

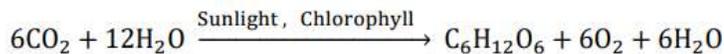
Board –CBSE

Class –10th

Topic – Life Processes

Nutrition

- Nutrition in Plants (autotrophic): Make their own food.
- Nutrition in Animals (heterotrophic): obtain nutrition from plants or other animals.
- Autotrophic Nutrition (photosynthesis): Autotrophs use simple inorganic material and convert it into complex high energy molecules (Carbohydrates)

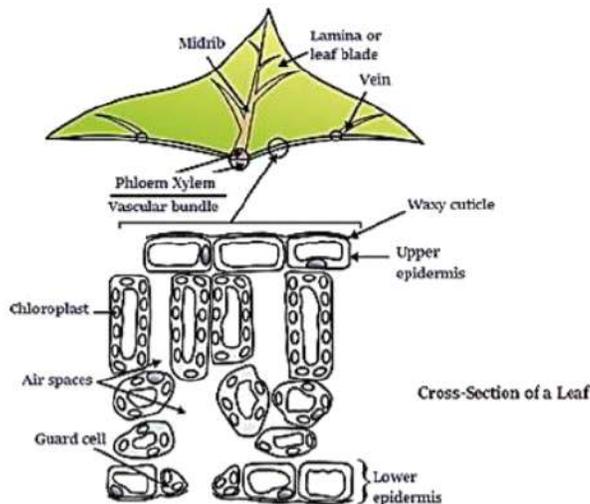


- The equation for Photosynthesis:
- Raw materials for photosynthesis

Chlorophyll: Sunlight absorbed by chlorophyll.

CO₂: Enters through stomata from the atmosphere.

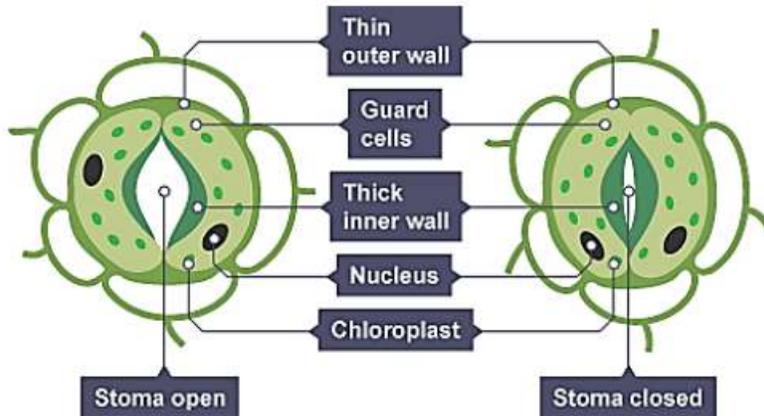
Water: Water + dissolved minerals are taken up by the roots of the soil.



- Site of Photosynthesis (chloroplast in mesophyll layer of leaves)
- Absorption of light energy by chlorophyll.
- Conversion of light energy into chemical energy + splitting (breaking) of water into hydrogen ion and oxygen.

- Reduction of CO₂ to glucose for providing energy to plant and excess is stored as starch.

Stomata:



Stomata are the tiny pores present on the surface of the leaves.

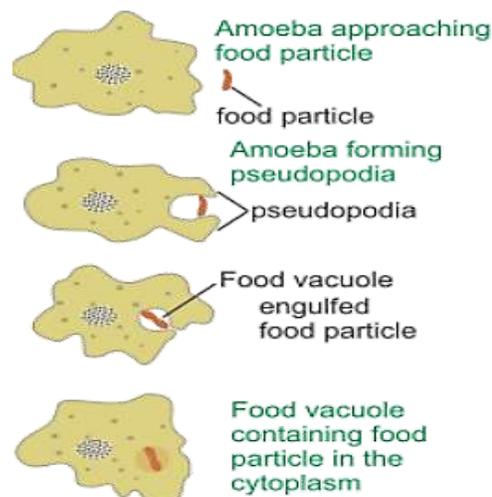
Functions of stomata

- Exchange of gases O₂/CO₂.
- Loses a large amount of water (water vapour) during transpiration.

