




The Body's Transport System



-  What Is the Role of the Cardiovascular System?
-  What Is the Role of the Heart?
-  How Does Blood Travel Through Your Body?

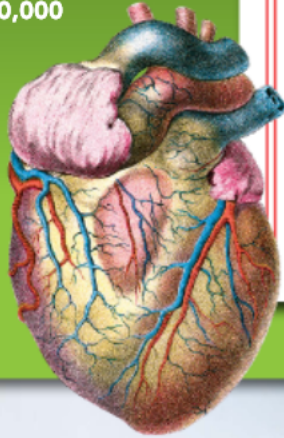


my planet DiARY

Your Heart, Your Health

Here are some fascinating facts that you may not know about your heart.

- In one year, your heart pumps enough blood to fill more than 30 competition-sized swimming pools!
- A drop of blood makes the entire trip through your body in less than a minute.
- Your heart beats about 100,000 times a day.
- Your heart pushes blood through about 100,000 kilometers of vessels. They would circle Earth more than twice!
- A child's heart is about the size of a fist. An adult's heart is about the size of two fists.




FUN FACTS

Read the following questions. Write your answers below.

1. Why is it important for a person's heart to be healthy?

2. About how many times does your heart beat in a week? In a year?


 **PLANET DIARY** Go to Planet Diary to learn more about the body's transport system.



Do the Inquiry Warm-Up
Observing a Heart.

What Is the Role of the Cardiovascular System?

As shown in **Figure 1**, the **cardiovascular system**, or circulatory system, is made up of the heart, blood vessels, and blood.

 **The cardiovascular system delivers needed substances to cells, carries wastes away from cells, and helps regulate body temperature. In addition, blood contains cells that fight disease.**

Vocabulary

- cardiovascular system • heart • atrium
- ventricle • pacemaker • valve • artery
- aorta • capillary • vein

Skills

- 🎯 Reading: Sequence
- 🔺 Inquiry: Calculate

Deliver Materials

Blood transports chemical messengers, oxygen from your lungs, and glucose from your digestive system to your body cells.

Remove Wastes

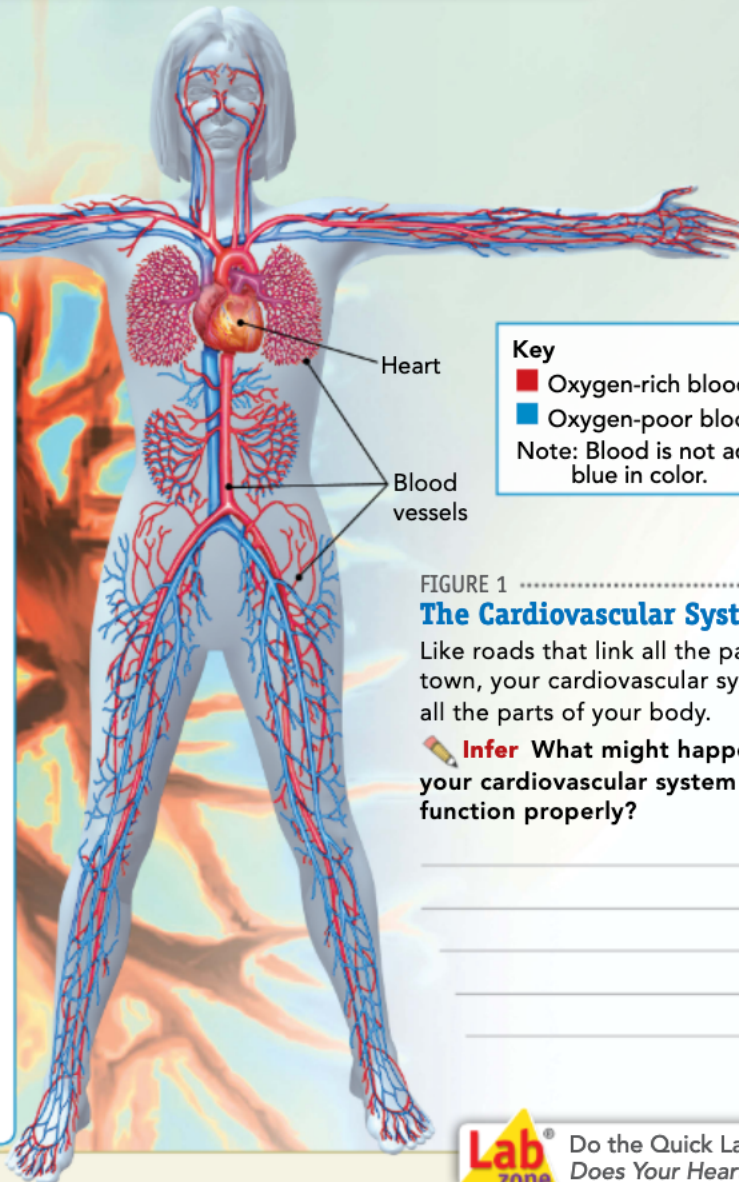
Blood takes away wastes from body cells. For example, blood transports carbon dioxide from body cells to your lungs, where it is exhaled.

