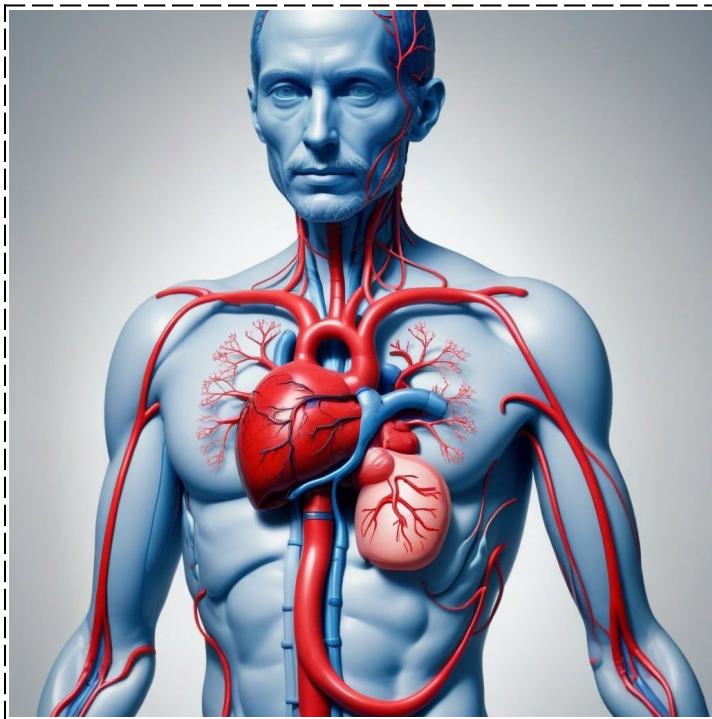




TRANSPORTATION IN ANIMALS AND PLANTS

- ✕ Transport of materials in Plants and Animals is necessary because every cell needs a regular supply of nutrients and oxygen to release energy through respiration.
- ✕ These nutrients and oxygen needs to be transported to all cells of the body, through a transport system, so that they can produce energy.
- ✕ The waste products generated by cells needs to be transported to the excretory organs.

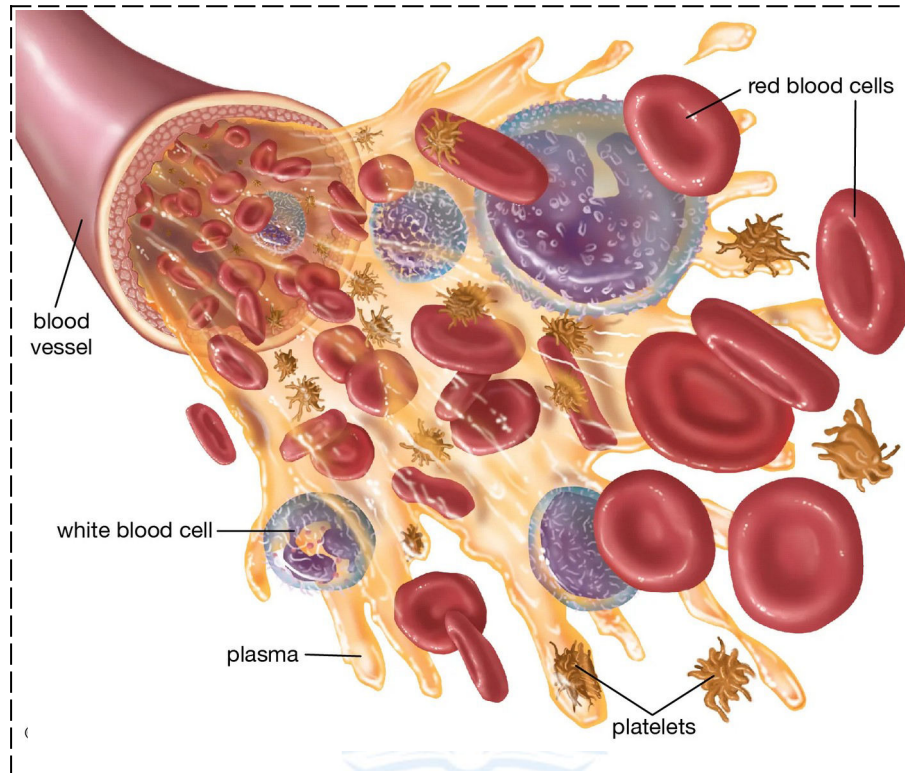
HUMAN CIRCULATORY SYSTEM



- The circulatory system in human consists of **blood, blood vessels** (*arteries, veins and capillaries*).
- It carry blood, water and oxygen to all parts of the body.
- It transports digested food from the small intestine to the other parts of the body.