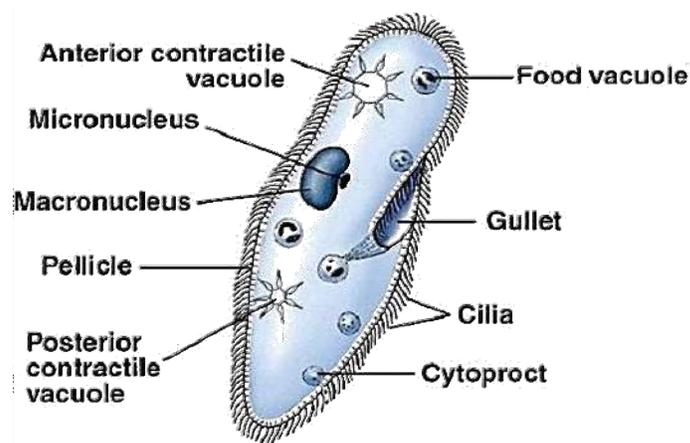
Heterotrophic Nutrition

- Holozoic Nutrition: Animals take in solid food and break it down inside the body. Example: Amoeba, animals.
- Saprophytic Nutrition: Organisms feed on dead, decaying matter. Example: Fungi.
- Parasitic Nutrition: Parasites live inside or outside other organisms (host) and derive nutrition from them. Example: Cuscuta (plant parasites), Ticks, etc.

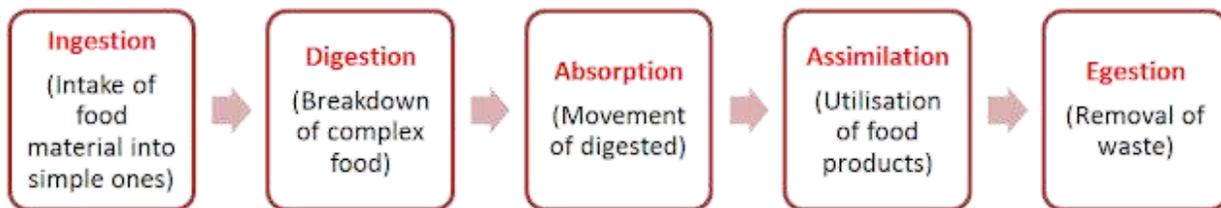
Nutrition in amoeba (Holozoic Nutrition)



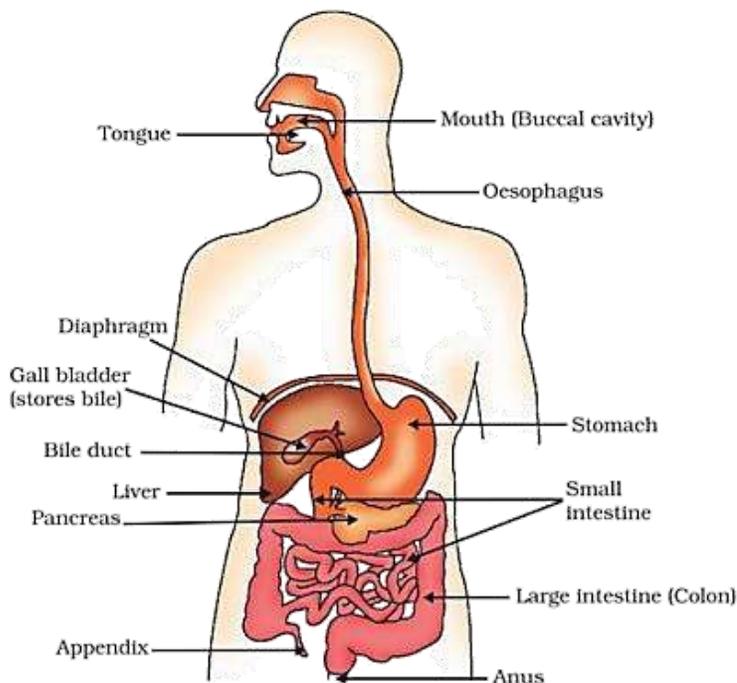
Paramecium: Cilia (Present all over the body) → Take in food → At a specific spot.



