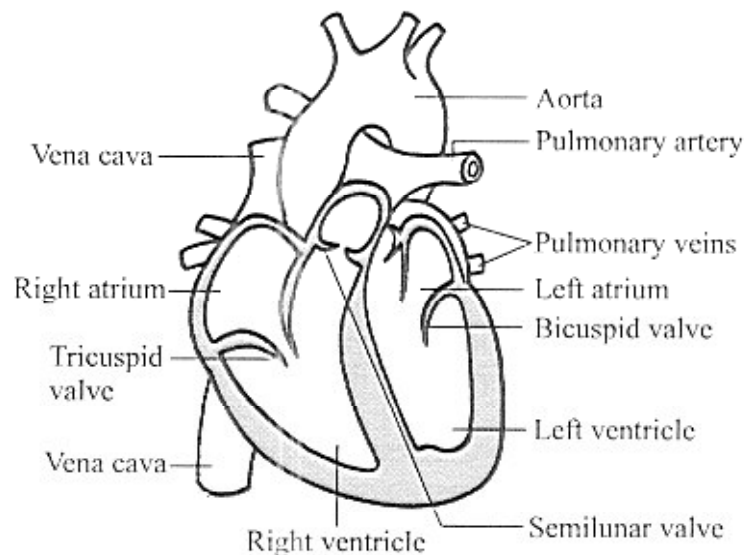


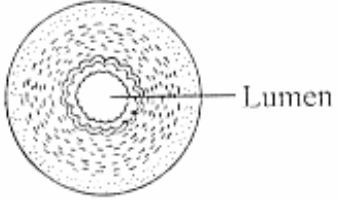
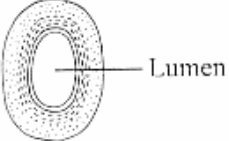
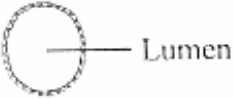
CHAPTER 2: BLOOD CIRCULATION AND TRANSPORT

2.1 TRANSPORT SYSTEM IN HUMAN

- The circulatory system is a system of tubes with a pump and valves that ensure the one-way flow of blood.
- The function of heart is to pump blood to all parts of the body.
- The heart is divided into four chambers. The upper two chambers are the right atrium and left atrium. The lower two chambers are the right ventricle and left ventricle.
- The upper and lower chambers are divided by a muscular wall.
- The left ventricle has the thickest wall because it has to pump blood to all parts of the body.
- There are three types of valves inside the heart.
 - (a) The tricuspid valve is found between the right atrium and the right ventricle.
 - (b) The bicuspid valve is found between the left atrium and the left ventricle.
 - (c) The semilunar valves are situated at the beginning of the pulmonary artery and the aorta.
- The valves prevent blood from flowing backwards.
- Each chamber of the heart is connected to one or two major blood vessels.
 - (a) The vena cava returns blood to the right atrium.
 - (b) The pulmonary artery carries blood from the right ventricle to the lungs.
 - (c) The pulmonary vein carries blood from the lungs to the left atrium.
 - (d) The aorta carries blood out of the left ventricle to all parts of the body.
- Figure below shows the structure of a heart.



- There are three types of blood vessels: artery, vein and capillary.
 - (a) Arteries: carry oxygenated blood away from the heart. (except pulmonary artery)
 - (b) Veins: carry deoxygenated blood towards the heart (except pulmonary vein)
 - (c) Capillaries: connect artery and vein, are the smallest blood vessels with one cell thick walls. They allow substances to diffuse through them.
- The table below shows the comparisons of artery, vein and capillary.

Characteristic	Artery	Vein	Capillary
Cross section			
Lumen size	Medium	Wide	Narrow
Wall	Thick, muscular and elastic	Thin, less muscular and less elastic	One-cell thick
Direction of blood flow	Away from heart	To the heart	From artery to vein
Blood pressure	High	Medium	Low
Presence of valve	No valve (except for the pulmonary artery)	With valve	No valve
Type of blood being carried	Oxygenated blood (except for the pulmonary artery)	Deoxygenated blood (except for the pulmonary vein)	Oxygenated blood from the artery and deoxygenated blood to the vein

- There are two types of blood circulation:
 - (a) Pulmonary circulation: Blood circulates from the heart to the lungs and back to the heart.
 - (b) Systemic circulation: Blood circulates from the heart to other organs and back to the heart.

2.2 HUMAN BLOOD

- There are two components in blood. The liquid component is called plasma and the solid component consists of red blood cells, white blood cells and platelets.
- Plasma: is to carry dissolved substances and heat around the body.
- Red blood cells: is to transport oxygen in their haemoglobin to all parts of the body.
- White blood cells: is to fight infections by killing microorganisms in our body.
- Platelets: is to help in blood clotting to stop bleeding.
- There are four blood groups: A, B, AB and O.
- Group O: universal donor, group AB: universal recipient.
- The table below shows the compatibility of blood among the donors' blood and the recipients' blood.

Donor's blood group	Recipient's blood group			
	A	B	AB	O
A	√	x	√	x
B	x	√	√	x
AB	x	x	√	x
O	√	√	√	√

√ : compatible x : not compatible. Agglutination occurs,

2.3 TRANSPORT SYSTEM IN PLANTS

- Transpiration is a process by which water is lost in the form of water vapour from the surface of a plant into the air by evaporation.
- Guard cells control the opening and closing of stomata in leaves.
- Factors affecting the rate of transpiration:
 - (a) Temperature
 - (b) Light intensity
 - (c) Wind
 - (d) Humidity of air
 - (e) Number of stomata

- Roles of transpiration:
 - (a) Get rid of excess water from plants
 - (b) Cool plants on hot days
 - (c) Transport water and dissolved mineral salts from the roots to other parts of plants
- The transport system of flowering plants consists of the:
 - (a) xylem which carries water and mineral salts from the roots to the leaves
 - (b) phloem which carries food made in the leaves to other parts of a plant
 - (c) cambium produces new xylem and phloem cells.
- The diagram below shows the cross section of a stem of a woody plant.

