

Grade 5 Science  
Week of November 16 – November 20

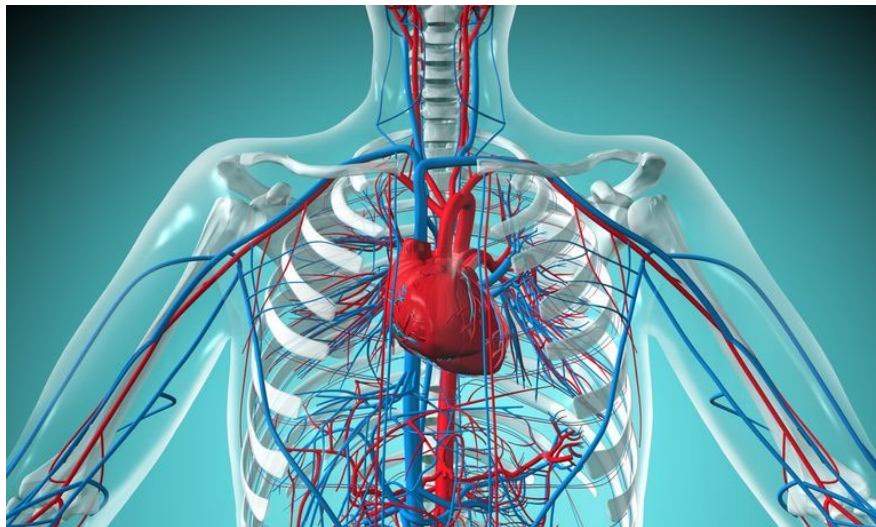
**Circulatory System**

Most of the cells inside of your body **do not move**. If a cell is hungry or needs to get rid of waste, it can't simply move itself to the part of your body where it needs to go. Instead, **your body must bring the food** to your cells and **take the waste away** from them.

By using **billions of tiny tubes the circulatory system transports substances around our bodies**. It delivers essential nutrients to every cell, and it transports waste products to waste-disposal sites—the lungs, the skin, and the kidneys.

The circulatory system is an organ system that includes the heart, the blood vessels, and the blood itself. It has **three functions**:

1. to transport materials (i.e., nutrients and oxygen) and cells from one place to another
2. to defend the body against invasion by harmful organisms by taking white blood cells to an area of injury or infection
3. to maintain a constant body temperature



**Introduction**

Your body has a network of blood vessels—hollow tubes—that move blood and nutrients. A pumping organ—the heart—pushes blood through this network of vessels.



**Watch this video** to start looking at this incredible system: <https://youtu.be/tF9-jLZNM10>

**Complete the following.**

1) Fill in the blanks:

1. Most of the cells inside of your body \_\_\_\_\_ . If a cell is \_\_\_\_\_ or needs to get rid of \_\_\_\_\_, it can't simply move itself to the part of your body where it needs to go. Instead, your body must bring \_\_\_\_\_ to your cells and \_\_\_\_\_ from them.

2.) What are the 3 functions of the circulatory system?

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

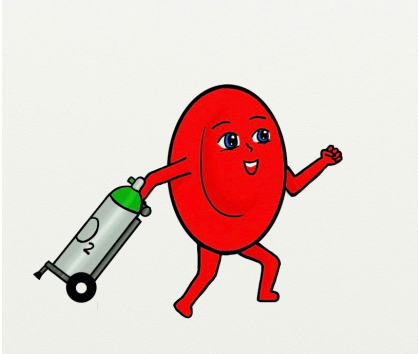
*How to Feel Your Heart Beat Video:*

3) Watch the "How to Feel Your Heart Beat" video and answer the following questions:

1. Is your heart a muscle? \_\_\_\_\_
2. How big is your heart? \_\_\_\_\_
3. Your heart can pump blood to every part of your body in less than \_\_\_\_\_ minute.
4. The more you exercise your \_\_\_\_\_, the more you exercise your \_\_\_\_\_.

## What is Blood?

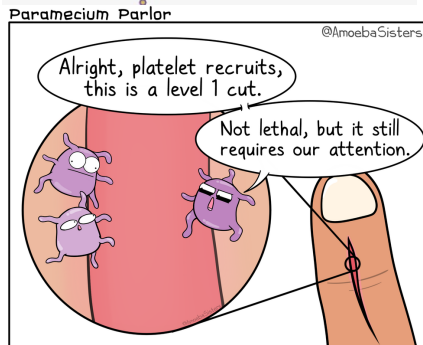
The average adult has 4.5 to 5.5 liters of blood circulating through their body. But when you're a baby, you only have 1 cup! Blood is made up of both liquid and cells. The **liquid part of blood is called plasma**. In the plasma, you can find different kinds of cells. Let get to know these cells!