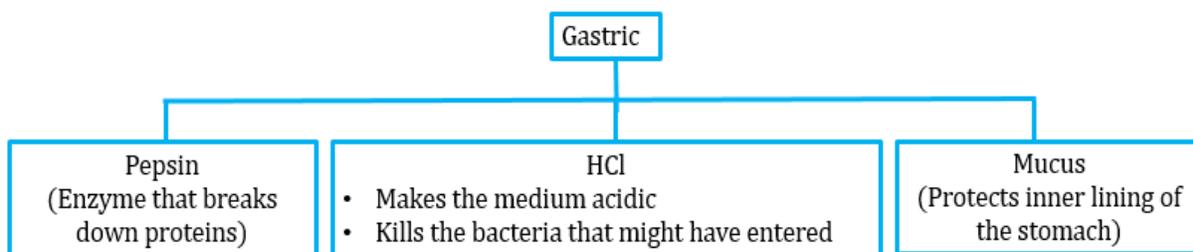
Nutrition:



Human Digestive System (alimentary canal)



- (i) **Mouth:** Intake of whole food.
- (ii) **Teeth:** Chewing/grinding of food.
- (iii) **Tongue:** Rolling of food + Tasting of food + Swallowing/Pushing down of the food.
- (iv) **Salivary Glands:** Secrete saliva + Mucus. Starch is converted into glucose (maltose) by saliva (Salivary amylase).
- (v) **Esophagus:** Taking food from mouth to stomach by Peristaltic movements.
- (vi) **Stomach:** Gastric glands present in the stomach secrete gastric juice.



(vii) Small Intestine:

- (a) Secret intestinal juice converts: Carbohydrates into glucose, fats into fatty acid + glycerol, and Proteins into amino acids.
- (b) Its wall has Villi (finger-like projection) increases surface area for maximum absorption and digestion of food into blood.
- (c) It receives the secretions of the liver (bile juice) and pancreas (pancreatic juice). Pancreatic juice which contains enzymes like trypsin for digesting proteins and lipase for breaking down emulsified fats. It also neutralizes the acidic chyme (1st digested food). Bile salts break a large fat molecule into smaller globules (fat emulsification)

(viii) Large Intestine: Absorb excess water from the undigested food and converts it into a semi-solid form called faeces.

Respiration in Human Beings:

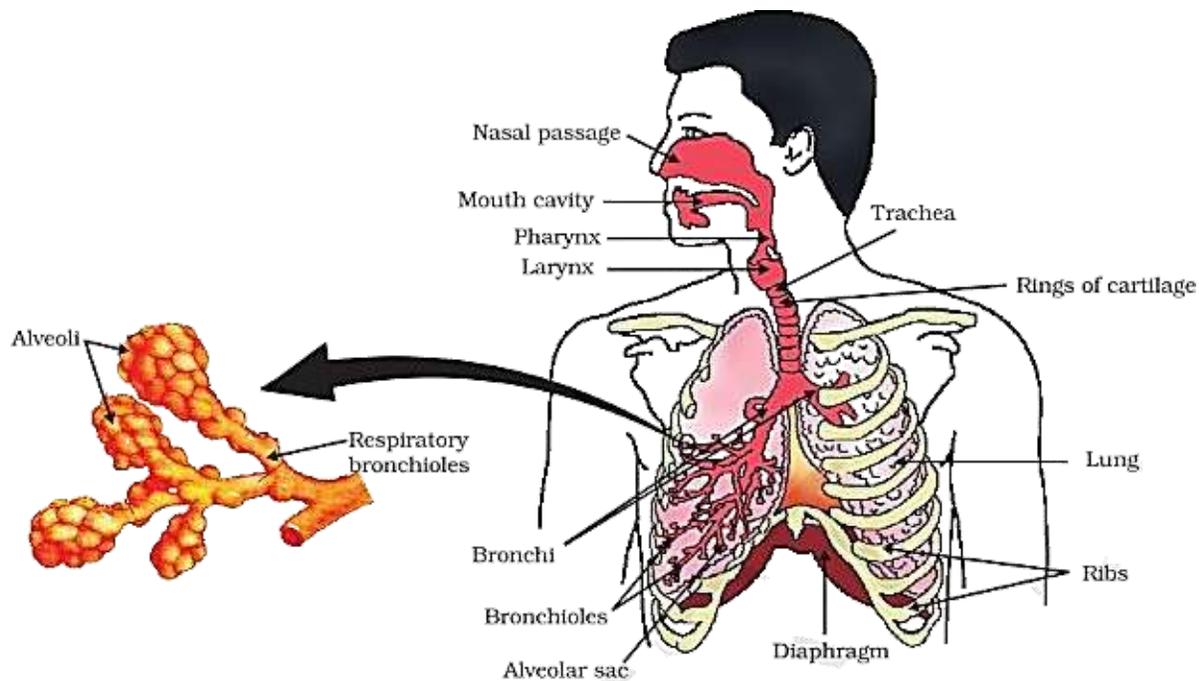
- (i) Gaseous exchange (Breathing): Intake of oxygen and release of CO₂.
- (ii) Cellular respiration: Breakdown of simple food in order to release energy inside the cell.

