Be an Engineer!

Create a diagram, digital model, or 3-D model of the human heart. To make a 3-D model, use common materials such as straws, recycled water bottles, yarn, cardboard, construction paper, clay, and food containers.

Label the parts of the heart that you read about in the book. Also label where the blood is going each time it exits the heart and where it is coming from each time it returns. Share your diagram or model with the class by tracing the path of blood as it flows through and beyond the heart and back again.

Beyond the Book

Conduct research to learn about an animal whose circulatory system is different from a human's.

Notes

Your Hardworking Heart

FOCUS Question

How does the human heart work?

Structure and Function

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Your Hardworking Heart
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Written by Kira Freed

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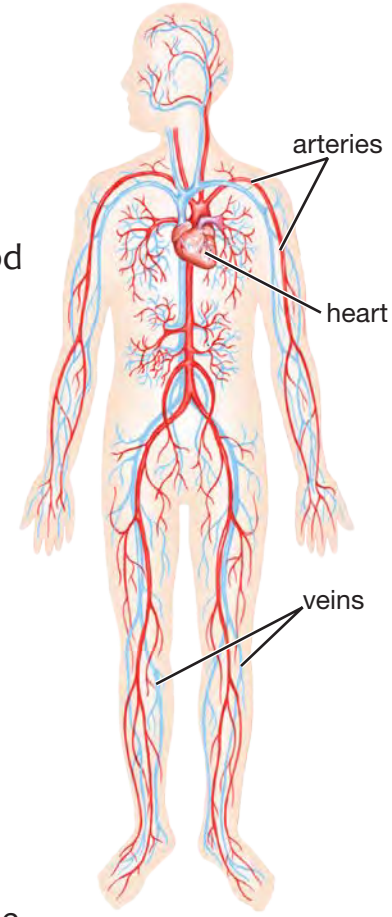
A Mighty Muscle

What's the most important muscle in your body? It's your heart!

That's right—your heart is a muscle, and it has a very important job. It pumps blood throughout your body. Most other muscles in your body get to rest now and then, but your heart never stops. It started working long before you were born. It will keep working nonstop for your whole life, without you even thinking about it. Amazing!

The heart, blood, and blood vessels together make up the *circulatory system.* That's because the heart causes blood to travel, or circulate, throughout the body.

THE CIRCULATORY SYSTEM



Wowser!

Your heart beats about 100,000 times each day, including while you sleep.

Notes

Read-Think-Write

Write your answers on separate paper. Use details from the text as evidence.

1. How is your heart similar to the muscles in your arms and legs? How it is different?
2. What actions make up the cycle of one heartbeat?
3. What is the correct sequence for the blood's path, starting with the heart pumping blood to the body's cells? Rewrite this list in the correct order: left atrium, right atrium, left ventricle, right ventricle, lungs, cells
4. Why are the lungs important to the circulatory system, even though they are not part of it?
5. According to the book, what are four things you can do to help keep your heart healthy?

FOCUS Question

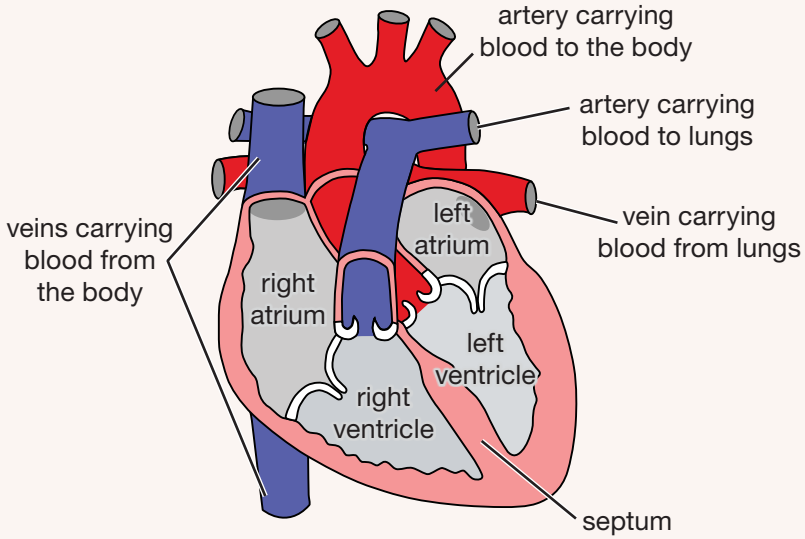
How does the human heart work? Describe in your own words the main parts of the heart. Then describe how those parts work together to pump blood throughout the circulatory system.

