are called **striated** (STRY•ayt•uhd) **muscles**. The stripes are patterns made by the working parts of the muscle cells. The fibers in a skeletal muscle can be up to 30 centimeters (12 in.) long. Some muscles have more than 2000 fibers packed tightly together.

Smooth muscle does not have stripes. It is found in the walls of organs such as the stomach, intestines, blood vessels, and bladder. Smooth muscle works by squeezing and relaxing slowly and smoothly. Its fibers are shorter than the fibers in skeletal muscle.



THE INSIDE STORY

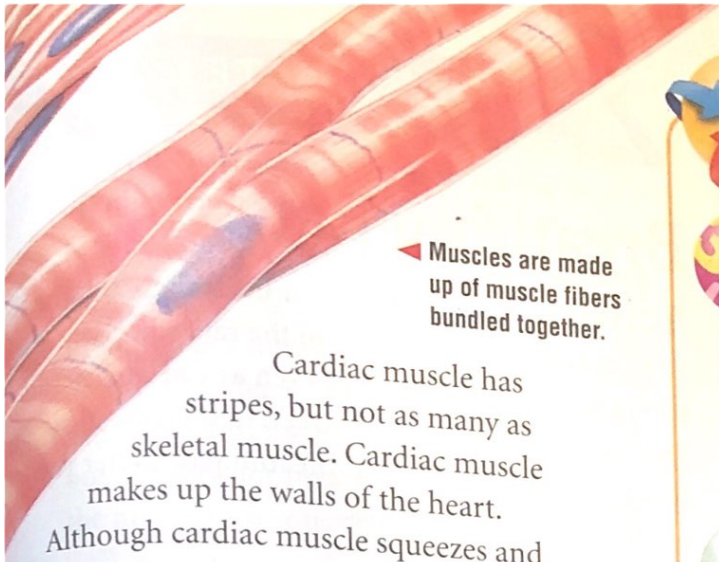


Arm Movement

The biceps (BY•seps) and triceps (TRY•seps) muscles work together to move the lower arm. They both attach to the bones of the lower arm on one end and the bones of the upper arm on the other. The biceps is on the front of the arm, and the triceps is on the back.

1. When the biceps becomes shorter, it pulls up on the bones of the lower arm. For the bones to move, the triceps must relax and become longer. As the biceps gets shorter and the triceps gets longer, the arm bends.

2. To straighten the arm, the triceps becomes shorter while the biceps relaxes and becomes longer. This pulls the arm straight.



◀ Muscles are made up of muscle fibers bundled together.

Cardiac muscle has stripes, but not as many as skeletal muscle. Cardiac muscle makes up the walls of the heart. Although cardiac muscle squeezes and relaxes without stopping, it never gets tired.

✓ **Which type of muscle doesn't have stripes?**

Summary

The body is made up of basic parts called cells. Cells make up tissues, tissues make up organs, and organs make up body systems. The skeletal and muscular systems work together to help the body move.

Review

1. What are the basic building blocks of life?
2. How do the skeletal and muscular systems work to move the body?
3. Which type of muscle works without ever stopping?
4. **Critical Thinking** Why is it good that people don't have to think about smooth muscles doing their jobs?
5. **Test Prep** _____ move bones in different directions.
   - A Muscle pairs
   - B Smooth muscles
   - C Cardiac muscles
   - D Cells

LINKS

MATH LINK

Calculating with Heartbeats Count the number of times your heart beats in one minute. This is your heart rate. Use this number to figure about how many times your heart beats in an hour and in a day.

WRITING LINK

Narrative Writing—Story Suppose you take a long hike. Write a story from the point of view of the muscles you would use. Describe for another classmate what it is like to walk and climb.

LITERATURE LINK

Let's Exercise Exercise is important for muscles and bones. Learn about exercise by reading *Staying Healthy: Let's Exercise* by Alice B. McGinty.

HEALTH LINK

Nutrition Find out what kinds of foods are important for building strong bones and muscles. Which ones would you like to try? Prepare a menu of meals and snacks for a day. Include foods that help build strong bones.

TECHNOLOGY LINK

Learn more about ways to keep your bones healthy by viewing *Bone Health* on the **Harcourt Science Newsroom Video** in your classroom video library.