

## Lesson 2: Let's Circulate!

### Purpose

- ♥ Know that the heart and blood vessels make up the circulatory system
- ♥ Understand that the heart works as a “double pump” to supply the cells of the body with oxygen and nutrients
- ♥ Differentiate between arteries and veins and understand their role in circulation
- ♥ Demonstrate how blood is pumped through the circulatory system

### Time Frame

45–50 minutes

### What Students Do In This Activity

Students investigate how blood flows throughout the body and through the heart. They simulate the concept of “double circulation” and explain why it is important. Students learn about the blood vessels—arteries, capillaries and veins—that serve as the transport system for nutrients and oxygen. *Note: It is **not** important that students learn the anatomical terms for heart structures in this lesson.*

### Background

Every cell in the body needs a constant supply of fresh blood in order to stay alive. The circulatory system transports oxygen and nutrients to the cells of the body and removes wastes such as carbon dioxide. The heart serves as a “double pump” for the circulatory system, receiving deoxygenated blood from the body, pumping it to the lungs to be oxygenated, receiving oxygenated blood from the lungs and then pumping it to the rest of the body.

There are two types of blood vessels: arteries and veins. The arteries carry the blood away from the heart to the cells of the body, and the veins return the deoxygenated blood to the heart. Arteries branch into smaller vessels called arterioles, which branch into even smaller vessels called capillaries. It is in the capillaries that the exchange of gases (oxygen and carbon dioxide) and nutrients takes place. The blood then moves into small veins called venules, which merge into larger veins until they finally join the vena cava, which feeds blood into the heart. This completes the “double circle” of the circulatory system.

**Student Misconception:** Many students believe that blood carried by the veins is actually blue. In diagrams, the color blue is used to signify that the blood carried by the veins has a decreased supply of oxygen. The blood's actual color in the veins is a dark, bluish-red. Red is used for the arteries to indicate that they transport blood that is rich with oxygen.

### Materials

- ♥ Overhead projector
- ♥ Red and blue overhead markers
- ♥ Tennis balls (2 or 3)
- ♥ Human Circulatory System transparency
- ♥ Circulation cards
- ♥ Red and blue colored pencils
- ♥ Tape

### Circulation:

The heart serves as a “double pump” for the circulatory system, receiving deoxygenated blood from the body, pumping it to the lungs to be oxygenated, receiving oxygenated blood from the lungs and then pumping it to the rest of the body.



### Mnemonic Device:

“a” from “arteries” =  
“away from the heart”

## Procedure

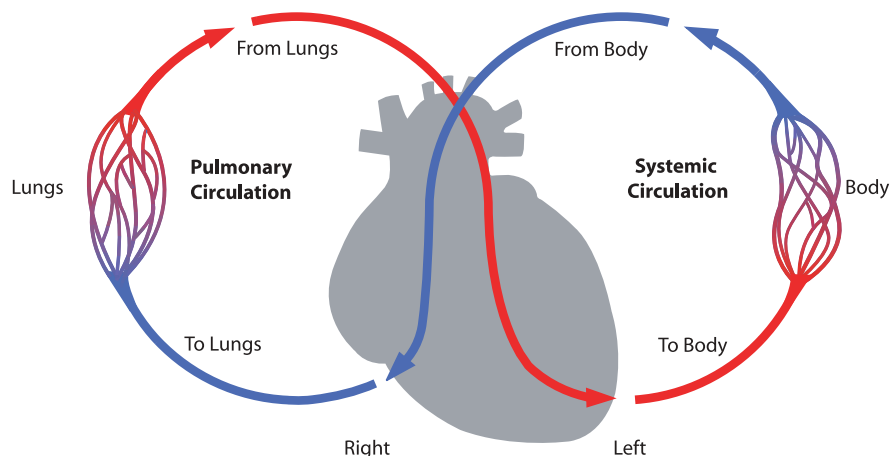
### Part A: Blood Flow Throughout the Body (10 min.)

Ask the students the following questions, guiding them with answers if needed:

1. **What does almost every living cell in your body need to survive?**  
Oxygen and nutrients, food, fuel, glucose, etc.
2. **How are oxygen and nutrients transported to the cells of your body?**  
Through the blood in the circulatory system, via capillaries, etc.
3. **How do you think blood gets all the way to your toes and back to your heart?** Through blood vessels in the circulatory system
4. **What part does the heart play in this process?**  
It is the pump that powers the circulatory system; it serves as a “double pump,” sending blood to the lungs and out to the rest of the body

### Part B: Instruction About the Circulatory System (10 min.)

Using the **Human Circulatory System transparency** and a blue marker, follow the flow of blood from the heart through the arteries to the capillaries of the lungs. The exchange of gases and nutrients between the blood and the body tissues takes place in the capillaries. Then, with a red marker, trace the route from the lungs back to the heart and out to the rest of the body via the capillaries. Finally, with the blue marker, show the blood returning to the heart through the veins.



**Human Circulatory System**

## Notes:

Remind students that the right and left sides of the heart seem opposite to us because we label the heart taking the perspective of the body we are looking at. The idea is similar to looking into a mirror.

## Teaching Points

- ♥ The blood flows throughout the body through a network of arteries and veins called the circulatory system.
- ♥ The heart serves as the “double pump” of the circulatory system. The left side of the heart pumps the blood throughout the body and the right side of the heart pumps blood to the lungs.
- ♥ The right side of the heart pumps deoxygenated blood to the lungs, where it receives fresh oxygen.
- ♥ The left side of the heart receives this newly oxygenated blood from the lungs and pumps it through the aorta to the rest of the body.
- ♥ As the blood moves through the arteries, the arteries branch off into smaller vessels called arterioles and then into even smaller vessels called capillaries. It is in the capillaries that the transfer of nutrients and gas between the blood and the body tissues takes place.
- ♥ The blood begins its trip back to the heart through small veins called venules, which merge into larger veins until they finally join the vena cava, which empties into the right side of the heart.

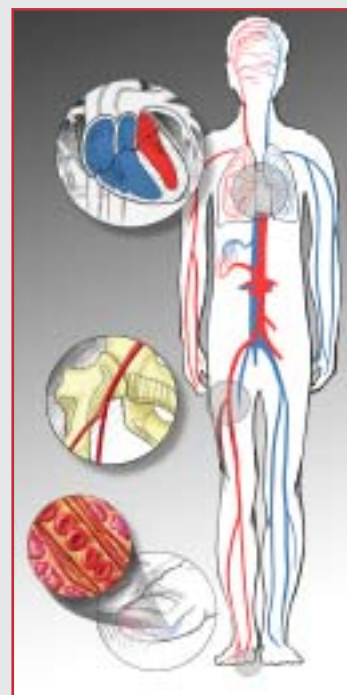
## Part C: “Double Circle” Activity (15 min.)

1. Divide the class into two groups.
2. Give each group a card that describes a location of blood flowing through the circulatory system.
  - ♥ Right side of the heart
  - ♥ Arteries to the lungs
  - ♥ Capillaries of the lungs
  - ♥ Veins to the heart
  - ♥ Left side of the heart
  - ♥ Aorta
  - ♥ Arteries
  - ♥ Arterioles
  - ♥ Capillaries of the body
  - ♥ Venules
  - ♥ Veins
  - ♥ Vena cava

Capillaries of the lungs

Arteries to the Lungs

Notes:



Overview of the Circulatory System