**Red blood cells:** They deliver oxygen to cells, which is a cell's main source of energy. Also takes carbon dioxide away from cells.



**White blood cells:** They are in charge of fighting off foreign substances and viruses.



**Platelets:** They fix veins and arteries if you get a cut! They help form clots in your blood.

## Function of Blood

Blood has several functions or 'jobs' in your body. However, the main function of blood is **transport**. Blood in **arteries** carries **oxygen and nutrients** to all the body's cells. Blood in **veins** carries **carbon dioxide and other wastes** to be removed from your body.

Think about blood as a vehicle, arteries and veins as roads, and your heart as 'home' where you go to and from.



## Blood Vessels

If you've ever seen a road map, you probably saw many roads going here, there, and everywhere. Your **body has a highway system** of its own that sends blood to and from your body parts. It's called the **circulatory system** and the roads are called blood vessels. There are different kinds of blood vessels that have different functions.



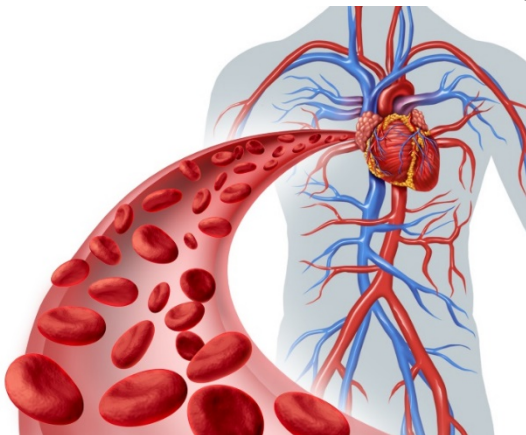
Check out this video to learn more: <https://youtu.be/ZiT3qjxYTro>

## Arteries

**Arteries are blood vessels that carry blood away from the heart.** These blood vessels are responsible for carrying **oxygen-rich blood** to the rest of your body. They have **muscular walls** that send the blood on its journey to the outer regions of the body.

So, exactly how does an artery work? Think about squeezing that last bit of toothpaste from the tube. You squeeze from the bottom to the top, pushing the toothpaste ahead of your fingers. Arteries work in a similar way.

Each time the heart **contracts**, it sends out a gush of blood under **high pressure**. Between each heartbeat or contraction, the pressure decreases and the arteries return to their normal shape. Each time the artery expands and contracts, it **pushes the blood along**.



The rhythm of arterial expansion and contraction is called the **pulse**. Your **pulse rate** is the same as your **heartbeat rate** because it's a single beat of the heart that causes each expansion and contraction of the artery.

**Fun fact:** A heart can keep beating outside of a body, as long as it is still receiving oxygen!

## Healthy Arteries

Like everything in your body, arteries function best when they are healthy! **Unhealthy arteries are clogged arteries.** This means that build up in your arteries can **block the flow of blood through your body.** If the build-up that is blocking your arteries reaches 70% (blocking 70% of the artery) then this is when it can become extremely dangerous for your health.

So **what can clog your arteries** and **how can keep your arteries healthy?**

There are a few different things that can contribute to build-up in your arteries. One of the main causes is eating too much food that is **high in cholesterol.** This includes things like fast food, processed meat (like bacon) and desserts. All of these things are OK to eat every once in a while, but in order to maintain clean, healthy arteries you need to **eat a healthy diet.**

## Veins

In the circulatory system, veins carry blood towards the heart. This blood carries something called deoxygenated blood, which basically means blood with no oxygen in it. Your veins carry the carbon dioxide in your blood (waste) back to the heart so it can be released through your lungs when you breathe out.

Veins are much thinner and softer than arteries. They are also closer to the surface of your body. Take a look at your forearm, can you locate any of your veins? They should look blue!

**Fun fact:** Did you know that the **weather can affect your veins** and other blood vessels? When it's **hot outside**, they expand, releasing heat and **cooling** your body temperature. On **cold** days, they restrict to **conserve heat** and energy.



## The Heart's Beat

Your heart is really a muscle (but also an organ!). It's located a little to the left of the middle of your chest, and it's about the size of your fist. It is **constantly** pumping blood through your circulatory system. No matter what you're doing, your heart is pumping!

