Recall…

* The main function of the respiratory system is to oxygen to and removes carbon dioxide from the blood (gas exchange)

* The system that transports these gases between the lungs and the cells is the circulatory system

The Circulatory System

Go with the flow!

Circulatory System - Video

The Circulatory System

* Cells require **constant supply** of oxygen and nutrients as well as **constant removal** of carbon dioxide and other wastes
* The circulatory system acts as both a **delivery** and **clean-up** system
* The blood carries oxygen and nutrients **to** the cells then carbon dioxide and wastes **away** from the cells

How does it work?

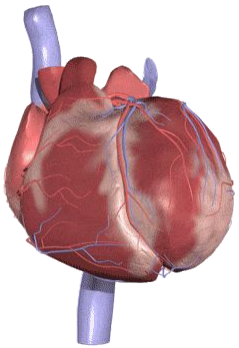
* The circulatory system is essentially a **pump** and **tubes**

* Blood is pumped through the body by the **heart** (the pump) and travels through blood **vessels** (the tubes)

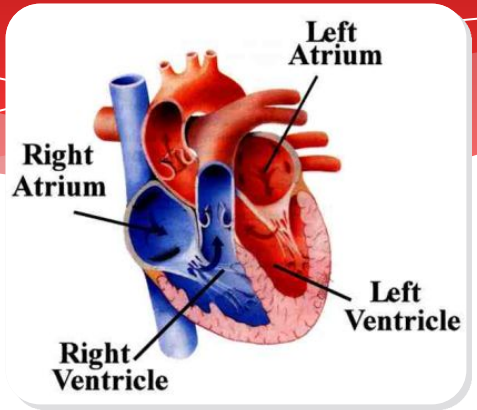
The Heart

* A muscular **organ** located between the **lungs** in the chest

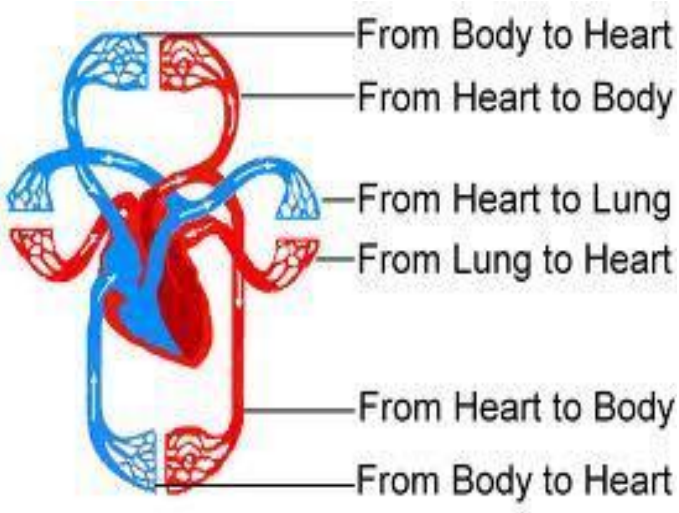
* It is a powerful **pump** that beats an average of **72** times/minute



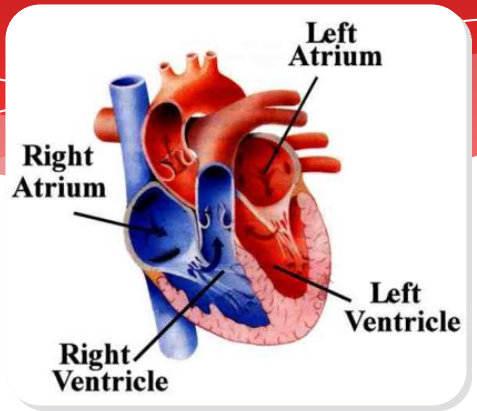
The Heart



* The upper-right chamber (right **atrium**) receives carbon dioxide-rich blood from all over the body
* Then, the carbon dioxide-rich blood moves into the lower-right chamber (right **ventricle**), which pumps it to the lungs
* Inside the lungs, the blood gets rid of the carbon dioxide and picks up **oxygen**