Types of Respiration

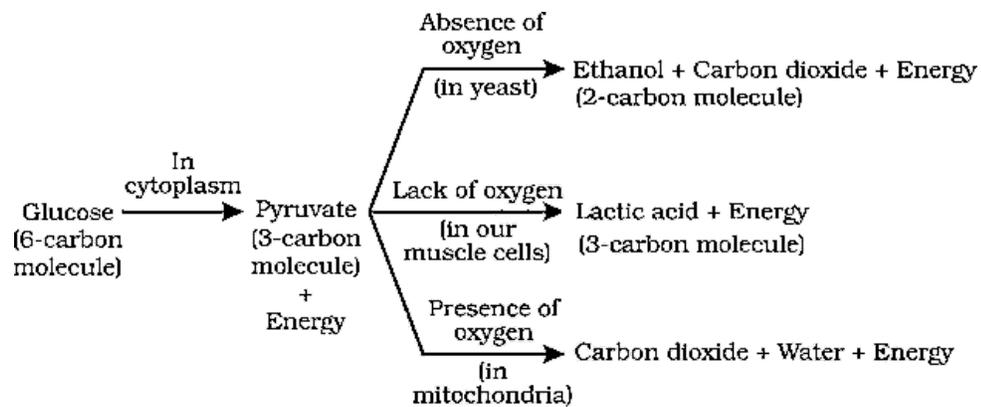
| Aerobic Respiration | Anaerobic Respiration |
|---------------------------------------|---------------------------------------|
| Takes place in the presence of oxygen | Takes place in the absence of oxygen. |

| | |
|---|--|
| End products are CO ₂ and H ₂ O | End products are alcohol or lactic acid. |
| More amount of energy is released | Less amount of energy is released. |

Human Respiratory System



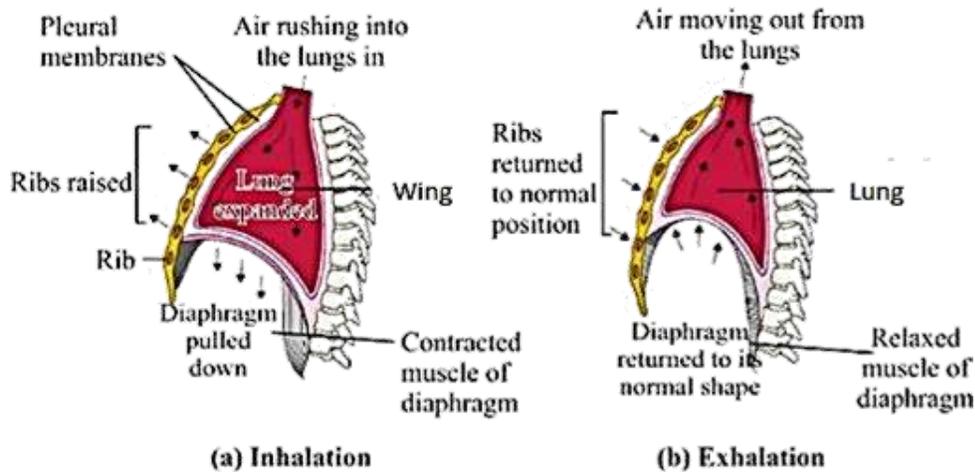
- Nostril



- Nasal Cavity
- Pharynx: Common passage for food and air.
- Larynx: Vocal cords are present here and control pitch and volume.
- Trachea: It provides airflow to and from the lungs for respiration.

