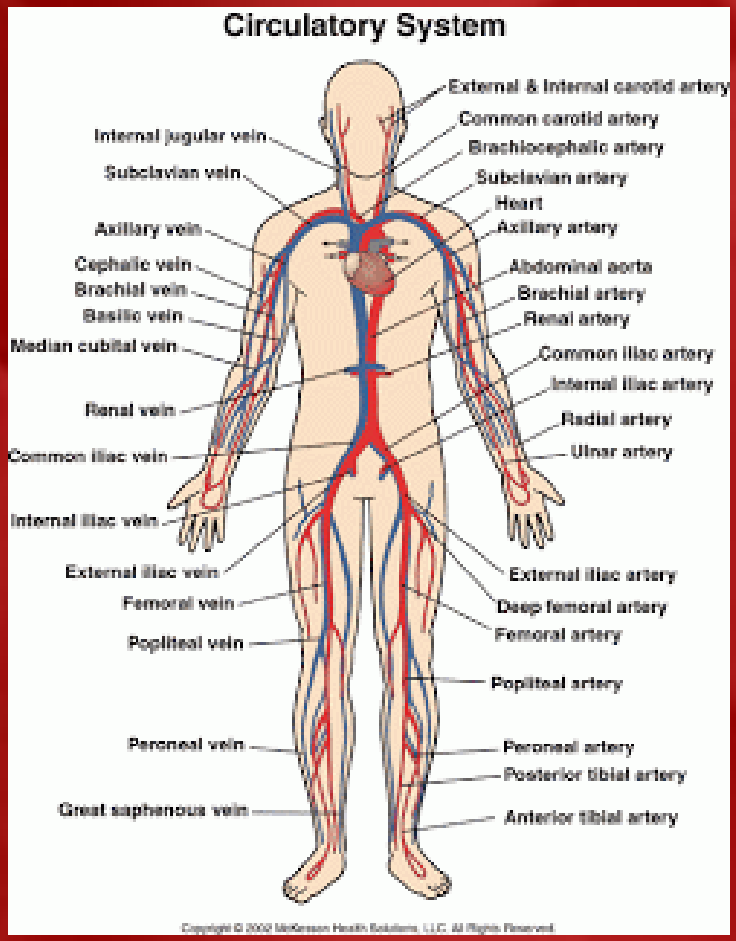
The Circulatory System

p. 195 - 200

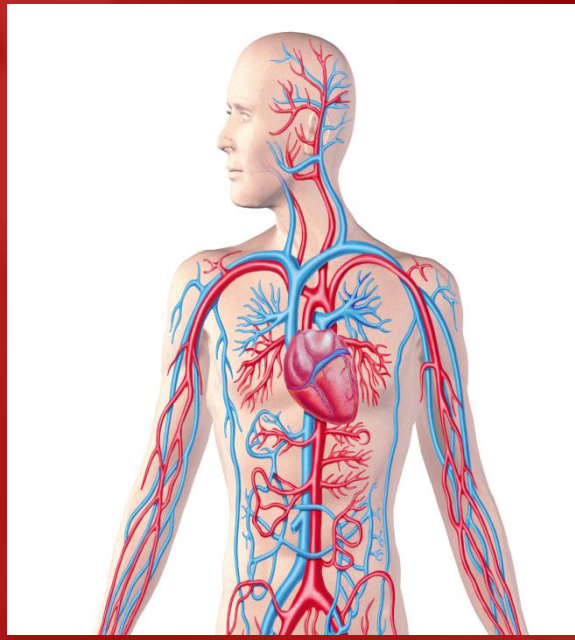


The circulatory system is connected to **all other systems** and serves four principal functions:

- **1) Transportation of oxygen and carbon dioxide**
- **2) Distribution of nutrients and transport of wastes**
- **3) Maintenance of body temperature**
- **4) Circulation of hormones**

The **circulatory system** is made up of three components:

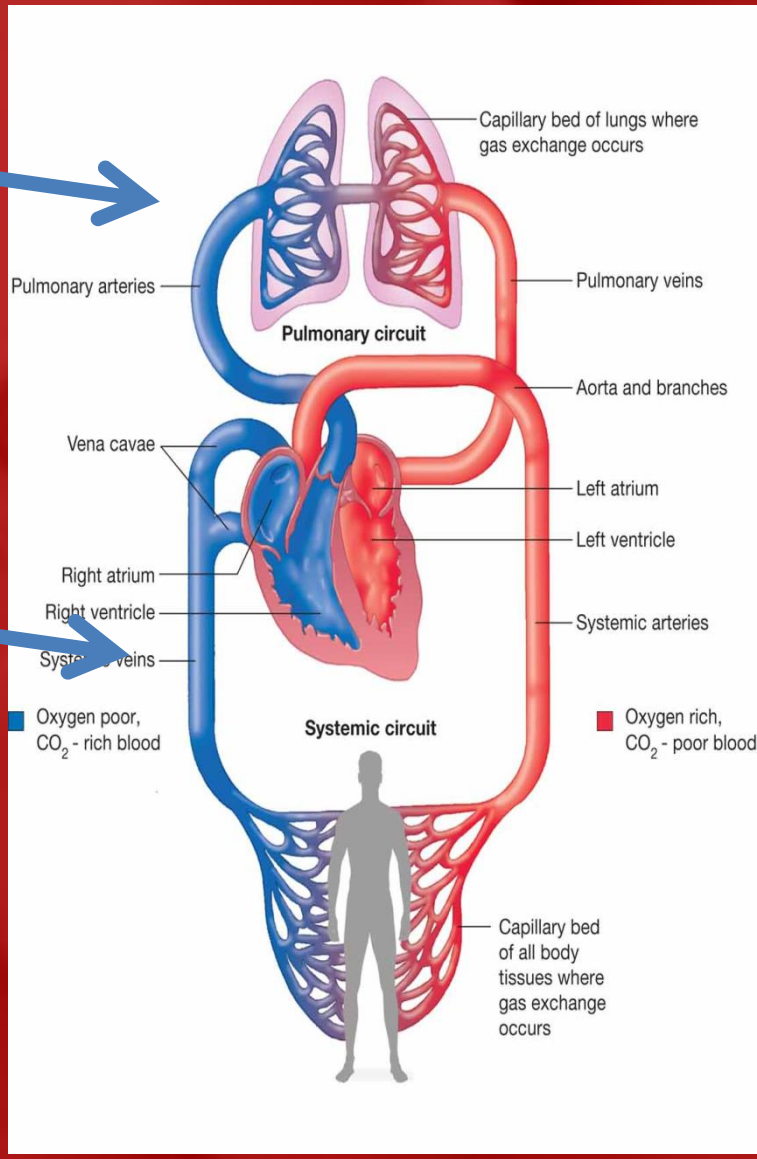
1. **Blood** → **A fluid in which materials are transported**
2. **Blood vessels** → **A system in which materials are transported**
3. **Heart** → **A pump that pushes blood through the vessels**



❖The Cardiovascular system consists of the **heart** and **blood vessels**

Blood Flow

1) **Pulmonary circuit:**
   - **right side of the heart** → pumps blood to the **lungs** → blood picks up **oxygen** → blood returns to **left side of heart**
2) **Systemic circuit:**
   - Oxygenated blood enters **left side of the heart** → blood pumped to **all parts of the body** → blood vessels(**arteries**) deliver **oxygen** and other **materials**
   - **Deoxygenated blood is returned to the right side of the heart (veins)**

