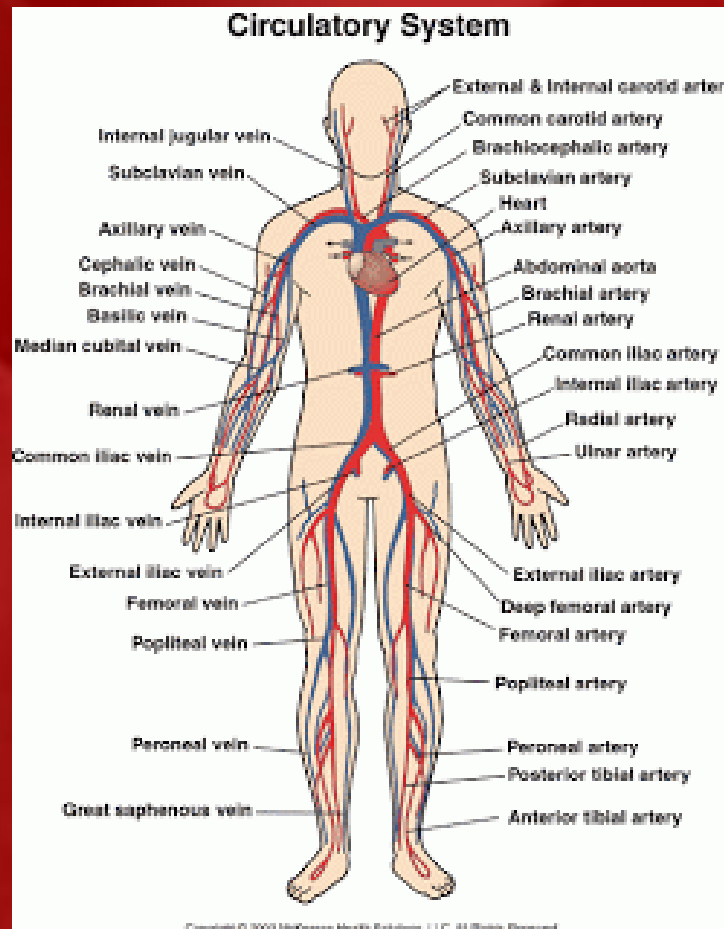


The Circulatory System

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



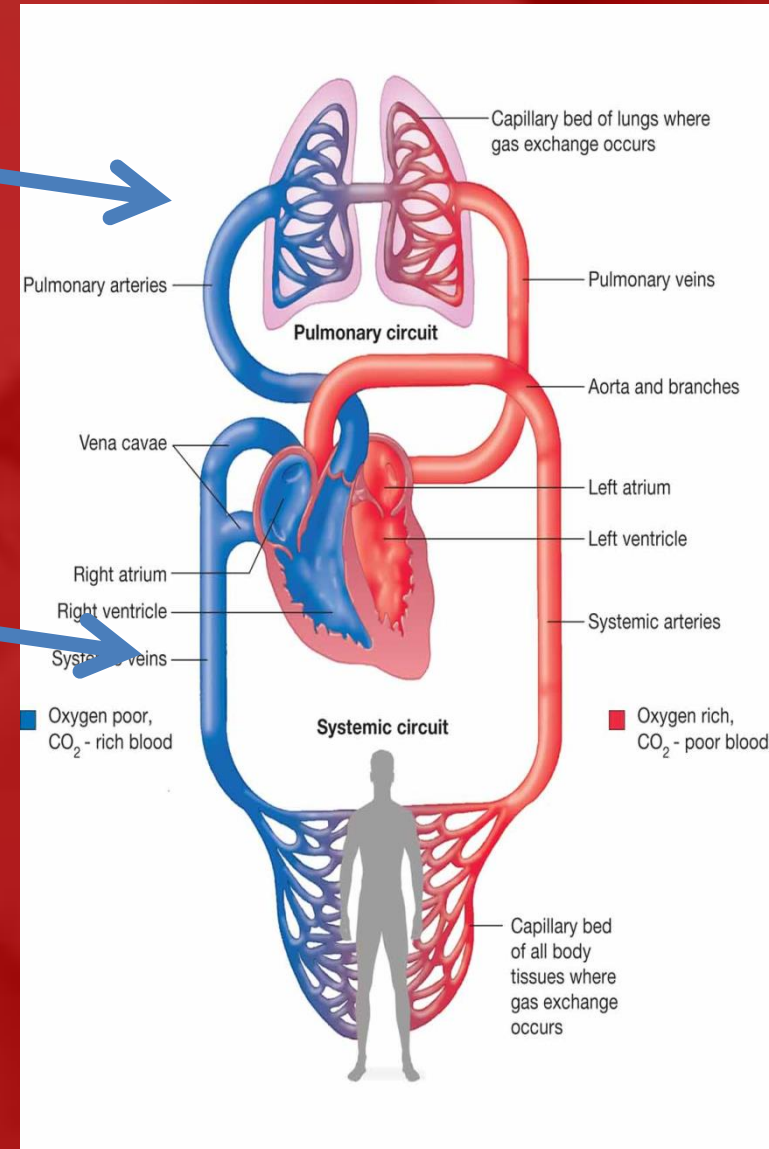
Blood Flow

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)

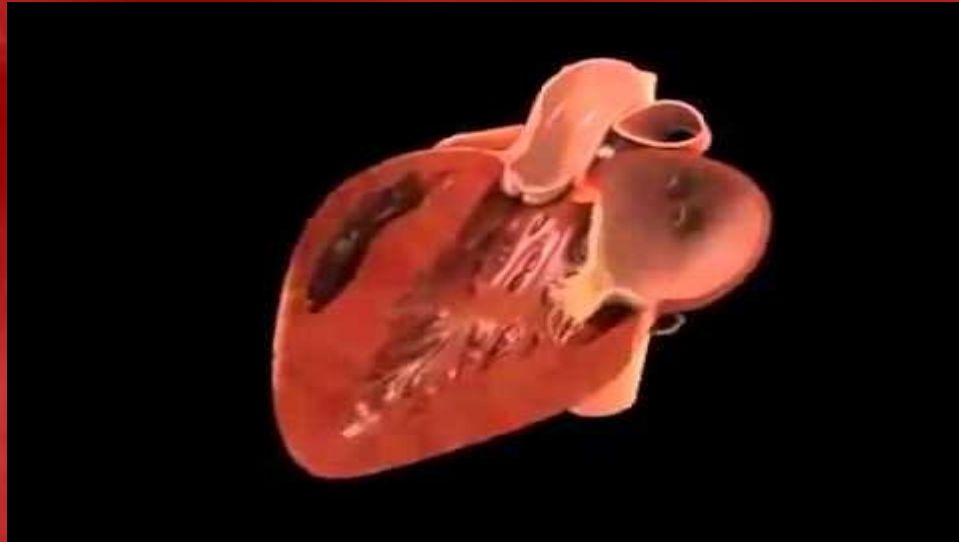


The Heart

- 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 thick walled ventricle, therefore the mammalian heart has **four chambers**:
 1. **right atrium**
 2. **left atrium**
 3. **right ventricle**
 4. **left ventricle**

The Heart

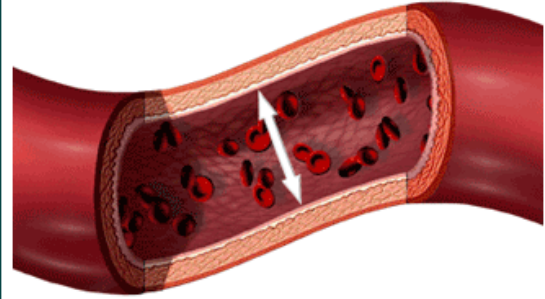
- Atria receive blood from veins and pump it into the ventricles
- Ventricles are more muscular and pump blood to distant tissues
- The atria and ventricles are separated by valves that allow blood to move between them at specific times