- Bronchi: The trachea subdivides into two bronchi that enter the individual lungs. Covered by C-shaped cartilaginous rings prevent collapsing of the trachea.
- Bronchioles: bronchi divide into bronchioles.
- Alveoli: terminal swelling of bronchiole, exchange of gases takes place from here.

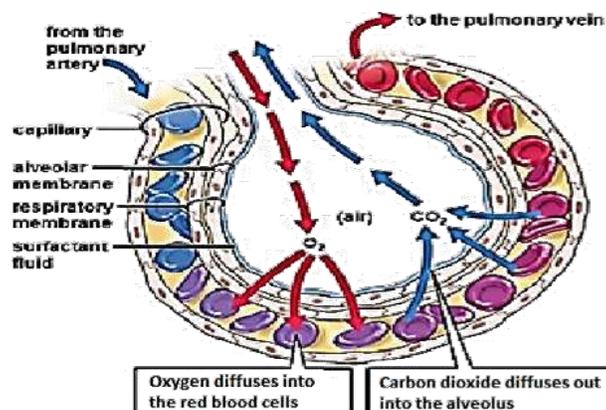
Mechanism of Breathing



Respiration in plants

Gaseous exchange occurs through:

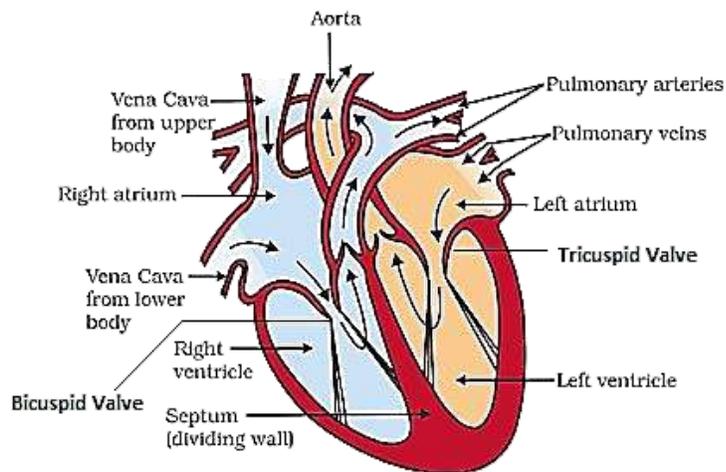
- (a) Stomata in leaves
- (b) Lenticels in stems
- (c) General surface of the root



Transportation in Human Beings: (circulatory system)

- (i) Heart (pumping organ)
- (ii) Arteries and Veins (Blood vessels)
- (iii) Blood and lymph (Circulatory medium)

Heart



- **Right auricle:** receives impure blood from superior and inferior vena cava.
- **Left auricle:** receives pure blood from lungs through the pulmonary vein.
- **Right ventricle:** pumps blood towards lungs through the pulmonary artery.
- **Left ventricle:** pumps blood to various parts of the body through the aorta.
- **Inter-auricular septum:** separates two atrium.
- **Inter-ventricular septum:** separates two ventricles.
- **Cuspid valve:** present between atrium and ventricle. Tricuspid on the left side, bicuspid (mitral valve) on the right side.
- **Semilunar valve:** present between blood vessels and ventricles. Blood circulation in the human body
- **Double circulation:** Blood travels twice through the heart in one complete cycle of the body.
- **Pulmonary Circulation:** Blood moves from the heart to the lungs.
- **Systemic Circulation:** Blood moves from the heart to the rest of the body.

Blood and its component:

- **RBC (Red blood cells):** It contains Haemoglobin, carries O₂ and CO₂.
- **WBC (White blood cells):** It provides immunity to the body.
- **Blood Platelets:** It helps in blood clotting during injury.
- Liquid components (**Plasma**): It is a straw yellow coloured fluid that contains 90% water & 10% organic substances.

Lymph

- It is a yellowish fluid that escapes from the blood capillaries into the intercellular spaces.
- It contains a high amount of WBCs provides immunity to the body.
- Also, transport certain substances.

