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# Circulating Your Blood



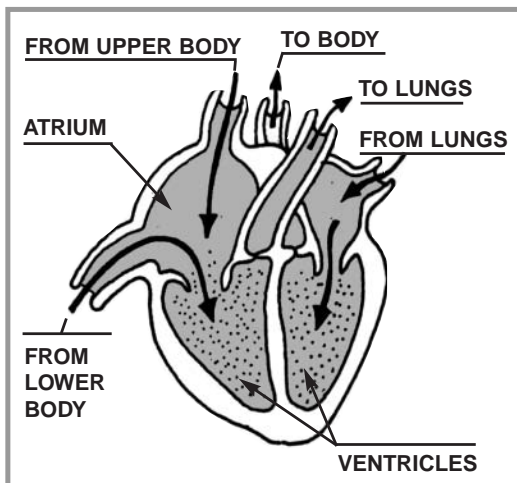
## Dr. Newton Wants You to Know

Your blood circulates in a closed loop around your body. Every minute five quarts (4.8 l) of blood moves completely through your body. This is to insure that all your living cells are constantly bathed in blood.

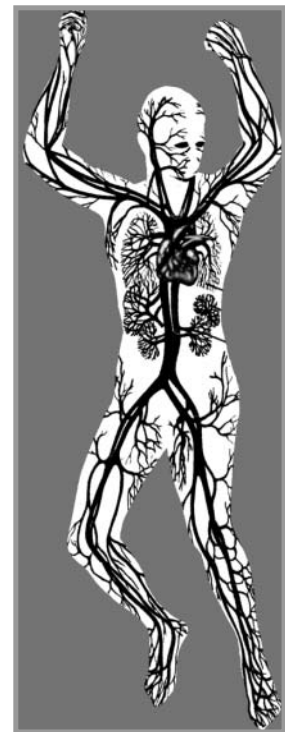
### WHAT BLOOD DOES

- Delivers food to the cells
- Delivers oxygen to the cells
- Removes waste materials, such as carbon dioxide, from the cells
- Circulates heat to maintain body temperature
- Fights infection
- Distributes chemicals that regulate the body

Your heart is a powerful muscular bag about the size of your fist. It is near the center of your chest cavity tilted toward the left. Your heart started beating six months before you were born. It may beat two billion times during a normal lifetime. No man-made machine can equal the heart's strength and durability. There are four sections to your heart. The upper two are called **atria**s. Blood flows *into* the atriums from the body or the lungs. The lower two sections are called **ventric**les. Ventricles pump blood out of the heart into the body or the lungs.



Every beat of your heart sends a spurt of blood to your body. The blood is pumped by your heart through over 60,000 miles (96,600 km) of blood vessels.



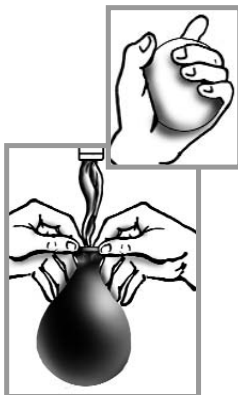
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Name \_\_\_\_\_



## Investigating Your Blood System

### Your Heart



Your heart is basically a hollow muscle. In just one minute it can move a drop of blood from your nose to your toes and back again. Unlike other body muscles, your heart rarely rests.

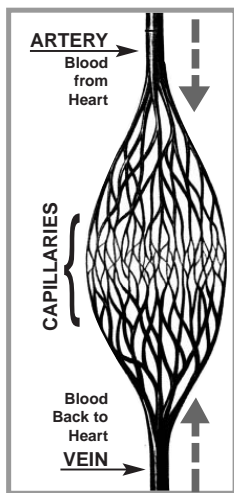
1. Obtain a tennis ball.
2. Squeeze it 60 times as rapidly and vigorously as you can. This is equal to the job your heart muscle does every minute. You are fortunate that your heart muscles are stronger than your tired hand muscles.
3. Obtain a balloon and carefully fill it with water.
4. Take the water balloon **outside** or over a sink.
5. Squeeze the balloon vigorously and let the water spurt out. Your heart muscle spurts blood in the same way. Each heart contraction spurts out three ounces (89 ml) of blood at a speed of three feet (.90 m) per second.
6. Hold one hand over your head and let the other hand hang at your side for one minute.
7. After one minute, look at the back of both hands. Which hand was redder? Can you explain why?



### Your Blood Tubes

Your blood system has three kinds of tubes.

1. **Arteries** are vessels that carry blood away from the heart. They have thick flexible walls to cope with the pressure found near the heart. Blood in an artery is usually rich in food and oxygen.
2. **Veins** carry blood back to the heart. Veins have little pressure so their walls are relatively thin. Blood in a vein is low in food and oxygen and high in body waste. Blood from a cut vein is dark red and flows out slowly. Veins are usually closer to the skin surface than arteries. The larger veins have cup-like valves. These valves prevent the blood from flowing backwards. Arteries do not have valves.