- It carries oxygen from the lungs to the cells of the body. It also transports waste products (like carbon dioxide) for removal from the body.

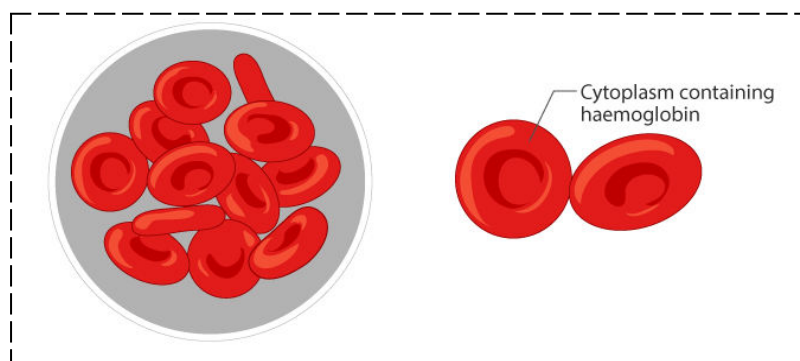
BLOOD



- ✕ Blood is a red colour fluid that flows through a network of tubes called blood vessels (arteries, veins and capillaries).
- ✕ It consists of four components -

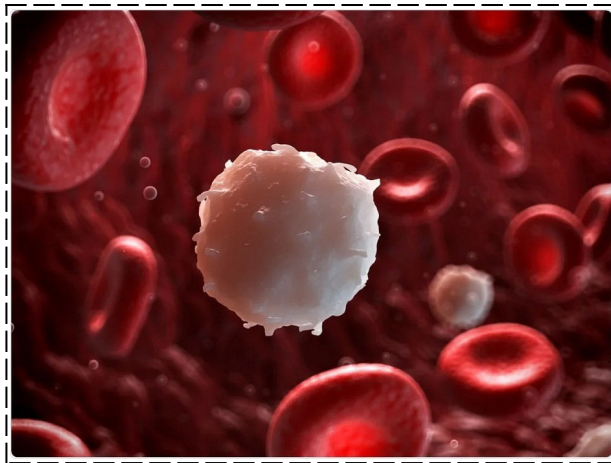
1) Red blood cells (RCBs):

- ✕ Red blood cells are red in colour because it contains a red colour pigment called **haemoglobin**.
- ✕ The pigment binds with oxygen and transports it to all parts of the body and ultimately to all the cells.



2) White blood cells (WBCs):

- ✕ White blood cells **fight against infection and protect us from diseases.**
- ✕ WBCs destroys the germs (like bacteria) that cause diseases.



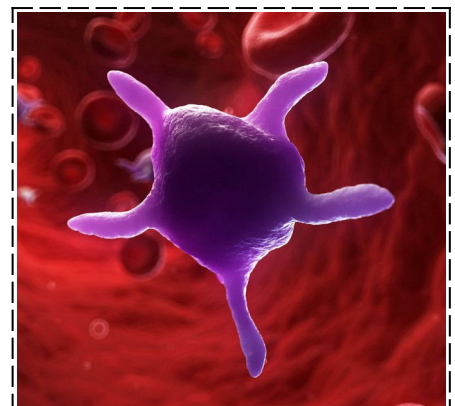
3) Plasma:

- ✕ It is the liquid part of the blood which is **pale yellow in colour.**
- ✕ Plasma carries water and dissolved substances such as digested food and waste products from one part to another part of the body.



4) Platelets:

- ✕ They are small, irregular shaped cell fragments in the blood.
- ✕ Platelets **helps in the clotting of blood in a cut or wound area.**



Functions of Blood

Various functions of blood are -

- a) It transports substances like digested food from the small intestine to other parts of the body.
- b) It carries oxygen from lungs to all the cells of the body.
- c) It carries waste products like urea from the liver to kidney for the excretion in urine.
- d) It protects the body from diseases.