Blood Vessels

| Arteries | Veins |
|--|---|
| Carry oxygenated blood away from the heart to body parts except for the pulmonary artery | Carry deoxygenated blood from body parts towards the heart except for the pulmonary vein. |
| Also called distributing vessel. | Also called collecting vessel. |
| Thick and elastic. | Thin and less elastic. |
| Deep-seated. (far from the skin) | Superficial (near to the skin) as compared to arteries. |

Transportation in Plants

| Xylem | Phloem |
|--|---|
| Transport water and minerals from the roots to other parts of the plant. | Translocate the product of photosynthesis (food) from leaves to the other parts of the plant. |
| Unidirectional movement | Bidirectional movement. |

Transpiration: It is the process of loss of water as vapour from aerial parts of the plant.

Function:

- (a) Absorption and upward movement of water and minerals by creating transpirational PULL.

(b) Helps in temperature regulation in the plant.

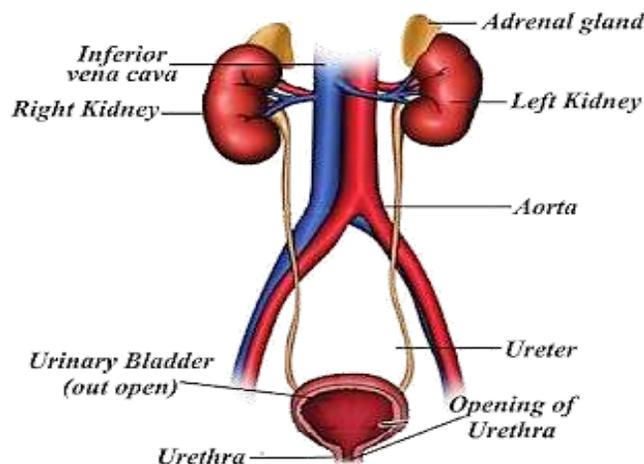
Transport of food from leaves (food factory) to a different part of the plant is called Translocation.

Excretion System in Human Beings

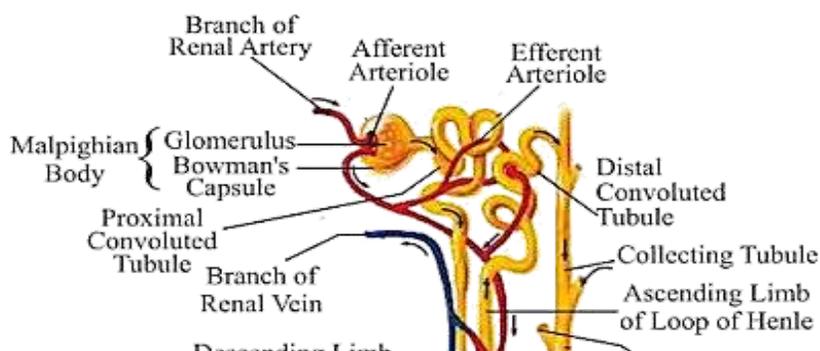
- (1) **The kidneys:** main excretory organ.
- (2) **The ureters:** Drains urine into the urinary bladder.
- (3) **The urinary bladder:** stores urine.
- (4) **The urethra:** duct to excrete urine.



“Excretion is the process to remove metabolic waste from the body”.



Nephrons.



Glomerulus Filtration:

- The renal artery brings oxygenated blood to the kidneys along with wastes.
- Glomerulus: a network of capillaries through which filtration takes place.
- Bowman's capsule: cup-like structure contains glomerular apparatus.
- Filtered blood enters into Proximal Convolved Tubule (PCT) and then loops of Henle's and then Distal convoluted tubule (DCT).
- Then finally concentrated urine was collected into the collecting duct.
- Tubular reabsorption: As this filtrate moves down the tubular part, glucose, amino acids, salts, and excess water gets selectively reabsorbed.
- Secretion: certain unwanted substances secreted into the nephron. Eg. Urea, extra salts, water, etc.
- Functions of Nephron
- Excretion of nitrogenous wastes.
- To maintain the water and ionic balance (osmoregulation).
- Artificial Kidney (Dialysis): Hemodialysis is the process of purifying blood by a machine.

Excretion in Plants

- Oxygen and carbon dioxide are diffused through stomata.
- Excess water is removed by transpiration.
- Plants can even loose some of their old parts like old leaves and bark of the tree.
- Other waste products are stored as raisins and gums especially in old xylem cells which can also be lost by plants.