How does the heart beat? Before each beat, your heart **fills with blood.** Then its muscle **contracts** to **squirt the blood along** through your arteries. When the heart contracts, it squeezes — try squeezing



your hand into a fist. That's sort of like what your heart does so it can squirt out the blood.

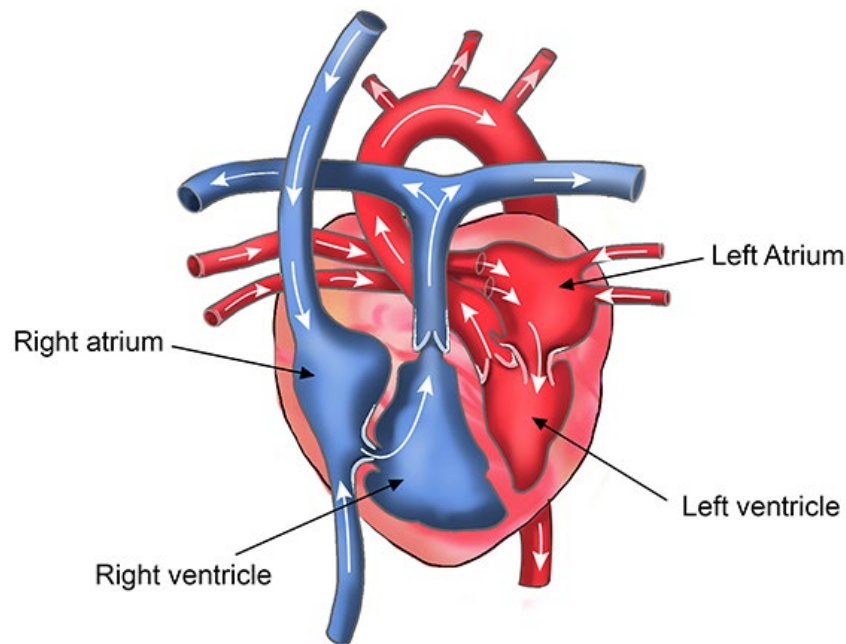
The heart adjusts its contraction rate (heartbeat) to **match the body's needs**. When you're resting, your heart pumps from 2.5 to 4.0 liters of blood every minute. If you begin to exercise, your heartbeat speeds up within seconds, increasing the volume of blood pumped per minute to meet your increased need for oxygen and nutrients. When you stop exercising, your heart rate slows down.

## Heart Chambers

Your heart has **4 major chambers**. Let's explore them a bit!

The **right atrium** and the **left atrium** are responsible for **intaking blood**. The left atrium takes in oxygen-rich blood from the lungs, and the right atrium takes the blood back from the body once the oxygen has been absorbed.

The **right ventricle** and the **left ventricle** are responsible for **exporting blood**. The left ventricle squirts oxygen-rich blood out into the body and the right ventricle squirts the blood containing carbon dioxide back to the lungs.



**Complete the following.**

4) The liquid part of your blood is called: \_\_\_\_\_

5) There are 3 different kinds of cells found in your blood. Complete the table below:

Type of Cell	Job of Cell

6) The blood found in arteries and the blood found in veins is different. How is it different?

*Operation Ouch – Blood Vessels Video*

7) Watch the “Operation Ouch- Blood Vessels” video and answer the following questions:

1. How many liters of blood is in your body? \_\_\_\_\_

2. Around how many miles of blood vessels do you have in your body?  
\_\_\_\_\_

3. What are the two types of blood vessels found in your body?  
\_\_\_\_\_

4. Which are larger: Arteries or veins? \_\_\_\_\_

8) What is one of the main causes that contribute to build up in your arteries?

\_\_\_\_\_

9) \_\_\_\_\_ move oxygen-rich blood away from your heart and  
\_\_\_\_\_ move deoxygenated blood back to your heart.

10) True or False: If the statement is false, change it so that it becomes true.

1. Your heart is a muscle, not an organ. \_\_\_\_\_

2. When you sleep, your heart stops pumping blood. \_\_\_\_\_

3. Your heartbeat speeds up when you are exercising. \_\_\_\_\_

11) What are the atrium chambers in the heart responsible for?

\_\_\_\_\_

12) What are the ventricle chambers in the heart responsible for?