BLOOD VESSELS

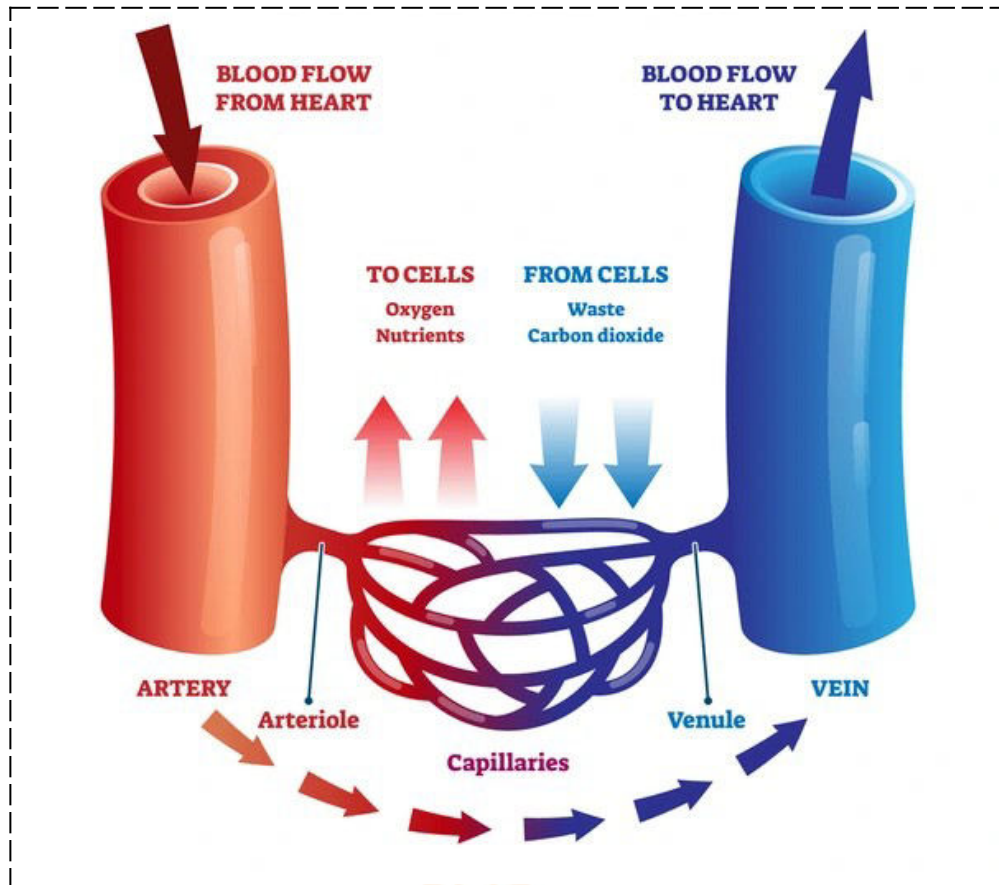
- x These are the **network of tubes** through which blood is pumped all over the body.
- x These vessels run between the heart and the rest of the body.
- x Blood vessels are of two types -

1. ARTERIES

- Arteries are the blood vessels that **carry oxygen-rich blood from the heart to all parts of the body.**
- The Arteries **lie quite deep under the skin** and hence they are not seen easily.
- Since the blood flows from the heart is rapid and at high pressure, **the arteries are thick and elastic walls.**

2. VEINS

- These are blood vessels that **carry carbon dioxide-rich blood from all parts of the body back to the heart.**
- The veins are **less deep than arteries** and hence can be seen easily.
- The greenish-blue line which we can see just below the skin on our hands and legs are the veins.
- Since the **blood flows at a low pressure** through the veins, so **veins have thin walls.**
- Veins have valves that allow **blood to flow only in one direction** (towards the heart) as it prevents the backflow of blood in the veins.