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)**

Blood pressure is the measurement of force applied to artery walls



Systolic BP

Systole occurs during the contraction and emptying of the heart



Diastolic BP

Diastole occurs during the relaxation and filling of the heart

Normal Blood Pressure

The pressure of blood in the vessels when the heart beats:
systolic pressure

The pressure between beats when the heart relaxes:
diastolic pressure

less than
120/80 mmHg

millimeters of mercury

High blood pressure

140/90 mmHg or higher

Prehypertension

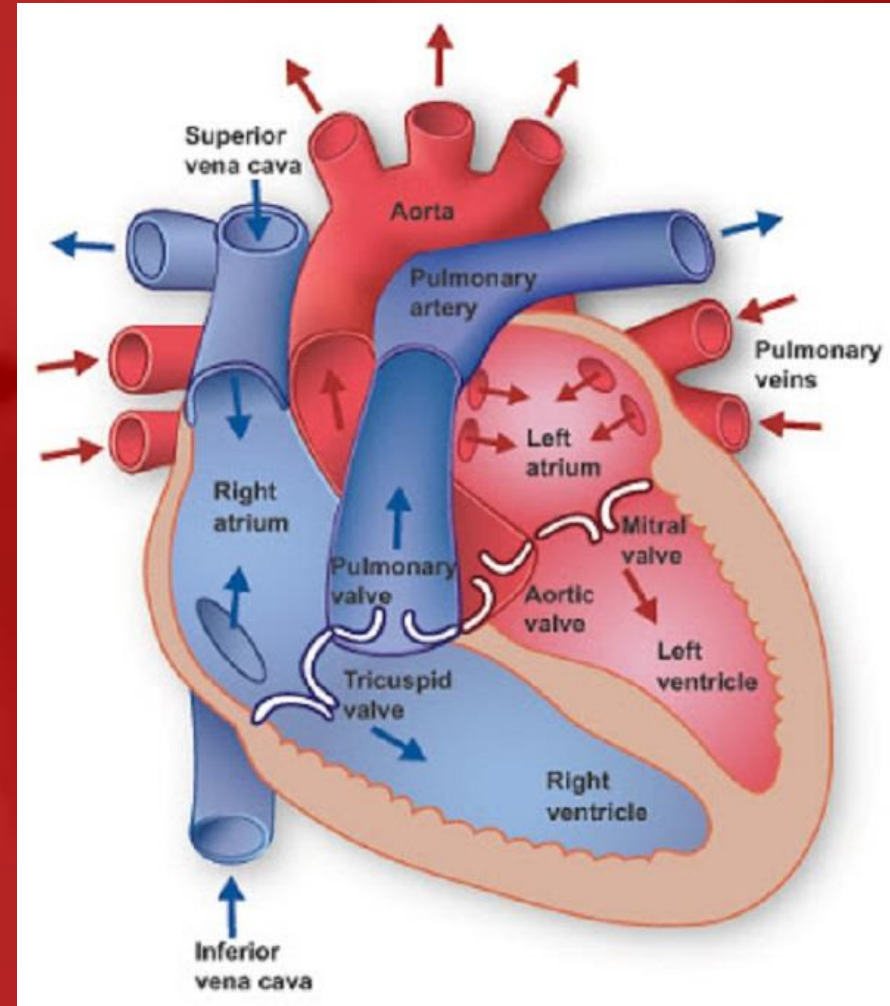
between 120-139 mmHg and/or 80-89 mmHg

Normal blood pressure

less than 120/80 mmHg

****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!)



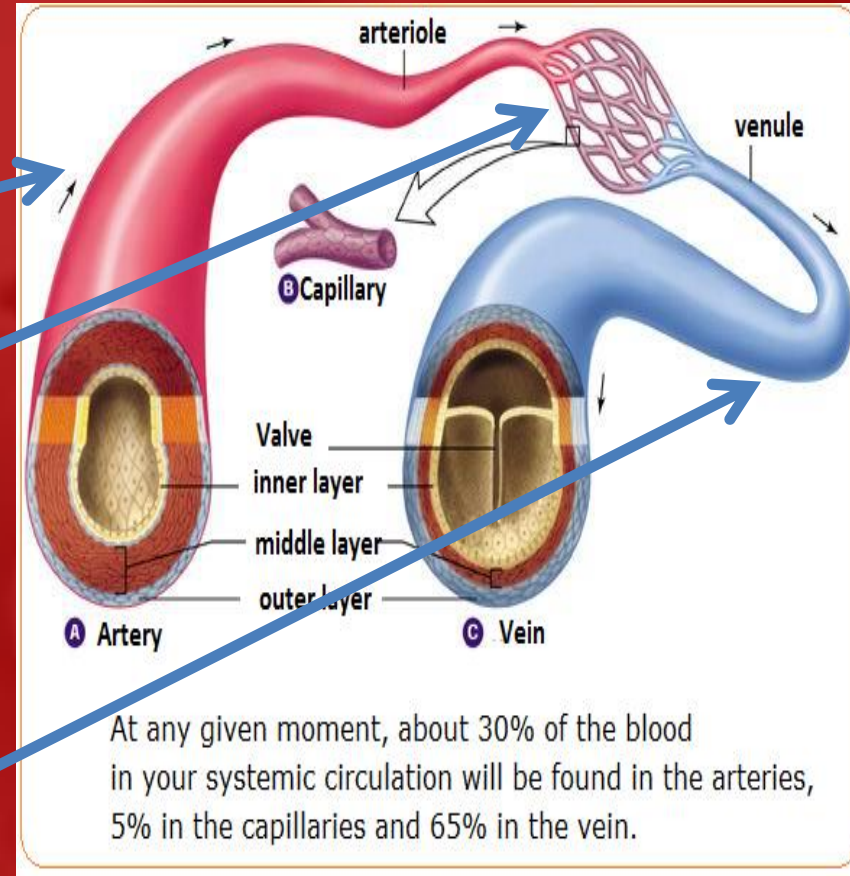
Blood Vessels

- 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

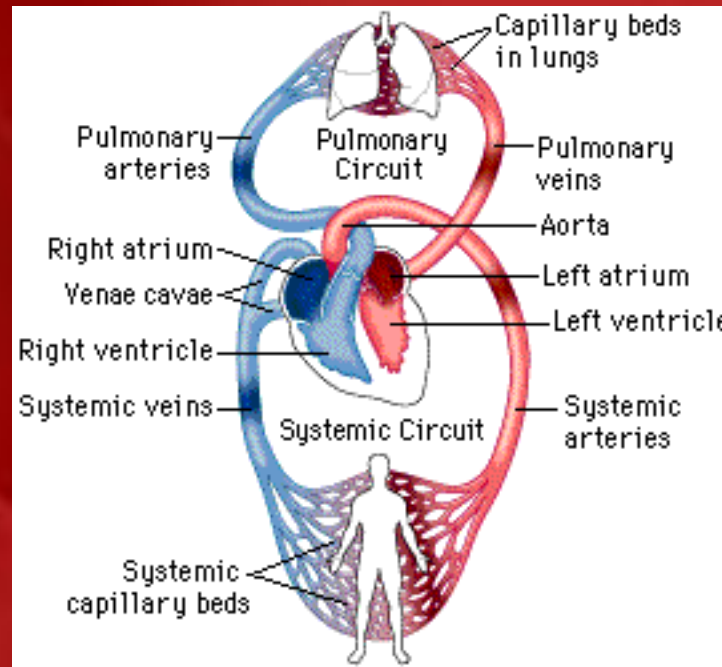
3) Veins- carry blood towards the heart



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

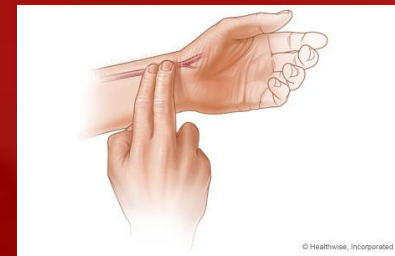
Flow through the human circulatory system:

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

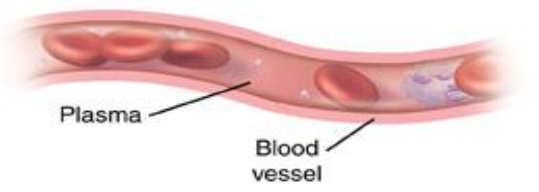





Pulse:

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	<ul style="list-style-type: none"> Clear, yellowish fluid  <p>The diagram shows a cross-section of a blood vessel. Inside, there are several red blood cells and a clear, yellowish fluid. Labels 'Plasma' and 'Blood vessel' point to the fluid and the vessel wall respectively.</p>	<ul style="list-style-type: none"> Carries the red and white blood cells and platelets Carries dissolved gases, nutrients, wastes and hormones around the body flows
Red Blood Cells (erythrocytes)	<ul style="list-style-type: none"> contains hemoglobin no nuclei biconcave shape  <p>The image shows several red blood cells, which are biconcave in shape and lack a nucleus.</p>	<ul style="list-style-type: none"> transport oxygen
White Blood Cells (leukocytes)	<ul style="list-style-type: none"> fewer in number than red blood cells several types contain nuclei  <p>The image shows several white blood cells, which are larger than red blood cells and have a prominent nucleus.</p>	<ul style="list-style-type: none"> Protects body against invading microorganisms and toxins
platelets	<ul style="list-style-type: none"> Small, irregularly shaped  <p>The image shows several small, irregularly shaped platelets.</p>	<ul style="list-style-type: none"> Initiates blood clotting

Human blood smear

