

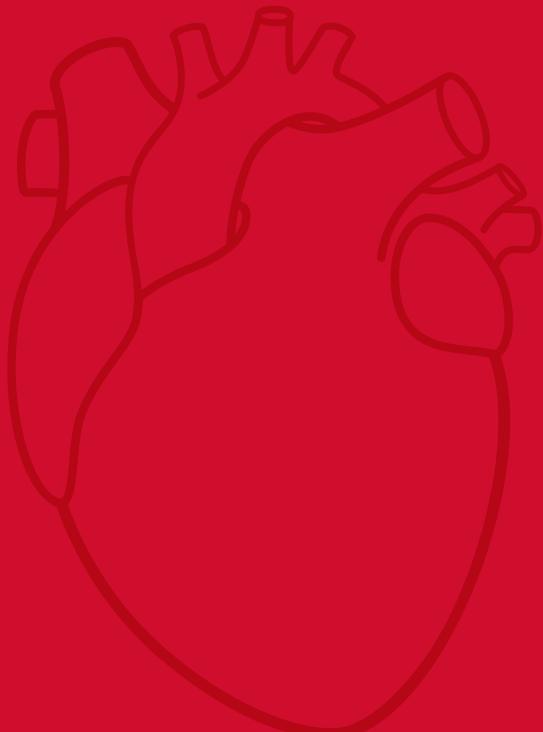
TEACHER TRAINING MODULE

**CVS I**

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**STRUCTURE AND  
FUNCTION OF THE HEART**

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# CHAPTER 1: STRUCTURE OF THE CARDIOVASCULAR SYSTEM

The cardiovascular system consists of the heart and the blood vessels that move blood around your body. The blood pumped through the heart supplies vital oxygen and nutrients throughout your body.

## ANATOMY OF THE CIRCULATORY SYSTEM

The Circulatory system is made up of:

- a. **Heart**, a muscular organ that pumps blood throughout the body.
- b. **Blood vessels**, which include the arteries, veins and capillaries.
- c. **Blood** made up of red and white blood cells, plasma and platelets.

## THE PARTS OF THE HEART

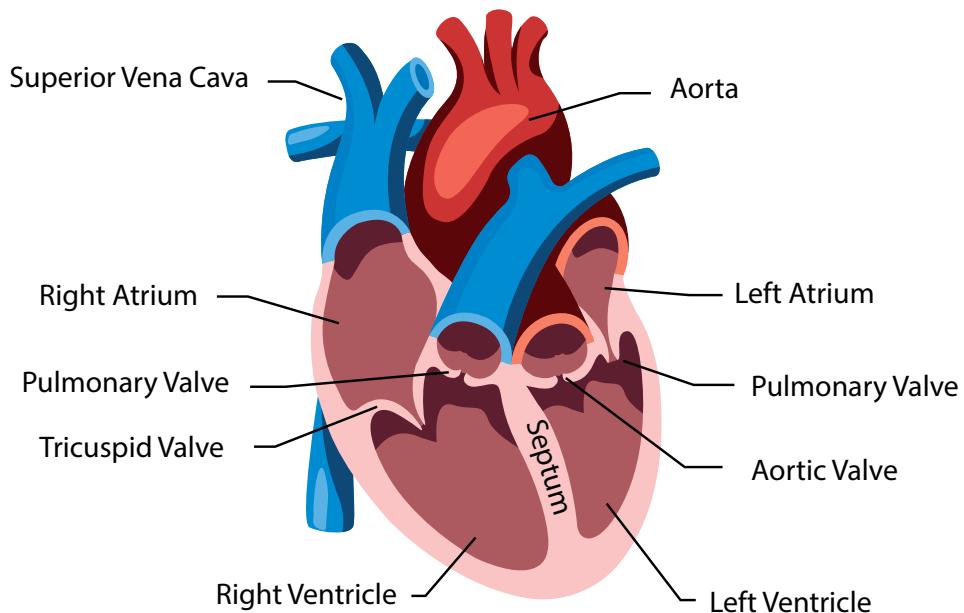
The heart has four chambers — two on top and two on bottom: The two bottom chambers are the **right ventricle** and the left ventricle. These pump blood out of the heart.

A wall called the **interventricular septum** is between and separates the two ventricles. The two top chambers are the right atrium and the left atrium. They receive the blood entering the heart.

A wall called the **interatrial septum** is between and separates the atria.

The atria are separated from the ventricles by the **valves**.