• CAPILLARIES

- Capillaries are thin **blood vessels that connect arteries to veins**.
- The oxygenated blood from arteries enters into the cell through the capillaries and the dissolved substances present in the blood (O_2 and food) pass into the cells through capillaries.
- The waste products (like CO_2) formed in the cells enter into the blood through a thin wall of capillaries.
- Thus, **the exchange of substances (like food, O_2 , CO_2) between the blood and the body cells takes place through capillaries.**

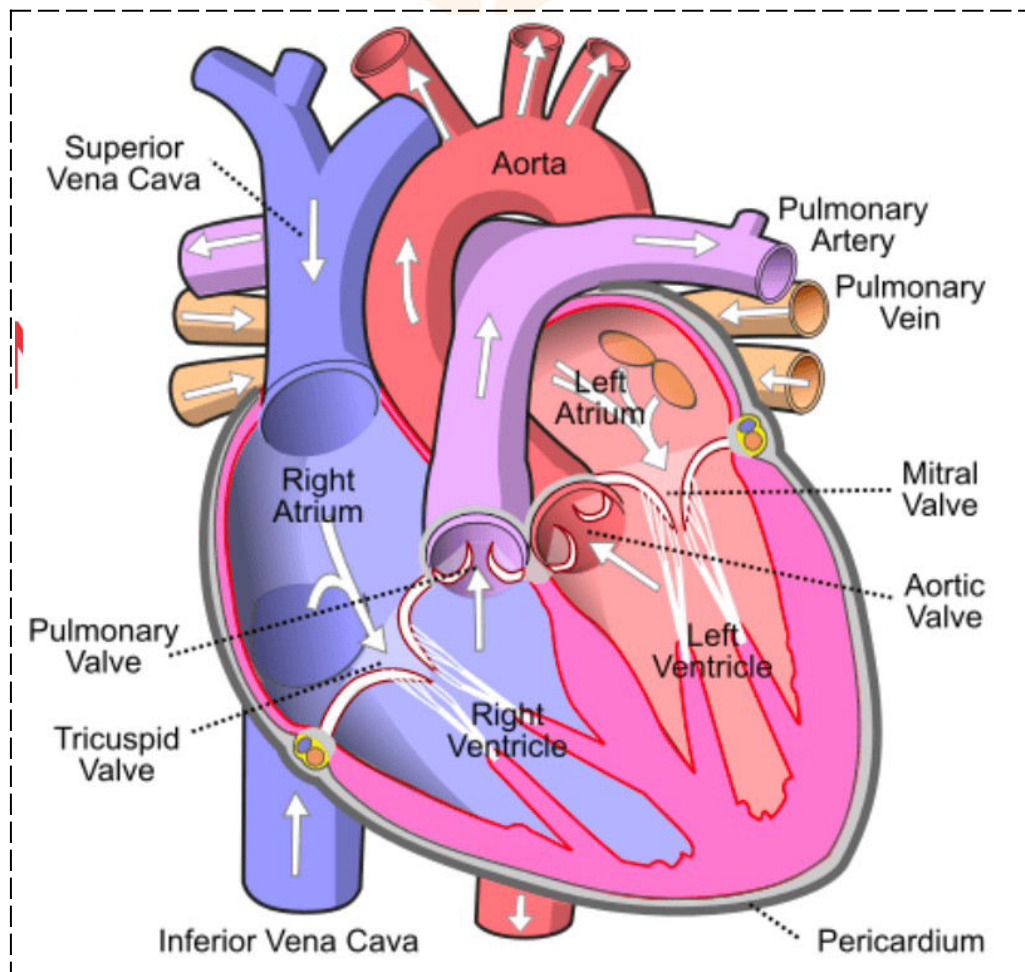
HEART

- The Heart is a vital organ **that continually beats as a pump to transport blood and other dissolved substances through blood.**
- The heart pumps blood throughout our life without stopping or relaxing.

