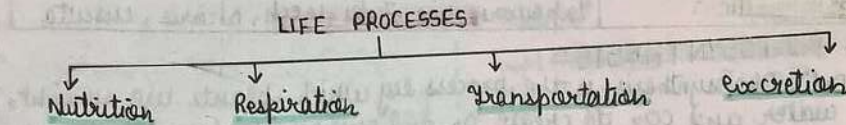
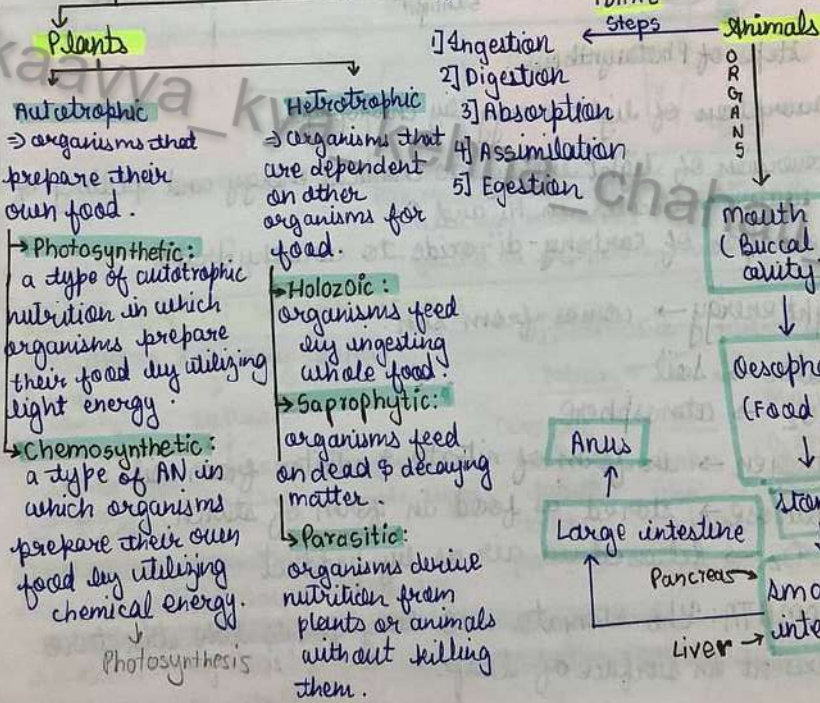


# LIFE PROCESSES

Life Processes: The basic and essential activities performed by a living organism to sustain and maintain life.



\* **NUTRITION**: the process of deriving and utilization of food.



CHEM CH 1  
 CHEM CH 2  
 CHEM CH 4  
 BIOLOGY CH 5  
 BIO CH 6

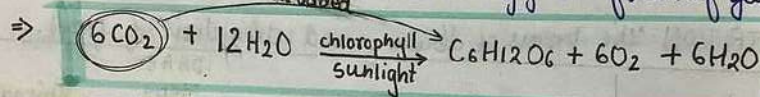
PHY CH 9  
 PHYSICS CH 10  
 PHY CH 11  
 CH 12

EXAMPLES:

|                 |   |
|-----------------|---|
| Nutritive:      | Examples:   |
| Photosynthetic: | Green plants, Cyanobacteria, Algae, Euglena                           |
| Chemosynthetic: | Purple sulfur bacteria  |
| Holozoic:       | Cow, goat, deer, Lion, Tiger, Humans, Amoeba, <sup>medium</sup> Para- |
| Saprophytic:    | Bread mould, Mushroom, Yeast, Mushrooms                               |
| Parasitic:      | Tapeworm, lice, Ticks, Leech, Ascaris, Cuscuta.                       |

PHOTOSYNTHESIS:

Def: Photosynthesis is the process by which plants use sunlight, water and CO<sub>2</sub> to create <sup>H<sub>2</sub> added</sup> O<sub>2</sub> and energy in form of glucose.



Steps of Photosynthesis:

- 1) Absorption of light energy by chlorophyll.
- 2) Conversion of light energy to chemical energy and splitting of water molecules in H<sub>2</sub> and O<sub>2</sub>.
- 3) Reduction of carbonyl-di-oxide to carbohydrates.