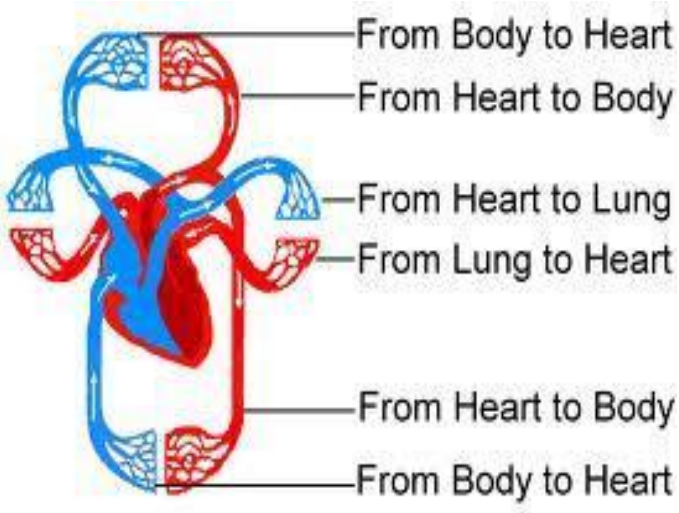
The Heart



* The upper-left chamber (left **atrium**) receives oxygen-rich blood from the lungs

* Then, oxygen-rich blood moves into the lower-left chamber (left **ventricle**) which pumps it out to the **body** cells

* The heart contains **valves** to control the flow of blood and prevent **backflow**

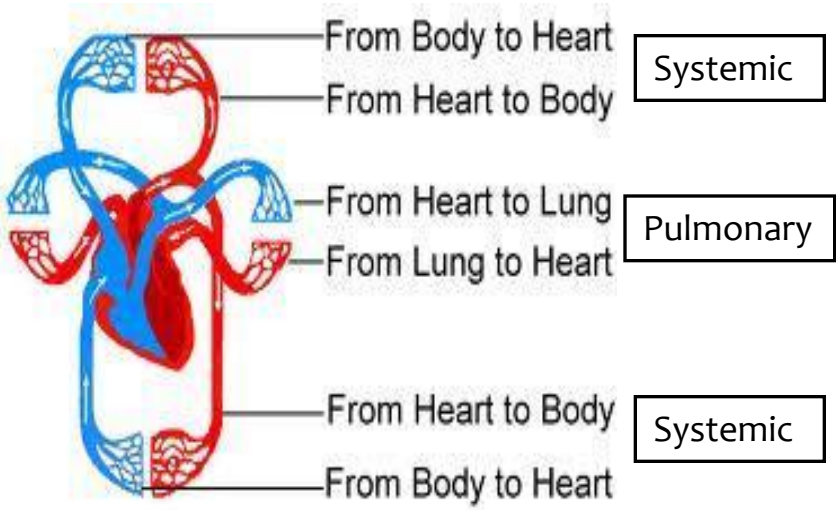


Two Systems

* There are two separate systems within the main circulatory system:

1. **Pulmonary :** circulates oxygen-poor blood to the **lungs** to become oxygen-rich blood to be delivered to the body

2. **Systemic:** circulates oxygen-rich blood to the **body** delivering nutrients, picking up wastes and then delivering oxygen-poor blood **back** to the heart



Blood Vessels

* The **branches** of the circulatory system
* As they move towards the cells, they branch out and grow **smaller and smaller**
* This allows them to bring blood to **all** the cells of the body
* As they move away from cells and back towards the lungs, they grow **larger** again

Blood Vessels

There are three main types:

1. **Artery**:
   - thick, elastic wall
   - carry blood **away** from the heart

2. **Capillary:**
   - small and thin
   - Where nutrient and **gas exchange** occur

3. **Vein**:
   - thin, inelastic wall
   - carry blood **toward** the heart
   - contain **valves** → **WHY?**