In and Around the Heart

Blood enters and leaves the heart through blood vessels. *Arteries* carry blood away from the heart, and tiny capillaries take it to individual cells. *Veins* bring blood back to the heart.

The heart has four sections, or *chambers,* that fill with blood at different times. The top two chambers, called *atriums,* receive blood coming back from the body and lungs. The bottom two chambers, called *ventricles,* pump the blood out to the body and lungs. The *septum* is a thick wall of muscle. It separates the left and right sides of the heart.

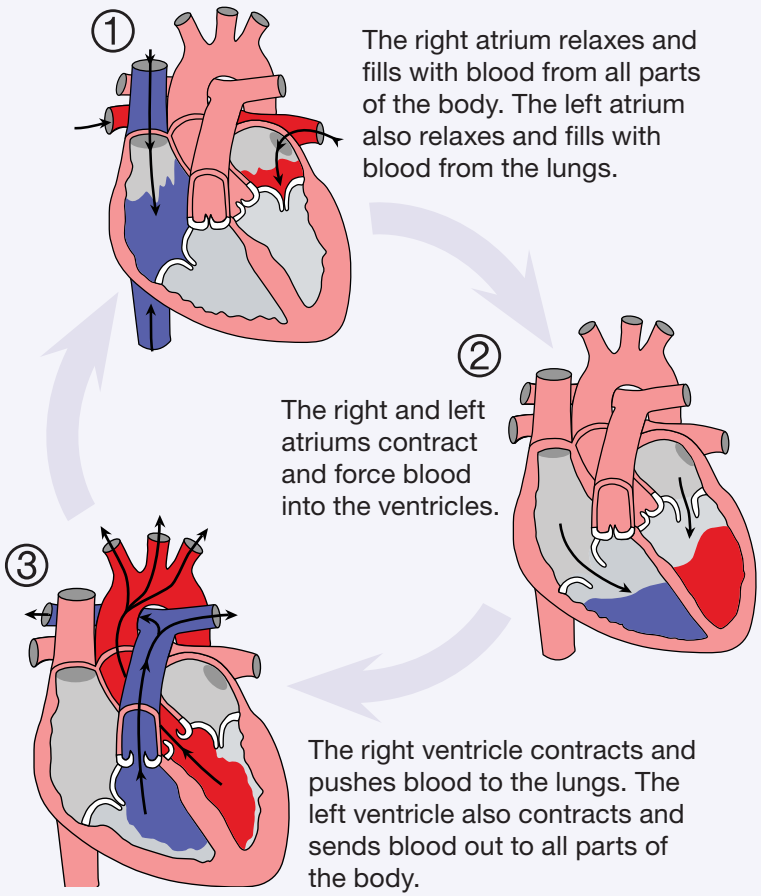
PARTS OF THE HUMAN HEART



One Heartbeat

Like other muscles, your heart produces force and motion. It does this by *contracting* (tightening) and relaxing over and over. When a chamber of the heart relaxes, it fills with blood. When it contracts, it squeezes and pushes the blood out.

A SINGLE HEARTBEAT



Eating healthy foods helps keep your heart healthy, too. Eat lots of colorful fruits and vegetables every day. Limit foods such as fatty cheeseburgers, greasy fries, salty chips, and sugary soft drinks. Good eating habits will help keep your weight within a healthy range. Moving extra weight makes the heart work harder.

Do you know what else keeps your heart strong? Laughter! When you laugh, more blood flows to every part of your body.

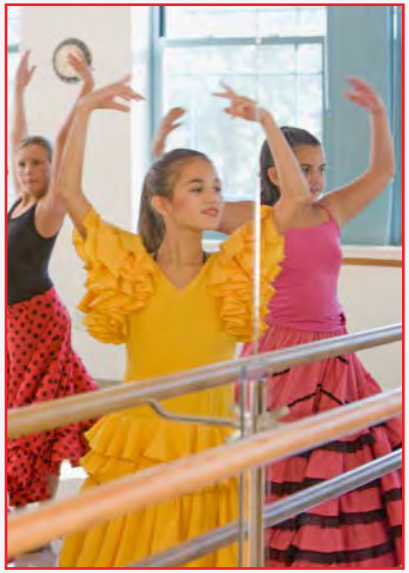
Take good care of your heart for a long, healthy life!

Eating right, staying active, and laughing are a winning combination for a healthy heart!