Location of Heart

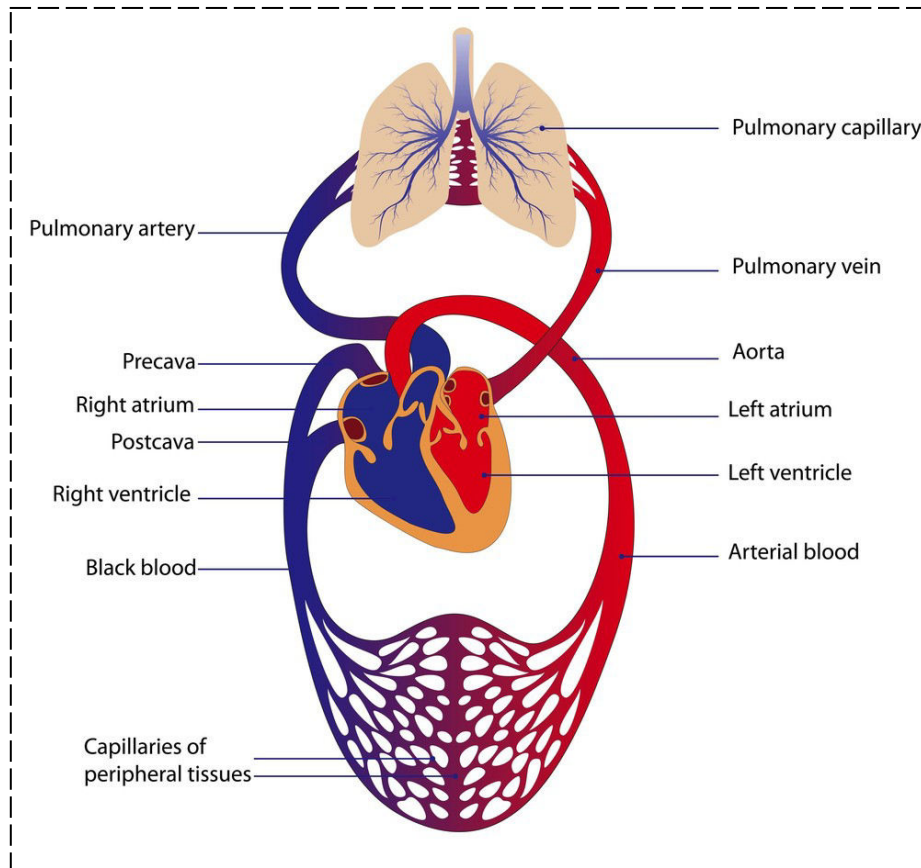
- ✕ The heart is **located in the chest cavity** with its lower tip slightly tilted towards the left side.
- ✕ It **lies between the two lungs**, above the diaphragm.
- ✕ The **size of heart is nearly equal to the size of our fist.**
- ✕ The heart is **made up of** a special muscles called **Cardiac muscles** that do not get fatigue.

Structure of Heart



- ✕ The **heart has four chambers**.
- ✕ The **upper two chambers of the heart are called atria** (sing. Atrium) and the **lower two chambers of the heart are called ventricles**.
- ✕ The **partition between the chambers helps to avoid mixing up blood rich in oxygen with the blood rich in carbon dioxide**.

Mechanism of Heart



- ✕ Pulmonary vein brings oxygenated blood from the lungs to the left atrium.
- ✕ Oxygenated blood from the left atrium goes into the left ventricles.
- ✕ The left ventricles pump oxygenated blood into the main artery for taking it to all the body organs.
- ✕ Vena Cava brings deoxygenated blood into the right atrium from all parts of the body.
- ✕ Deoxygenated blood from the right atrium goes into the right ventricle.
- ✕ The right ventricle pumps deoxygenated blood into the pulmonary artery for taking it to the lungs.

Every time heart beats, blood is forced into arteries due to this the arteries expand a little. The expansion of the arteries each time the blood is forced into it is called **PULSE**.

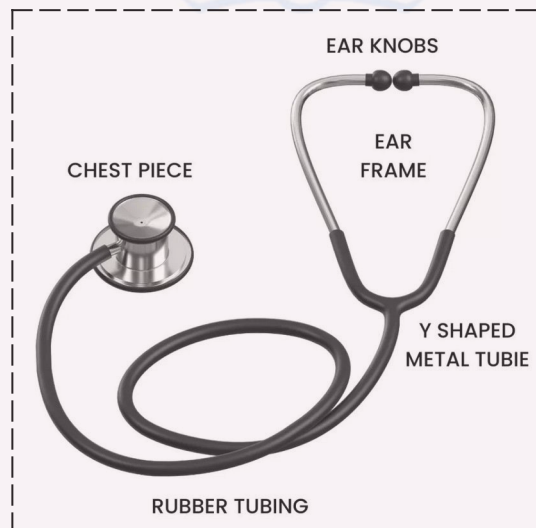
So, the **pulse rate** of a person is equal to the number of heart beats per minute.

