

# The Muscular System



-  What Muscles Are in Your Body?
-  How Do Skeletal Muscles Work?



## my planet DiARY

## BLOG

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Location: Moore,  
Oklahoma



I hurt my shoulder while participating in tackling drills during football practice. The doctor said I had a deep muscle contusion, which is a bruise deep in a muscle. I was unable to lift my right arm for more than a week because of the injury. I had to take three tablets of ibuprofen every day for two weeks because it helped the swelling go down. I missed playing in only one game, and the pain eventually went away.

Answer the questions below.

1. What are two things Will had to do because of his injury?

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2. What can you do to avoid being injured when playing sports?

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 **PLANET DIARY** Go to Planet Diary to learn more about muscles.



Do the Inquiry Warm-Up  
How Do Muscles Work?

### Vocabulary

- involuntary muscle
- voluntary muscle
- skeletal muscle
- tendon
- smooth muscle
- cardiac muscle
- striated muscle

### Skills

- 🎯 Reading: Compare and Contrast
- 🔺 Inquiry: Infer

## What Muscles Are in Your Body?

Try to sit without moving any muscles. Can you do it? First, you probably need to breathe, so your chest expands to let air in. Then you swallow. Breathing and swallowing involve muscles, so it is impossible to sit still without any muscle movement.

**Involuntary and Voluntary Muscles** Some body movements, such as smiling, are easy to control. Other movements, such as breathing, are impossible to control completely. That is because some of your muscles are not under your conscious control. Those muscles are **involuntary muscles**. Involuntary muscles are responsible for other activities such as digesting food. The muscles under your conscious control are **voluntary muscles**. Smiling, writing, and getting out of your seat when the bell rings are all actions controlled by voluntary muscles.

FIGURE 1 .....  
**Muscle Use**

Some muscles are voluntary and others are involuntary.

**✏️ Relate Text and Visuals**  
Write how the person in each frame is using involuntary and voluntary muscles.



	Frame 1	Frame 2	Frame 3
Involuntary			
Voluntary			



## Types of Muscle Tissue

Your body has skeletal, smooth, and cardiac muscle tissues. Some of these muscle tissues are involuntary, and some are voluntary.

**Skeletal muscles** provide the force that moves your bones. A strong connective tissue called a **tendon** attaches the muscle to a bone. Because you have conscious control of skeletal muscles, they are classified as voluntary muscles. In contrast, the inside of many internal body organs, such as the stomach and blood vessels, contain **smooth muscle** tissue. These are involuntary muscles. They work to control certain movements inside your body, such as moving food through your digestive system. The tissue called **cardiac muscle** is found only in your heart. Like smooth muscle, cardiac muscle is involuntary. Look at **Figure 2**.

FIGURE 2  
**Muscle Tissue**

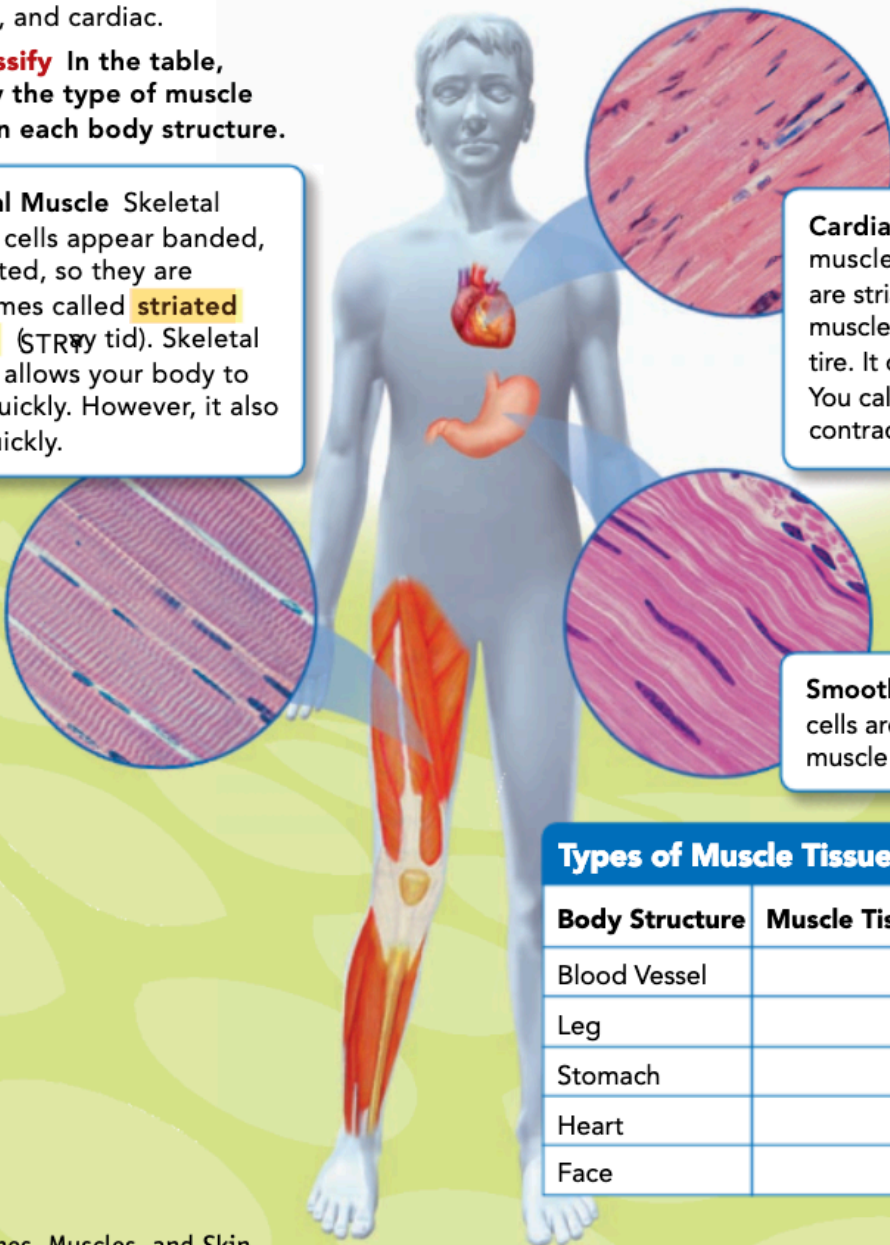
You have three types of muscle tissue: skeletal, smooth, and cardiac.