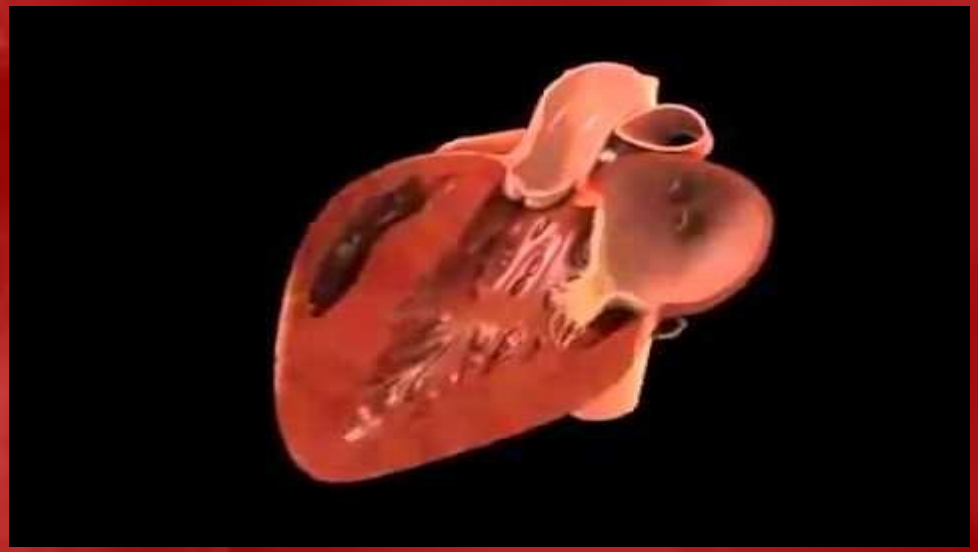


The Heart

- The **mammalian** heart consists of a **double pump** separated by the **septum**
- **Septum**: **a wall of muscle that separates the right heart pump from the left**
- Each pump consists of a thin-walled **atrium** and a think walled **ventricle**, therefore the mammalian heart has **four chambers**:
  1. **right atrium**
  2. **left atrium**
  3. **right ventricle**
  4. **left ventricle**

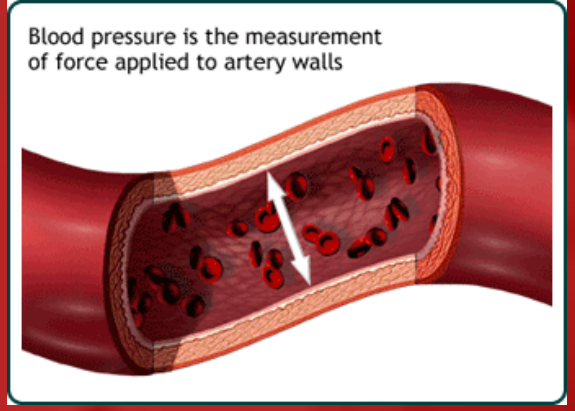
The Heart

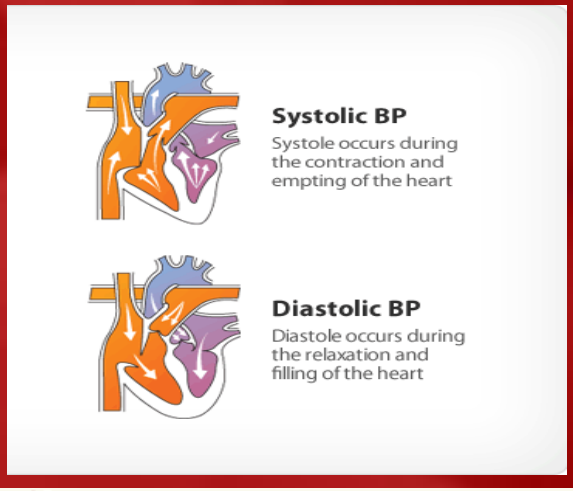
- Atria receive blood from **veins** and pump it into the **ventricles**
- Ventricles are more **muscular** and pump blood to **distant tissues**
- The atria and ventricles are separated by **valves** that allow blood to move between them at specific times

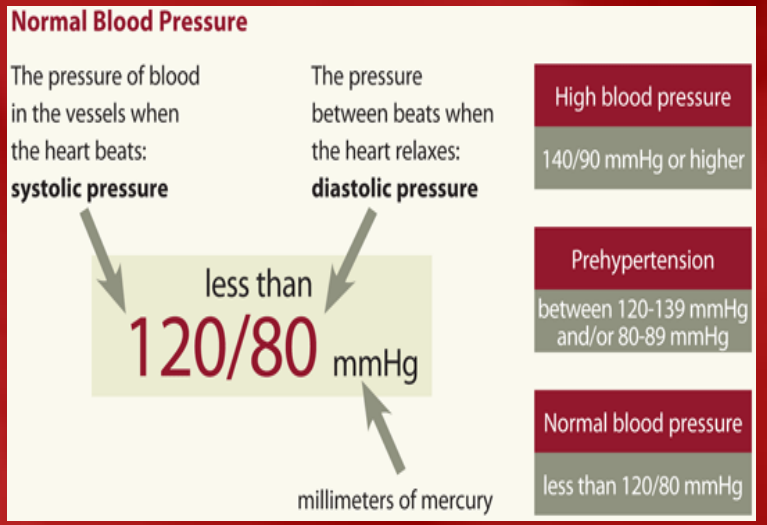


Blood pressure

- ***Blood pressure:*** **the pressure exerted on the walls of the arteries when the ventricles of the heart contract**
- ***Systole:*** **contraction of the ventricles, during which blood is pushed out of the heart**
- ***Diastole:*** **relaxation of the heart, during which the cavities of the heart fill with blood**
- The normal blood pressure for a young adult is **120 (systolic) over 80 (diastolic)**