HEARTBEAT

- The rhythmic contraction and relaxation of heart muscles constitutes a heartbeat.
- The average heartbeat of an adult person is 72-80 beats per minute.
- The number of heartbeats increase during physical exercise.
- If we place our hand on the left side of the chest, we can feel our heartbeat.

STETHOSCOPE

- The heartbeat can be heard by an instrument called as stethoscope.
- It is used by doctors to listen the amplified sound of the heartbeat.



EXCRETION IN ANIMALS

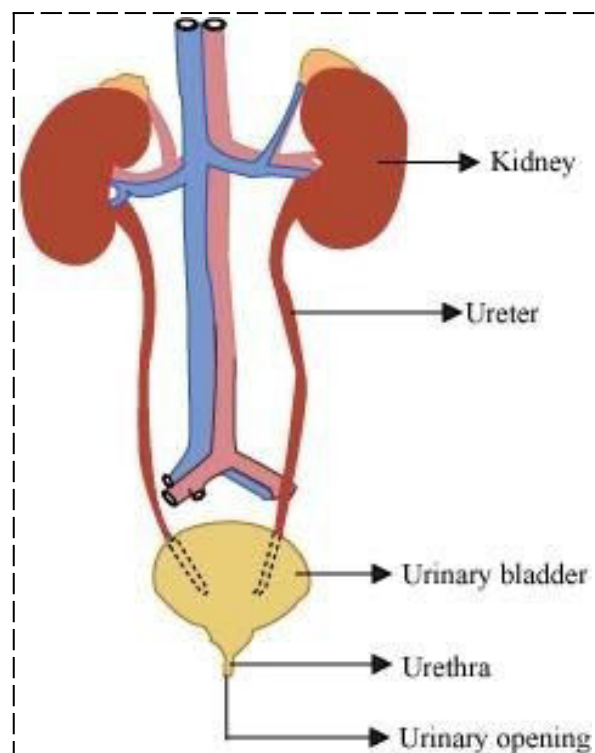
- The process of removal of waste material that is processed in the cells of the living organisms is called **Excretion**.
- The system involved in this process is known as the **Excretory system**.
- When our body utilize food, water and air, it produces some by-products or unwanted substances. These are called **Waste materials**.
- These waste materials (CO_2 , *urea*, *sweat* etc.) are toxic or poisonous and cause harm to the body. Therefore, these must be removed from the body, so that a person may stay healthy.

EXCRETORY SYSTEM IN HUMANS

The waste materials produced in the cells of the human body are carbon dioxide, urea and sweat.

- ✓ **Urea** is the major waste product in our body. It is poisonous substance and is removed from blood by the **Kidney**. Therefore, kidney is the main excretory organ of our body.
- ✓ **Sweat** is removed by the **sweat glands**.
- ✓ **Carbon dioxide** is removed from our bodies by the **lungs** during exhalation.

The excretory system of human beings consist of **two kidneys, two ureters, a bladder and a urethra**.



i. **KIDNEYS –**

The waste that is present in the blood has to be removed from the body. This is done by the blood capillaries present in the kidneys. When the blood reaches the two kidneys, it contains both harmful substances (urea and unwanted salts) and useful substances. The useful substances are absorbed back into the blood. The waste products get dissolved in water and are removed as Urine.

URINE – The urea and other unwanted salts when dissolve in water forms a yellowish liquid waste CALLED URINE.

It consists of 2.5% urea, 2.5% other waste products and 95% water.

An adult human being normally pass out 1-1.8 L of urine per day.

ii. **URETERS -**

The urine thus formed by each kidney is passed through the ureters (two tube-like structures) to the urinary bladder.

iii. **URINARY BLADDER AND URETHRA -**

The urine is stored in the urinary bladder for some time. It is removed at regular intervals through the opening present at the end of muscular tube called urethra.

SAATVIK
STUDY STATION

DIALYSIS -

If a person is having **kidney failure**, the waste products start accumulating in the blood. The person cannot survive unless his blood is filtered periodically through an artificial kidney machine to remove urea. This process is called Dialysis.