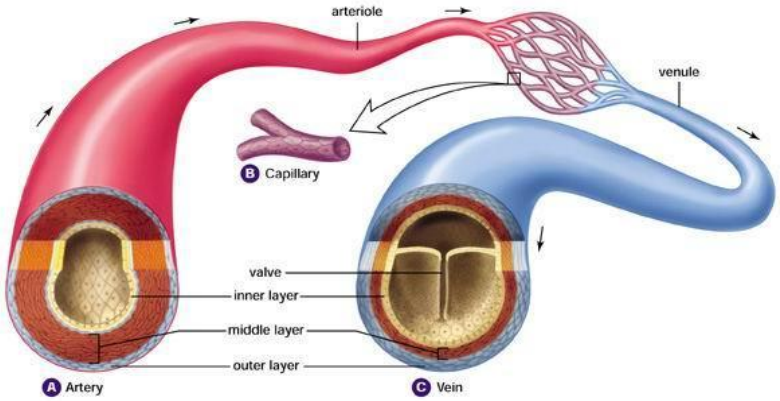
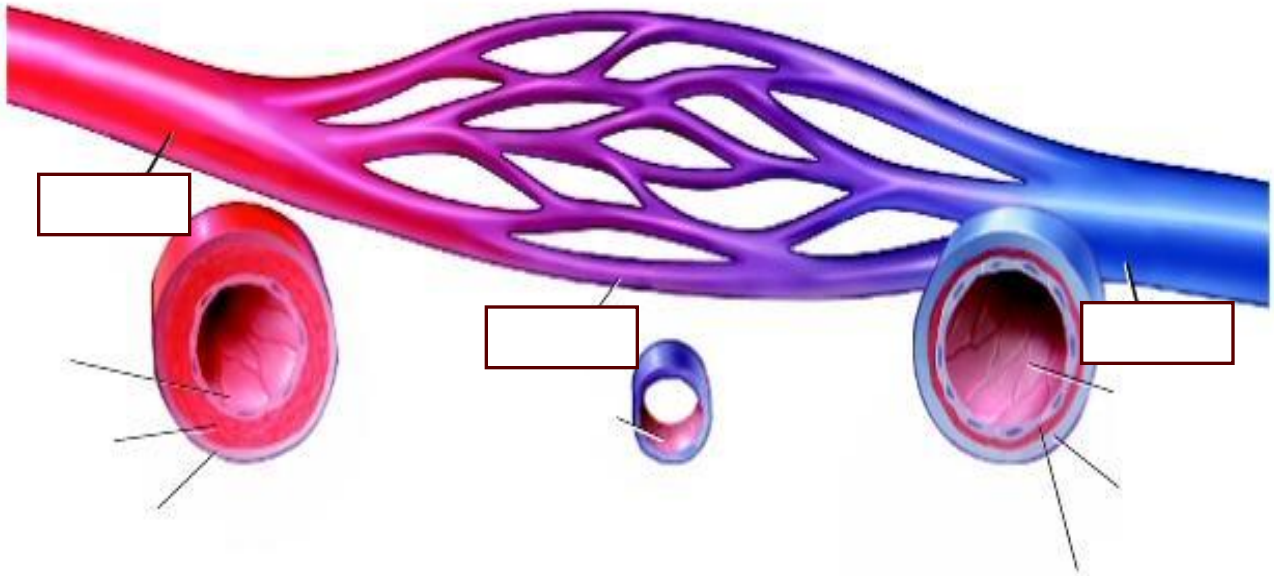
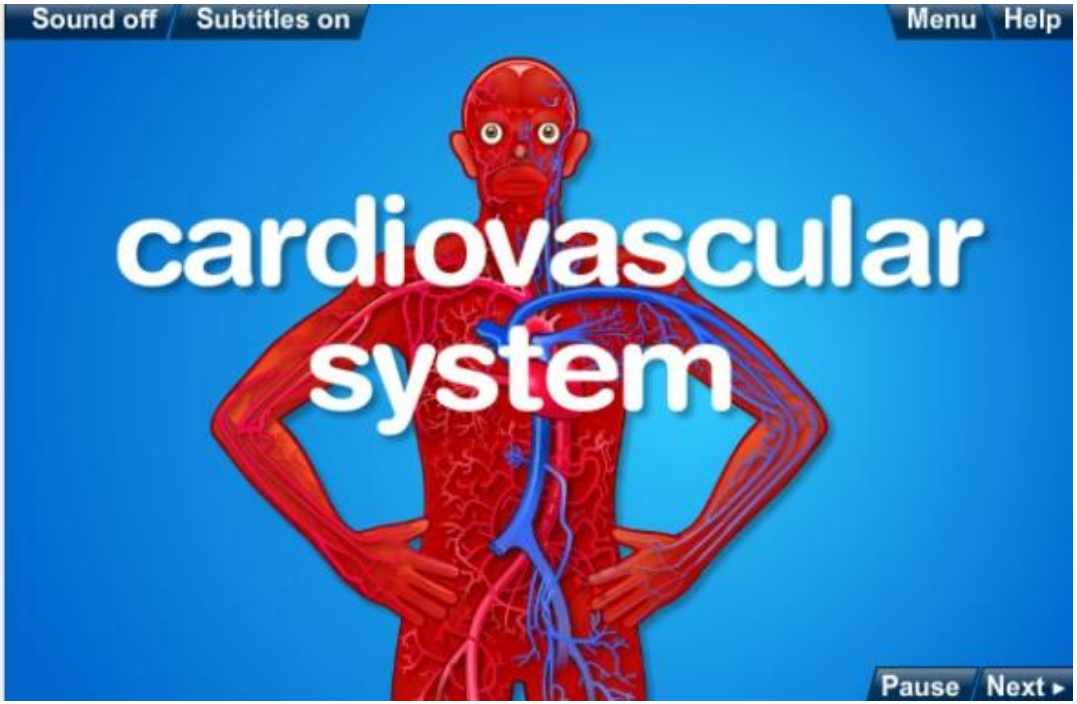