Healthy Heart

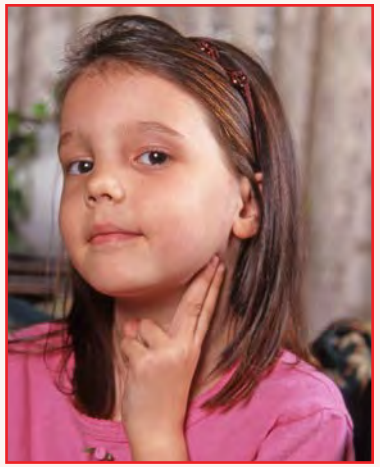
Your cells need a steady supply of oxygen and nutrients to stay healthy. That's why your heart must stay strong—so it can pump blood day and night without stopping. Keeping your heart in good shape will help you live a long, active life. What helps your heart stay healthy?

Move enough to huff and puff for thirty minutes to an hour every day. When you keep moving for that long, your heart beats faster to get more oxygen to your cells. Like your arm and leg muscles, your heart gets stronger and healthier when you exercise.



Riding your bike, dancing, and playing sports are all good for your heart.

The four heart chambers work together to keep blood moving through your body all the time. Blood rushes into the atriums and is immediately sent to the ventricles. As the ventricles pump blood out, other blood flows into the atriums. This cycle continues, causing heartbeat after heartbeat.



Two easy places to check your pulse are the side of your neck and the inside of your wrist.

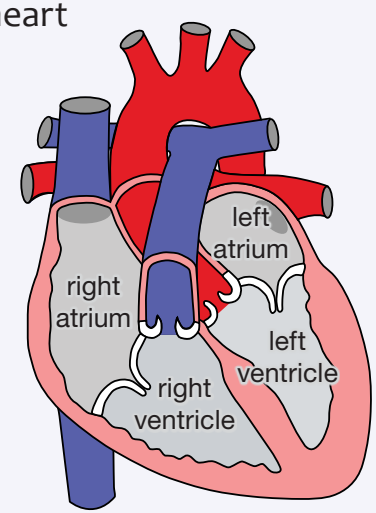
You can actually feel your heartbeat in certain places where blood flows close to the skin. This is called checking your *pulse.* An average pulse for humans is about 70 beats per minute.

Math Moment

People often check their pulse for only 15 seconds, then multiply by 4 to figure the beats per minute. Jane counted 16 beats in 15 seconds, and Doug counted 18 beats. What is the difference between their total beats in one minute?

Which Way?

Your heart is a busy place, like a big city where many freeways meet. How does the blood know which way to go? Four *valves* inside the heart act like security gates. They keep blood moving in the right direction. Two valves direct blood from the atriums to the ventricles. Two other valves direct blood as it leaves the ventricles. All the valves close after blood moves through them to prevent backward flow.



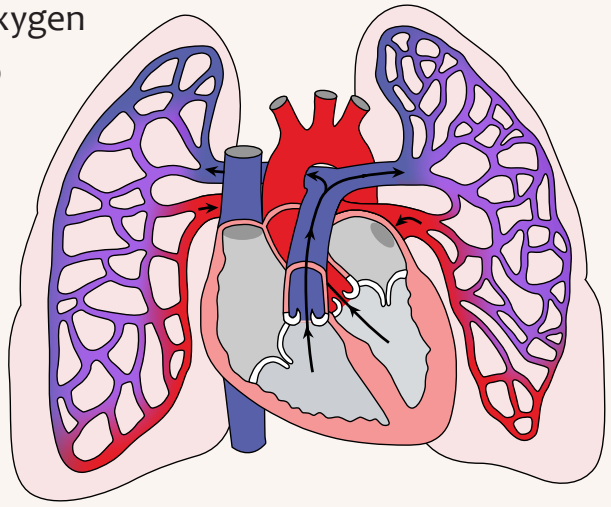
The four heart valves (in white) open and close to control blood flow through the heart.

A doctor uses a *stethoscope* to listen to your heartbeat. The valves closing create the sound that the doctor hears.

Pick Up and Delivery

The heart works so hard because blood carries nutrients and an important gas called *oxygen* to all the cells in your body. Blood also removes waste from your cells so they can stay healthy. It's like a food delivery service and a trash collector in one!

When blood returns to the right atrium, it contains very little oxygen. That's because the cells have used it up to keep the body alive. The right ventricle pushes this blood to the lungs. The lungs take in oxygen each time a person breathes in. The blood picks up the oxygen and gets rid of waste (carbon dioxide). The blood filled with oxygen then returns to the heart. The left ventricle pumps it out to the body. Fresh oxygen is delivered to the cells!



The heart and lungs work together to deliver oxygen to the body.