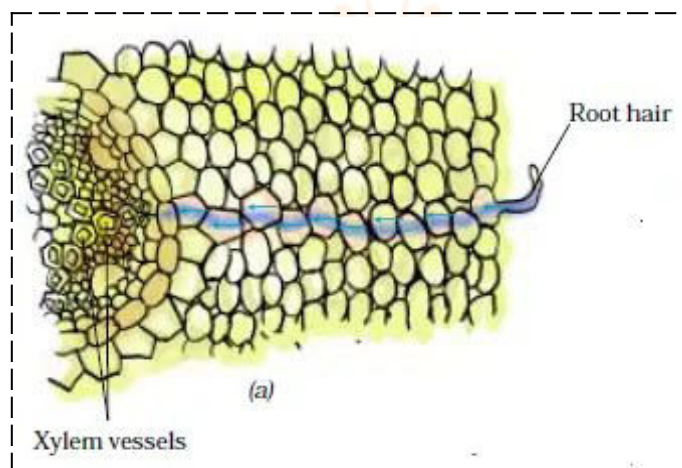
TRANSPORT OF SUBSTANCES IN PLANTS

Plants absorb water and dissolved minerals from the soil through their roots and transport it to their leaves. The leaves use water and carbon dioxide for synthesising their food by the process of photosynthesis. The food prepared by the leaves is transported to all parts of the plants.

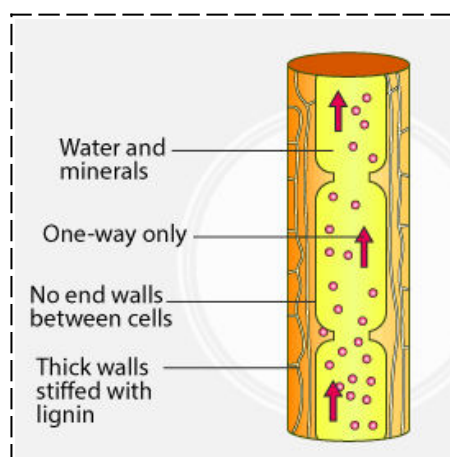
TRANSPORT OF WATER AND MINERALS

Water and minerals in plants are transported in the following ways -

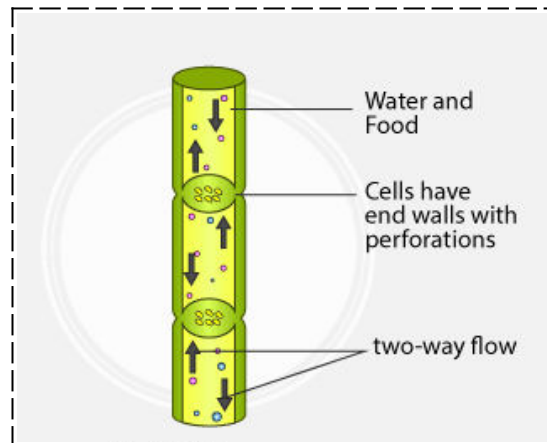
- x The roots of plants absorb water and minerals from the soil. The roots have **root hair**. The root hair increases the surface area of the root for the absorption of water and mineral nutrients dissolved in water. The root hairs are in direct contact with the water present between the soil particles.



- x Water and minerals are moved from the roots up to the stem and leaves through a tube-like vascular tissue called as **Xylem**.