Figure 9.12. Sections through an artery, capillary, and vein. At any given moment, about 30% of the blood in your systemic circulation will be found in the arteries, 5% in the capillaries, and 65% in the veins.



Activity

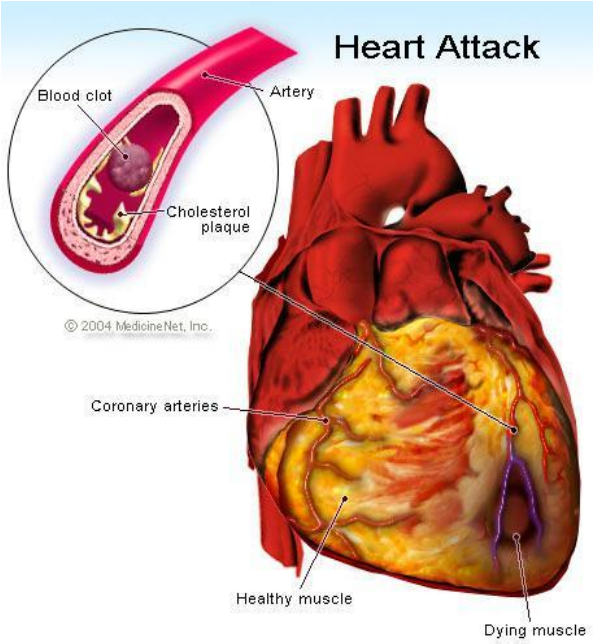

Sound off
Subtitles on
Menu
Help
cardiovascular
system
Pause
Next ▸

Problems in the Circulatory System

* **Anemia-** a condition where there is a lack of red blood cells or of hemoglobin in the blood
* **Hemophilia-** a rare disorder that prevents blood from clotting
* **Hypertension**- high blood pressure
* **Arteriosclerosis**- thickening of the walls of the arteries

Problems in the Circulatory System

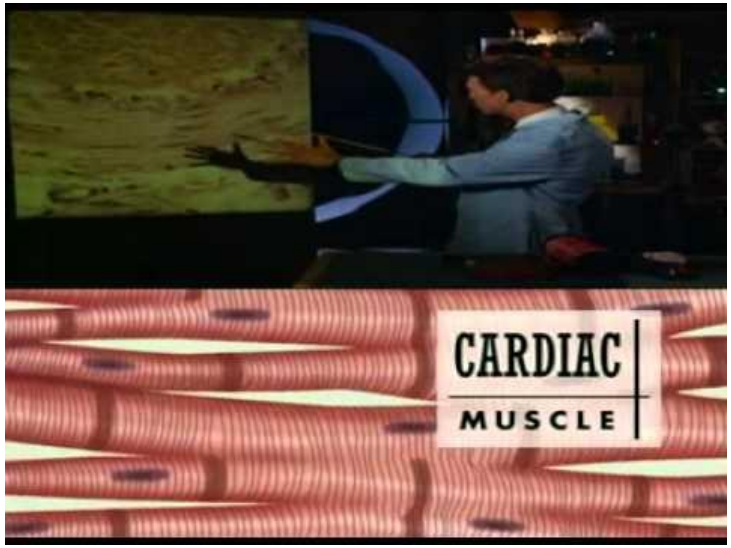
* Both hypertension and arteriosclerosis can cause the formation of blood clots which can break free
* If a blood clot flows to a coronary artery, it can block a vessel and cause a heart attack
* If the blood clot flows to the brain, it may block a vessel and cause a stroke



Videos

* https://www.youtube.com/watch?v=riDPxasIz_I

BNSG Heart 23 min



BNSG Blood and circulation 23 min