**Classify** In the table, identify the type of muscle tissue in each body structure.

**Skeletal Muscle** Skeletal muscle cells appear banded, or striated, so they are sometimes called **striated muscle** (STRĭy tid). Skeletal muscle allows your body to react quickly. However, it also tires quickly.

**Cardiac Muscle** Like skeletal muscle cells, cardiac muscle cells are striated. But unlike skeletal muscle, cardiac muscle does not tire. It can contract repeatedly. You call those repeated contractions heartbeats.

**Smooth Muscle** Smooth muscle cells are not striated. This type of muscle reacts and tires slowly.



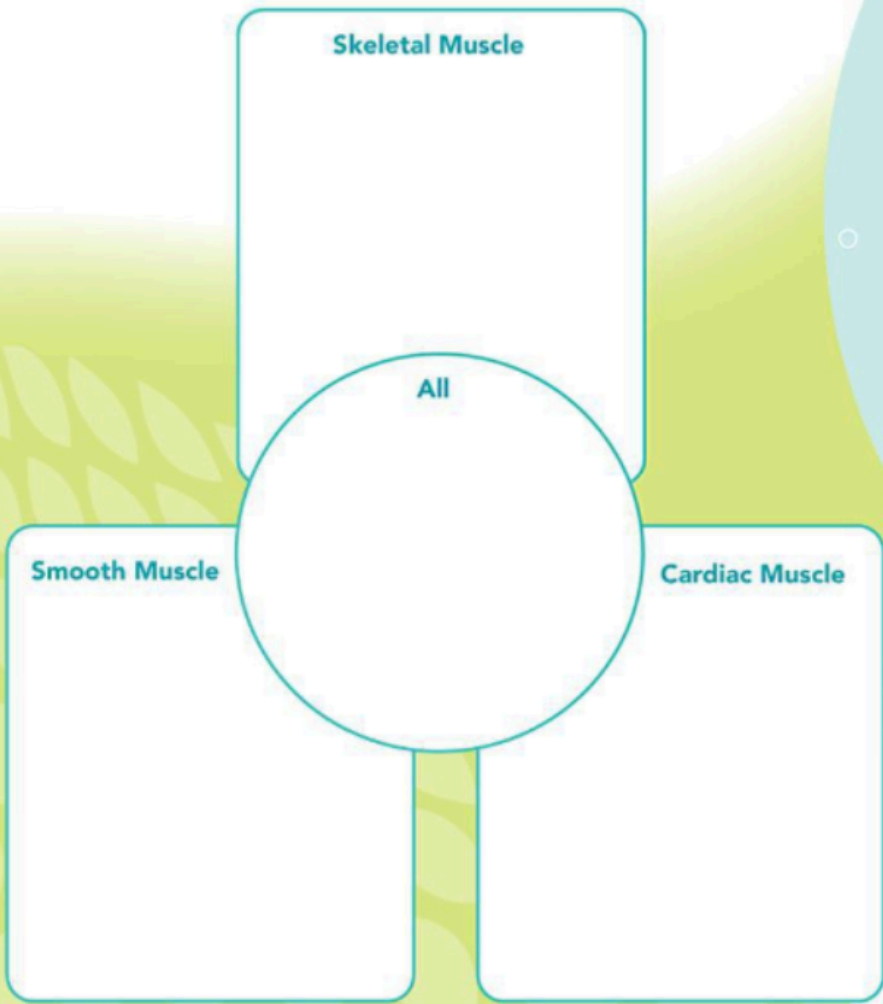
**Types of Muscle Tissue**


Body Structure	Muscle Tissue
Blood Vessel	
Leg	
Stomach	
Heart	
Face	



### did you know?

Why do you shiver when you get chilled? You shiver when many of your skeletal muscles contract quickly again and again. When your muscles contract, they produce extra heat. So, by shivering, your body produces heat that warms you.