Another set of valves also separate the ventricles from the large blood vessels that carry blood leaving the heart. These valves act like doors, allowing the flow of blood in only one direction



## THE ELECTRICAL AND PUMPING ACTIVITIES OF THE HEART

The heart receives (electrical impulses) messages from the body telling when to increase or reduce the rate of pumping blood according to the need of the person.

For example, when one is sleeping, it pumps just enough to provide for the lower amounts of oxygen needed by the body at rest. But when you are exercising, the heart pumps faster so that your muscles get more oxygen and can work harder.

One complete heartbeat is made up of two phases:

- a. The first phase is called **systole** (pronounced: SISS-tuh-lee). This is when the ventricles contract and pump blood into the aorta and pulmonary artery.
- b. The second phase is called **diastole** (pronounced: die-AS-tuh-lee). This is when the atrioventricular valves open and the ventricles relax. This allows the ventricles to fill with blood from the atria and get ready for the next heartbeat.

## TYPES OF BLOOD VESSELS

here are three main types of blood vessels:

- a. **Arteries:** Arteries are thin, muscular tubes that carry oxygenated blood away from the heart and to every part of your body. The aorta is the body's largest artery. It starts at the heart and travels up the chest (ascending aorta) and then down into the stomach (descending aorta). The coronary arteries branch off the aorta, which then branch into smaller arteries (arterioles) as they get farther from the heart.
- b. **Veins:** These blood vessels return oxygen-depleted blood to the heart. Veins start small (venules) and get larger as they approach the heart. Two central veins deliver blood to the heart. The Superior vena cava carries blood from the upper body (head and arms) to the heart. The Inferior vena cava brings blood up from the lower body (stomach, pelvis and legs) to the heart. Veins in the legs have valves to keep blood from flowing backward.
- c. **Capillaries:** These blood vessels connect very small arteries (arterioles) and veins (venules). Capillaries have thin walls that allow oxygen, carbon dioxide, nutrients and waste products to pass into and out of cells.

## **THE CIRCULATORY SYSTEM ORGAN**

The heart is the only circulatory system organ. Blood goes from the heart to the lungs to get oxygen. The lungs are part of the respiratory system. The heart then pumps oxygenated blood through arteries to the rest of the body.

## **THE SIZE OF THE CIRCULATORY SYSTEM**

The body has more than 60,000 miles of blood vessels that circulate about 1.5 gallons (5 liters) of blood every day. All blood is red. Haemoglobin, an iron-rich protein in red blood cells, mixes with oxygen to give blood its red colour. Blood which is rich in oxygen is known as oxygenated red blood. Arteries carry oxygen-rich blood, while veins carry oxygen-poor (deoxygenated) blood. This is sometimes called blue blood because the veins can look blue underneath the skin especially for those with fair skin. The blood is actually red, but the low oxygen levels give veins a bluish hue.

## **CHAPTER 2: FUNCTION OF THE CARDIOVASCULAR SYSTEM**

The circulatory system plays a critical role in keeping a person alive as it is critical to the maintenance of healthy organs, muscles and tissues.