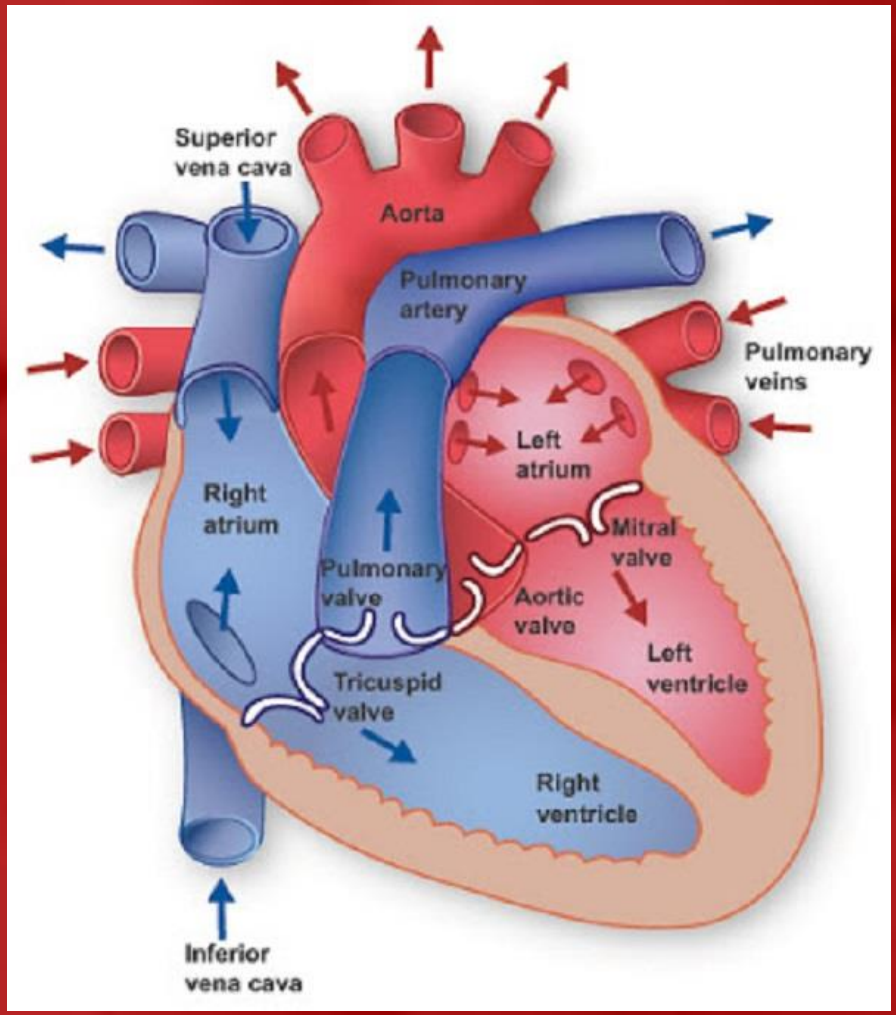






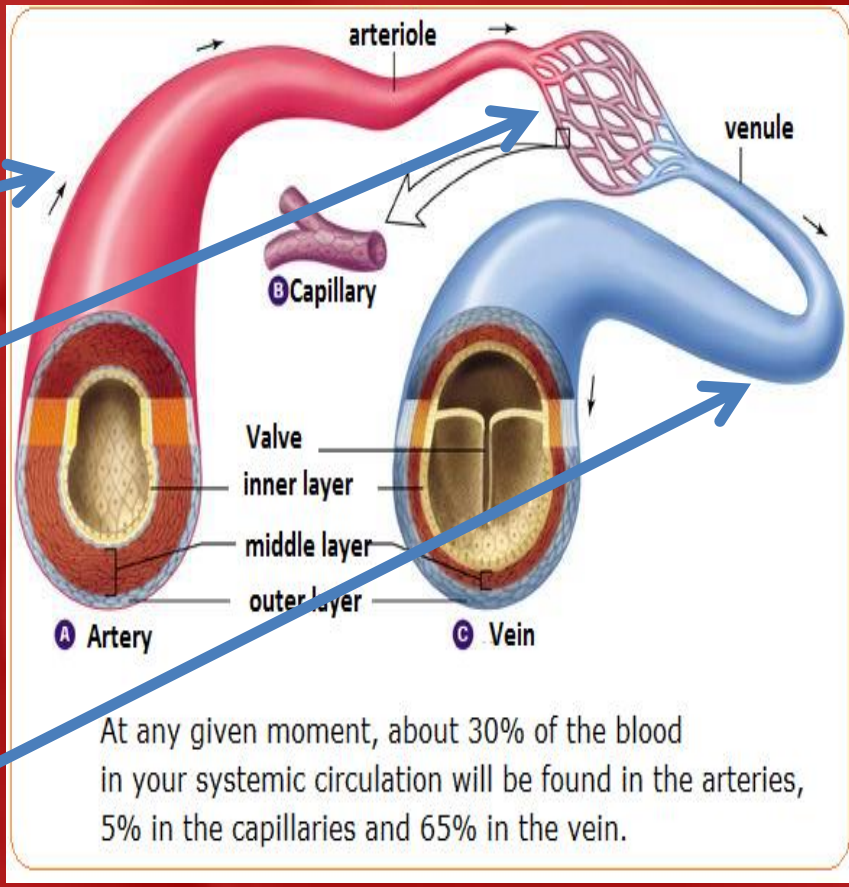
Label the diagram of the Heart in your package