Regulate Body Temperature

Changes in the amount of blood flow in the skin helps carry heat away or prevents heat loss.

Fight Disease

Blood contains cells that attack disease-causing microorganisms.



Key

- Oxygen-rich blood
- Oxygen-poor blood
- Note: Blood is not actually blue in color.

FIGURE 1 **The Cardiovascular System**

Like roads that link all the parts of a town, your cardiovascular system links all the parts of your body.

Infer What might happen if your cardiovascular system did not function properly?



Do the Quick Lab How Hard Does Your Heart Work?

Assess Your Understanding

got it?

I get it! Now I know that the cardiovascular system

I need extra help with

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

What Is the Role of the Heart?

Without your heart your blood would not go anywhere. As Figure 2 shows, the **heart** is a hollow, muscular organ. **The heart pumps blood to the body through blood vessels.**

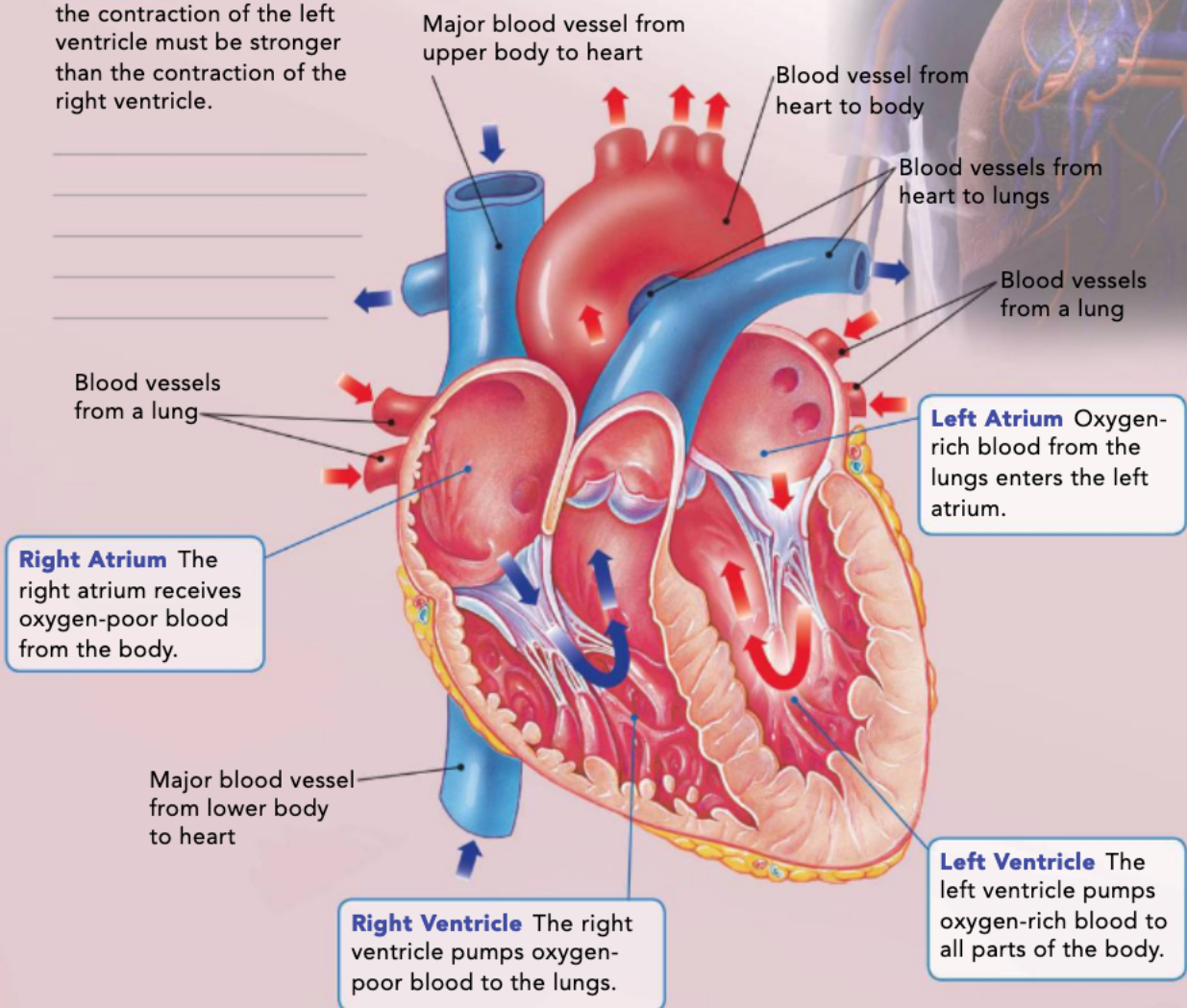
The Heart's Structure The heart has a right side and left side that are completely separated by a wall of tissue called the septum. Each side has two chambers. Each upper chamber, called an **atrium** (AY tree um; plural *atria*), receives blood that comes into the heart. Each lower chamber, called a **ventricle**, pumps blood out of the heart. The **pacemaker**, a group of cells in the right atrium, sends out signals that make the heart muscle contract. The signals regulate heart rate.