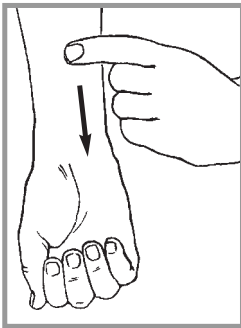
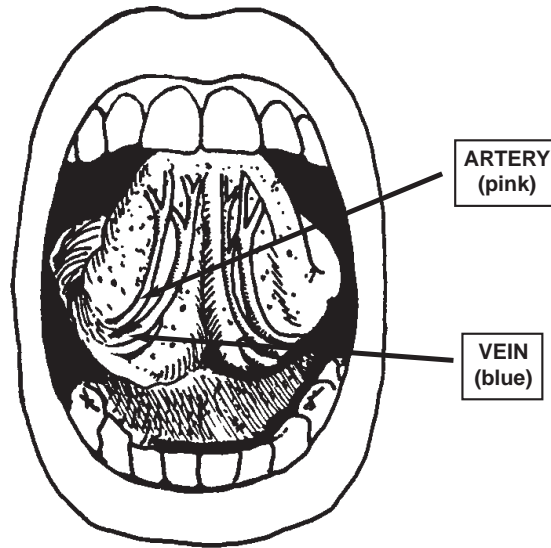
# Circulating Your Blood

Name \_\_\_\_\_

3. **Capillaries** are tiny blood vessels that connect arteries to veins. Millions of capillaries form an intricate network. Capillary walls are only one cell thick. Materials needed by body cells can pass through these thin walls.

Your tongue is a strange but useful place to observe blood tubes.

1. Use a mirror and a strong light to observe the **bottom** of your tongue. The sketch to the right will help. The two thick pink lines are arteries. The two thick blue lines are veins. You may not be able to see the much smaller capillaries. You might try observing capillaries in the fold under your eye. **Be careful.**



You've learned that blood flows in veins from the body back to the heart. Veins in your lower arms are close to the surface.

1. Locate a prominent vein on your or a friend's lower arm.
2. Press a finger down on the vein and keep pressing as you stroke a few inches (centimeters) toward the wrist.
3. Observe the blood flow back into the vein toward the heart as you release the pressure.



## The Pulse of Life

Every beat of the heart sends a spurt of blood to your body. The rate at which your heart beats in one minute is called your **pulse**. A child's pulse is faster than an adult's. A woman's pulse is faster than a man's. Animal pulse rates can vary from 25 to 1000 per minute.

You can feel the pulse anywhere that an artery is near the surface and above a bone. You can find your pulse on your neck and your temples. Doctors usually take your pulse on the wrist.

1. Try to feel your own pulse. Press two fingers (not the thumb) on your wrist firmly. Once you feel the pulse, relax your fingers.
2. In the following pulse activities, take your own pulse or take a friend's pulse.

## Circulating Your Blood

Name \_\_\_\_\_



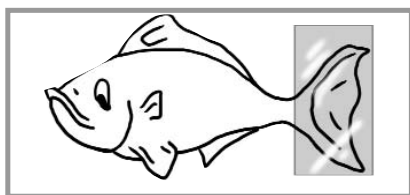
1. Sit and *relax* for three minutes. Now count your pulse beats for one minute while still seated. \_\_\_\_\_ rest beats per minute
2. Walk for three minutes. Now count your pulse beats for one minute while standing. \_\_\_\_\_ walking beats per minute
3. Exercise **vigorously** for one minute. This could be jogging in place, hopping on one foot or doing knee bends.
4. Immediately after exercising, count your pulse again for one minute. \_\_\_\_\_ exercise beats per minute

5. Compare your rest, standing and exercise pulse rates. Did they differ greatly?
6. Compare your pulse results with a friend. Did they differ?

The average pulse is around 70 beats per minute. Don't worry about your pulse. Pulse rates vary by age, sex and physical condition.



## Dr. Newton Wants You to Do More



### A Goldfish Tail

You can see blood flowing in a goldfish's tail. You will need a microscope, flat glass, cotton and the smallest goldfish you can buy.

1. Wrap your goldfish in wet cotton. Cover the gills, but leave the tail sticking out.
2. Place your fish on the glass. Place a smaller glass on the tail to hold it down.
3. Observe the blood flowing at the thinnest part of the tail.
4. Keep the cotton moist. Return the goldfish to its bowl every two minutes so as not to harm it.

### Poetry for Your Heart

Can you use what you learned about your heart and blood to write an interesting and humorous poem? Here is a sample poem to get you started.

*Around and around it goes  
From the tip of my nose  
To the tip of my toes  
When it stops, nobody flows.*