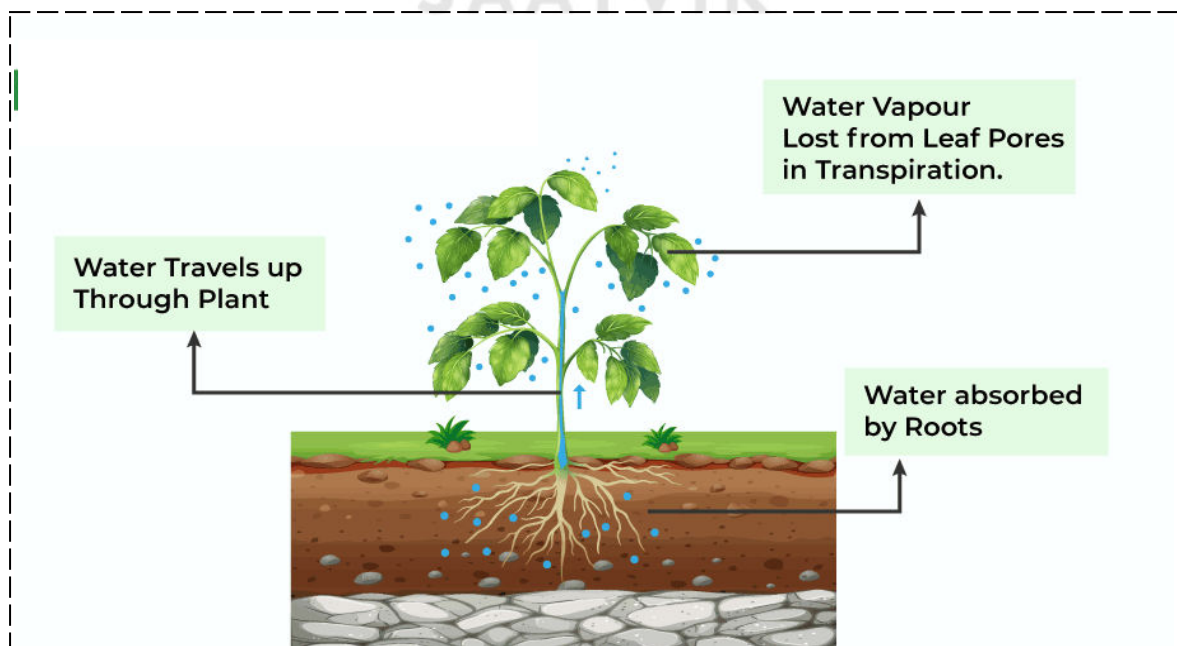


- x Leaves prepare food in the form of glucose by the process of photosynthesis and this food is transported to all parts of the plants including roots by **Phloem**.



TRANSPIRATION

The water evaporates through the **stomata** present on the surface of leaves by the process of transpiration. The transpiration generates suction force which can pull water to great height in the tall trees. Transpiration also keeps the plants cool in hot weather.



GLOSSARY

- **Ammonia** – Aquatic animals like fishes excrete ammonia as their waste product.
- **Artery** – Tube that carry oxygen-rich blood from the heart to all parts of the body.
- **Blood** – Red coloured fluid that flows in blood vessels.
- **Blood vessels** – Tubes which carry blood throughout the body.
- **Capillary** – Extremely thin blood vessels that connects arteries to the veins.
- **Circulatory system** – Heart, blood and blood vessels together constitutes the circulatory system. It transports various substances from one part of the body to another.
- **Dialysis** – The process of removal of waste products from blood by artificial kidney.
- **Excretion** – The process of removal of waste products from the body.
- **Excretory system** – Parts involved in excretion forms excretory system.
- **Haemoglobin** – A red coloured protein present in RBC that binds with oxygen.
- **Heartbeat** – The rhythmic contraction and relaxation of heart muscles.
- **Kidneys** – Main excretory organs that filter blood and remove the wastes.
- **Phloem** – Vascular tissue that transports food material from leaves to other parts of the plant.
- **Plasma** – A pale yellow coloured fluid in the blood.
- **Platelets** – Type of blood cell fragments which help in the clotting of blood.
- **Pulse** – The throbbing movement due to the blood flowing in the arteries.
- **Red Blood Cell** – Blood cells that contain a red coloured pigment called haemoglobin, which transports oxygen in the body.
- **Root hair** – Root possess root hair which increase the surface area of the root for absorption of water and minerals from the soil.
- **Stethoscope** – Instrument used to measure heartbeat.
- **Sweat** – Liquid waste of the body produced by sweat glands present in our skin.
- **Tissue** – A group of cells that perform a specialised function in an organism.
- **Urea** – Excretory product of animals like human, cow, goat, etc.
- **Ureter** – A pair of long tube-like structure that carry urine from kidney to urinary bladder.
- **Uric acid** – Excretory products of animal like lizard, birds and snakes that have less availability of water.
- **Urinary bladder** – Bag-like structure that stores urine until it is excreted out.
- **Veins** – Tubes that carry carbon dioxide-rich blood from all parts of the body to heart.

- **White Blood Cells** – Colourless blood cells that protect the body against diseases.
- **Xylem** – Vascular tissue that transport water and minerals from root to the entire plant.