FIGURE 2

INTERACTIVE ART The Heart

Complete the activities.

- 1. Relate Text and Visuals**
Find and label the septum on the diagram.
- 2. CHALLENGE** Explain why the contraction of the left ventricle must be stronger than the contraction of the right ventricle.





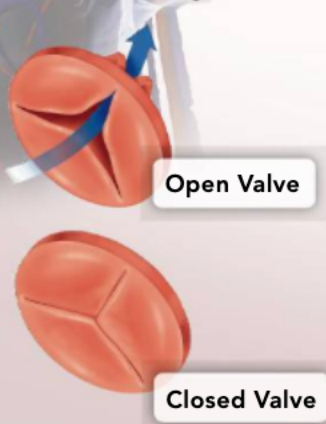
How the Heart Works Valves separate the atria from the ventricles. A **valve** is a flap of tissue that prevents blood from flowing backward. Valves also separate the ventricles and the large blood vessels that carry blood away from the heart.

A heartbeat sounds something like *lub-dup*. First, the heart muscle relaxes, and the atria fill with blood. Next, the atria contract, squeezing blood through valves, like those in **Figure 3**. Then the blood moves into the ventricles. The ventricles contract. This contraction closes the valves between the atria and ventricles, making the *lub* sound and squeezing blood into large blood vessels. Finally, the valves between the ventricles and blood vessels snap shut, making the *dup* sound. All this happens in less than one second.

Sequence In the text, underline each step involved in a heartbeat. Number the steps. Then write the steps in the table below.

FIGURE 3
Heart Valves

Like a faucet controls the flow of water, valves control the flow of blood through the heart.



Step 1	
Step 2	
Step 3	
Step 4	
Step 5	
Step 6	

Assess Your Understanding

- 1a. **Name** The _____ sends out signals that make the heart muscle contract.
- 1b. **Predict** What do you think would happen if a valve in the heart did not close?

Do the Lab Investigation *Heart Beat, Health Beat.*

got it?

- I get it! Now I know that the heart _____
- I need extra help with _____

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How Does Blood Travel Through Your Body?

As you can see in **Figure 4**, the overall pattern of blood flow through the body is similar to a figure eight. The heart is at the center where the two loops cross. **In the first loop, blood travels from the heart to the lungs and then back to the heart. In the second loop, blood travels from the heart throughout the body and then back to the heart.**

Your body has three kinds of blood vessels: arteries, capillaries, and veins. **Arteries** carry blood away from the heart. For example, blood in the left ventricle is pumped into the **aorta** (ay AWR tuh), the largest artery in the body. From the arteries, blood flows into tiny vessels called **capillaries**. In the capillaries, substances are exchanged between the blood and body cells. From capillaries, blood flows into **veins**, which carry blood back to the heart.



Vocabulary Greek Word Origins The Greek word *kardia* means "heart." The English word *cardiac* is based on this Greek root. What do you think the word *cardiology* means?