- Colour the chambers :
  - Oxygen rich blood – red
  - Oxygen poor blood – blue
- Draw arrows through the chambers and vessels to indicate the flow of blood through the heart (use your textbook to help!)



Blood Vessels

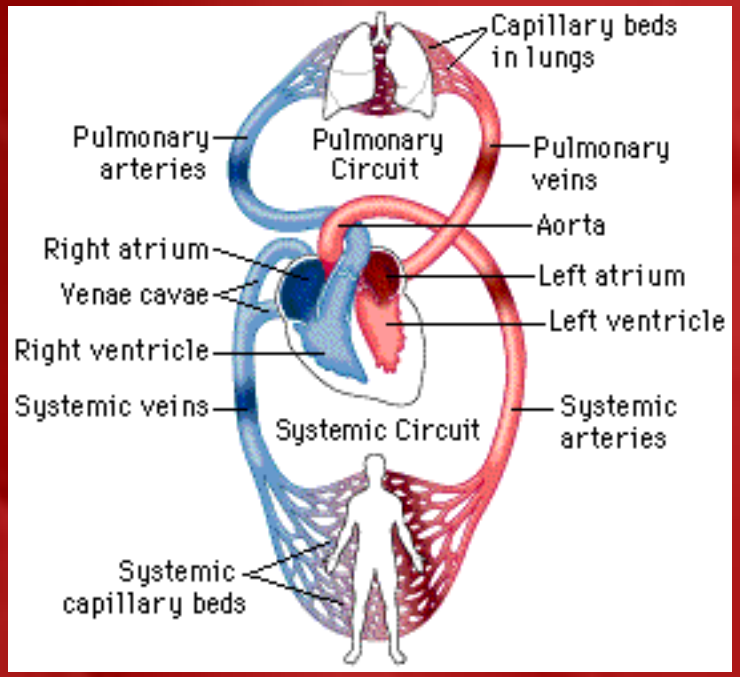
- There are 3 main types of blood vessels:
  1) Arteries- **carry blood away from the heart**
  2) Capillaries- **tiny blood vessels in the tissue, red blood cells moves through them in single file**
  3) Veins- **carry blood towards the heart**



***Arterioles* - receives blood from arteries and controls blood flow into capillaries**
***Venules* – smaller veins connect between larger veins and cappillaries**

Flow through the human circulatory system:

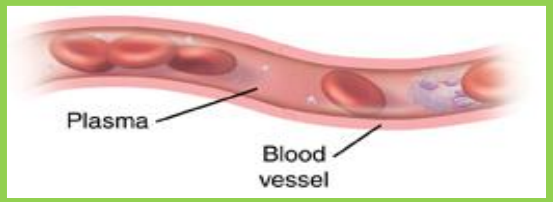
Heart→ **arteries**→ **capillaries**→ **veins**→ return to heart



Pulse:

Change in the diameter of the arteries that can be felt on the body's surface following heart contractions

The Blood

Blood Component	Structure	Function
Plasma	▪ Clear, yellowish fluid 	▪ Carries the red and white blood cells and platelets ▪ Carries dissolved gases, nutrients, wastes and hormones around the body ▪ flows
Red Blood Cells (erythrocytes)	▪ contains hemoglobin ▪ no nuclei ▪ biconcave shape 	▪ transport oxygen
White Blood Cells (leukocytes)	▪ fewer in number than red blood cells ▪ several types ▪ contain nuclei 	▪ Protects body against invading microorganisms and toxins
platelets	▪ Small, irregularly shaped 	▪ Initiates blood clotting

Human blood smear