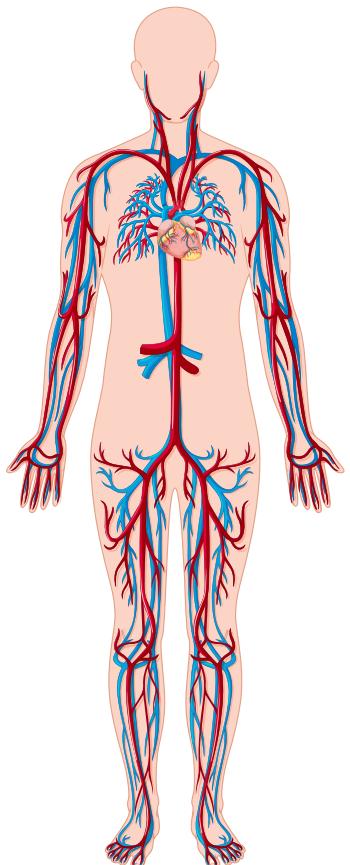
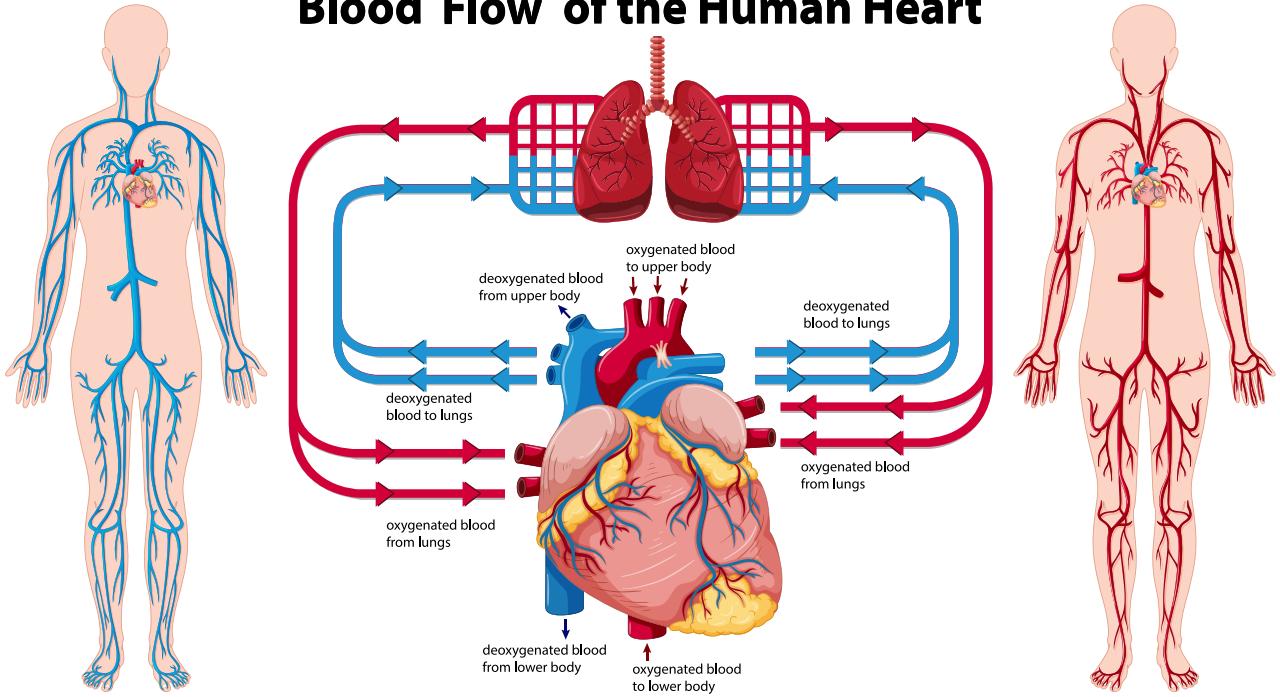
The circulatory system (cardiovascular) pumps blood from the heart to the lungs where the blood receives oxygen and it becomes oxygenated blood. The oxygen-rich blood from the Lungs then returns to Heart. The heart then sends oxygenated blood through arteries to the rest of the body. The veins carry oxygen-poor blood back to the heart to start the circulation process over.

### **How the Circulatory System works**

The blood vessels work with the heart and lungs to continuously circulate blood through your body. The Mechanism is as follows:

- a. The heart's bottom right pumping chamber (right ventricle) sends blood which is low in oxygen to the lungs.
- b. In the lungs, Blood cells pick up oxygen (oxygenated blood).
- c. The oxygenated blood from the lungs is carried to the heart's left atrium (upper heart chamber).
- d. The left atrium sends the oxygenated blood into the left ventricle (lower chamber).
- e. The Left Ventricle pumps the blood out to the body
- f. As it moves through the body and organs, blood collects and drops off nutrients, hormones and waste products.
- g. The veins (Superior and Inferior Vena Cavae) carry deoxygenated blood and carbon dioxide from the body back to the Right atrium of the heart.
- h. The deoxygenated Blood from the Right atrium enters into the Right ventricle and from here to the Lungs and the cycle keep repeating.

## Blood Flow of the Human Heart



### **What does the circulatory system do?**

The circulatory system is made up of blood vessels that carry blood away from and towards the heart. Arteries carry blood away from the heart and veins carry blood back to the heart. Therefore, the function of the circulatory system is to move blood throughout the body.

This blood circulation keeps organs, muscles and tissues healthy and working and keep the person alive. As circulatory system carries oxygen, nutrients, and hormones to cells, it also removes waste products, like carbon dioxide.

These roadways travel in one direction only, to keep things going where they should.

The waste products usually eliminated by the circulatory system include:

- a. Carbon dioxide from respiration (breathing).
- b. Other chemical by-products from the organs.
- c. Waste from things we eat and drink.