FIGURE 4

Two Loops

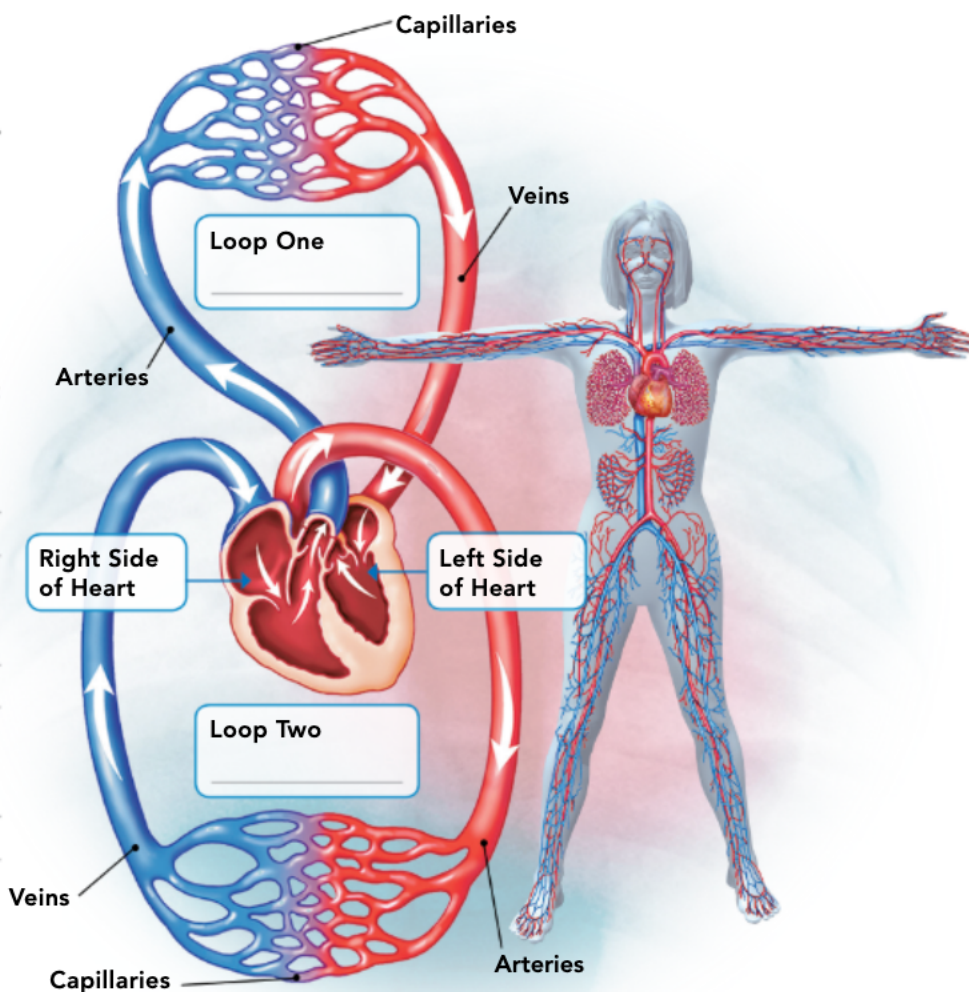
Your heart can pump 5 liters of blood through the two loops each minute.

Interpret Diagrams In each box, write where the blood from the heart travels to. Then tell where blood travels after it leaves each part listed below.

Right atrium

Veins from the body

Arteries to the lungs



do the math!

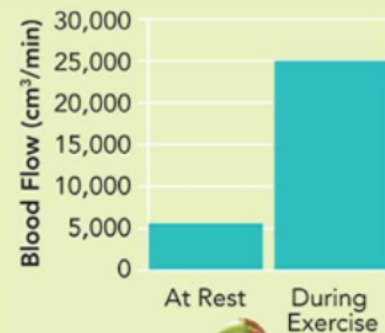
When you exercise, your heart pumps more blood through your body than when you are at rest.

1 Read Graphs About how much more blood flows through the body during exercise than at rest?

2 Calculate About how much blood flows through the body each second at rest? During exercise?

3 Infer Why do you think the rate that blood flows through the body is greater during exercise than it is at rest?

Average Rate of Blood Flow Through the Body



Do the Quick Lab
Direction of Blood Flow.

Assess Your Understanding

2a. Identify Where does blood returning from the lungs enter the heart?

b. Draw Conclusions Why must your blood complete both loops to keep you healthy?

got it?

I get it! Now I know that blood travels _____

I need extra help with _____

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