\_\_\_\_\_

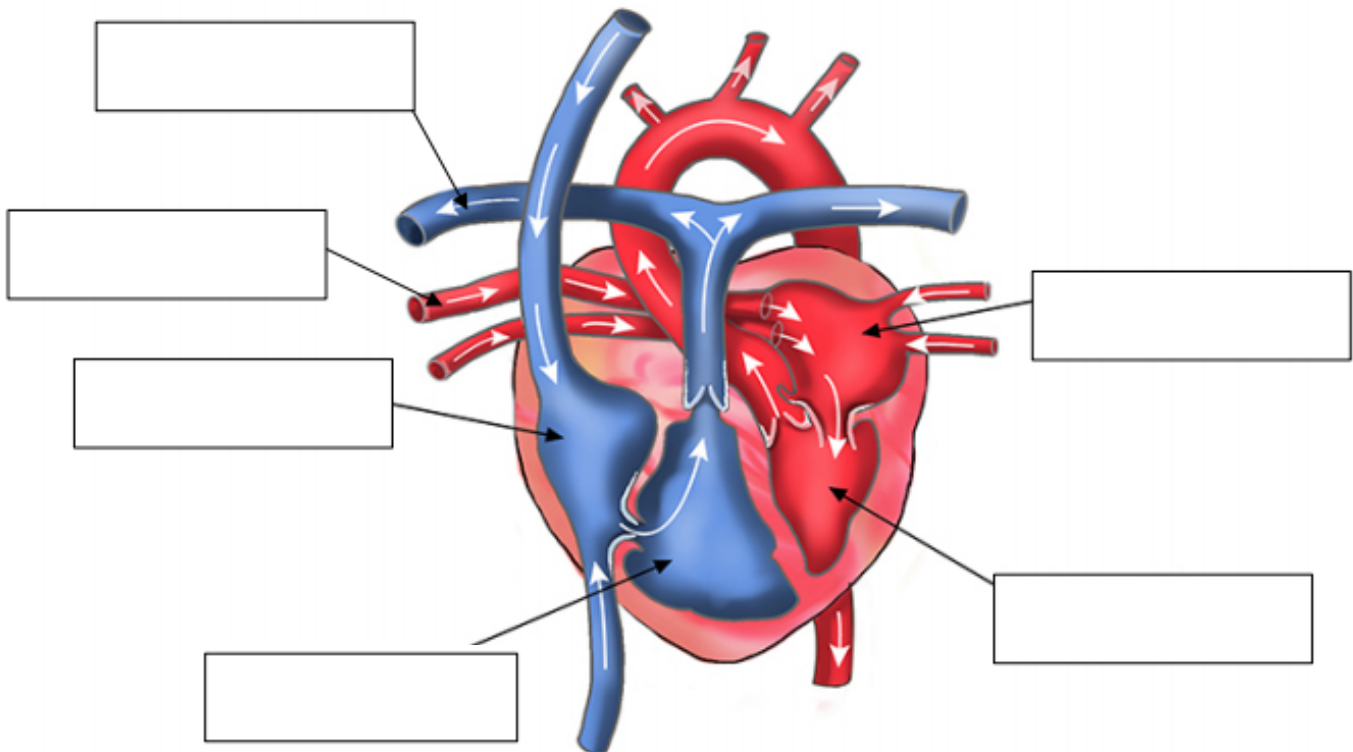


13) Label the circulatory system.

## The Circulatory System

### Word Bank

- An artery (\*pay attention to the direction of the arrows)
- A vein (\*pay attention to the direction of the arrows)
- The right atrium
- The left atrium
- The right ventricle
- The left ventricle



14) Now that you know the connection between the **respiratory system** and the **circulatory system**, you're going to use some of the knowledge you built during the respiratory system chapter to complete this activity.

**Instructions:** Read all instructions before starting the activity

1. Have a stopwatch ready to go, whether this be on a wrist watch or a smartphone.
2. Go back to The Respiratory Unit and into the "Focused Breathing Activity Video".

Have this open and ready to go.

3. Choose an exercise to do for 2 minutes. This could be a combination of things like jumping jacks, running on the spot, high knees, burpees, etc. Start the timer and make sure that you are giving it your all for 2 minutes!
4. Find your pulse on your neck like this and count how many times your heart beats in 15 seconds. Record the results in the chart below, this is your heartrate.



5. Now, play the focused breathing video and focus on your breathing until the end of the video.
6. Find your pulse again and count how many times your heart beats in 15 seconds. Record the results in the chart below, this is your heartrate.

<b>After 2 mins of exercise</b>	Heartrate: _____ beats per 15 sec
<b>After 2 mins of focused breathing</b>	Heartrate: _____ beats per 15 sec

15) What exercise(s) did you choose to do?

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16) What did your chosen exercise(s) do to your heartrate?

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17) Did you find it easy or hard to focus on your breathing after you exercised?

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18) What happened to your heartrate after you did the focused breathing exercise?

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