 **Compare and Contrast** In the graphic organizer, write how all three muscle tissues are alike and how each type is different.

**Lab zone** Do the Quick Lab *Observing Muscle Tissue.*

### Assess Your Understanding

1a. **Define** What is the difference between voluntary and involuntary muscles?

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b. **Infer** Why is it important that cardiac muscle tissue does not tire?

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**got it?** .....

I get it! Now I know that the muscles in my body are \_\_\_\_\_

I need extra help with \_\_\_\_\_

Go to **my science**  **COACH** online for help with this subject.



## How Do Skeletal Muscles Work?

Has anyone ever asked you to “make a muscle”? If so, you probably tightened your fist, bent your arm at the elbow, and made the muscles in your upper arm bulge, or contract. Like other skeletal muscles, the muscles in your arm do their work by contracting, which means becoming shorter and thicker.

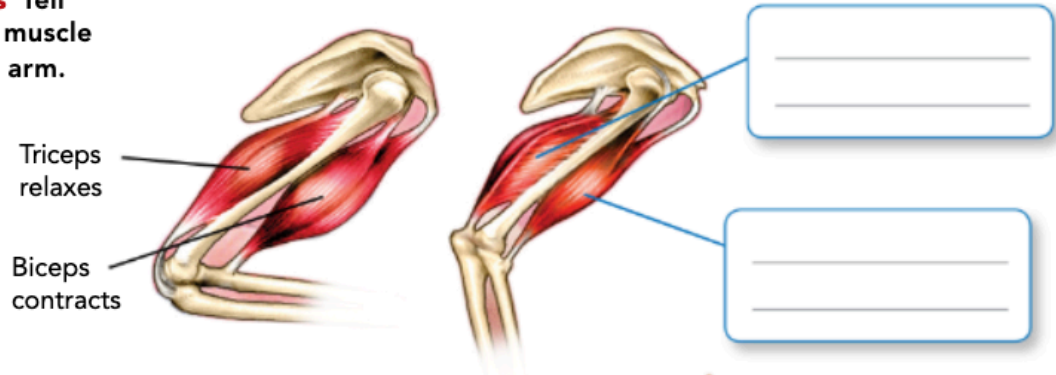
**Working in Pairs** Each time you move, more than one muscle is involved. **Skeletal muscles work in pairs. Muscle cells can only contract, not lengthen. While one muscle in a pair contracts, the other muscle in the pair relaxes to its original length.** The biceps and triceps shown in **Figure 3** are an example of a pair of skeletal muscles in your upper arm.

FIGURE 3 .....

### ART IN MOTION Muscle Pairs

To bend your arm at the elbow, the biceps contracts while the triceps relaxes.

**Interpret Diagrams** Tell what happens to each muscle as you straighten your arm.



## apply it!

This girl's biceps and triceps work as a pair.

**1 Apply Concepts** Below each photo, write which muscle is contracted.



**2 Infer**

What might happen if the biceps could not contract?



**Keeping Muscles Healthy** Regular exercise is important for maintaining the strength and flexibility of muscles. Exercise makes individual muscle cells grow bigger, so the whole muscle becomes thicker and stronger. Warming up before exercising increases the blood flow to your muscles. Stretching as you warm up helps your muscles become more flexible and prepares them for exercise. Exercise is important even in space, as shown in **Figure 4**.

Sometimes, muscles can become injured. A muscle strain can occur when muscles are overworked or overstretched. After a long period of exercise, a skeletal muscle can cramp, or contract and stay contracted. If you injure a muscle, be sure to follow medical instructions and rest the injured area so it can heal properly.

FIGURE 4 .....  
**Muscle Loss**

Without gravity, astronauts in space can lose muscle mass. Therefore, they need to exercise daily.

**CHALLENGE** Explain why a lack of gravity might cause muscles to weaken.

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Do the Quick Lab Modeling How Skeletal Muscles Work.

**Assess Your Understanding**

**2a. Review** How do muscles work in pairs?

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**b. Make Generalizations** Why is it important to exercise both muscles in a pair?

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**got it?** .....

I get it! Now I know that skeletal muscles work .....

I need extra help with .....

Go to **my science** **COACH** online for help with this subject.