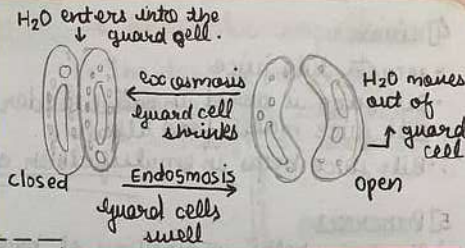
Carbohydrates is the simplest form of glucose

- Light energy → comes from sun.
- Water → soil
- CO<sub>2</sub> → atmosphere
- Nitrogen → in form of nitrates & nitrites from soil
- glucose → stored as food in form of starch
- O<sub>2</sub> → Released in air as by product.

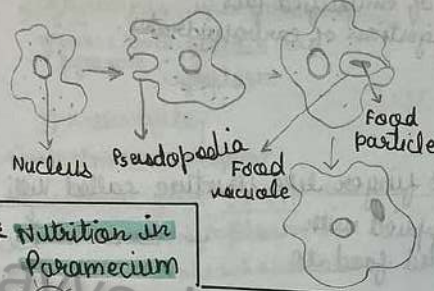
STOMATA: The stomata are tiny pores like structure present on surface of leaf.

### Functions of stomata:

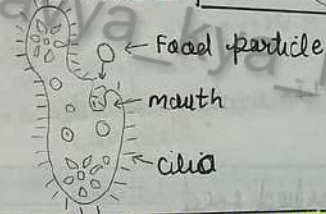
1. transpiration
2. exchange of gases during photosynthesis and respiration



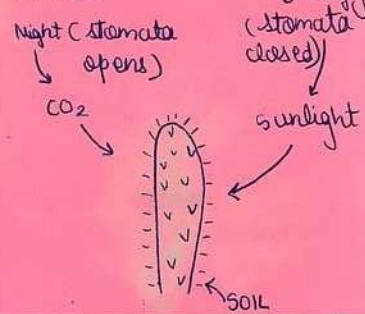
### \* Nutrition in Amoeba



### \* Nutrition in Paramecium



### • Photosynthesis in Desert Plants



- Paramecium:
- Unicellular, eukaryotic,
  - cilia for movement
  - found in freshwater, marine & brackish w.

### NUTRITION IN HUMAN BEINGS:

1] Mouth → Salivary glands  
(Buccal cavity)

↓ saliva

starch (complex sugar) ← Salivary amylase → maltose (simple sugar)

2] Oesophagus (Food pipe)

→ Food is pushed downwards due to rhythmic contraction and relaxation of muscles and is known as Peristaltic movement.

3] Stomach → Gastric juices

Pepsin ← enzyme that breaks down proteins

HCl (Makes the medium acidic)

Mucus (Protects inner lining of stomach)

- increased secretion of HCl causes acidity.

CHEM CH 1

CHEM CH 2

CHEM CH 4

BIO CH 6

PHY CH 9

PHY CH 10

PHY CH 11

PHY CH 12

#### 4] Liver

- secretes bile juice
- Bile juice is stored in gall bladder
- Bile juice makes food alkaline.
- Bile juice helps in emulsification of fats.

• length of small intestine is longer in herbivores because they need to digest cellulose. meat is easier to digest so carnivores have shorter intestine.

#### 5] Pancreas

- 1) Trypsin: helps in digestion of proteins
- 2) Lipase: helps in breakdown of emulsified fats.
- 3) Pancreatic amylase: helps in digestion of carbohydrates.

#### 6] Small Intestine

- 5-7m long
- site of final digestion

\* Food is absorbed by small finger-like structure called villi.

- small intestine is richly supplied with blood vessels to take absorbed food to each & every cell.

increases surface area.

#### 7] Large Intestine (colon)

- all unabsorbed food is sent to LI.
- absorption of H<sub>2</sub>O.

#### 8] Anus

- removal of undigested and unabsorbed food.

### RESPIRATION & BREATHING:

- taking air inside the body
- diaphragm flattens
- Intercostal muscles contract
- Ribcage moves upward & outward
- Volume of thoracic cavity increases
- air pressure decreases
- air flows into lungs.

**Breathing**  
is the exchange of gases

- Releasing air outside body
- diaphragm arches upwards
- Ribcage moves downwards & inwards.
- volume of thoracic cavity decreases.
- air pressure increases
- air is forced out.



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**Aerobic respiration**

**Respiration**

**Anaerobic respiration**

• The type of respiration in which process takes place in presence of  $O_2$ .

• The type of respiration in which process takes place in shortage or absence of  $O_2$ .

1] Glycolysis: Break down of glucose into pyruvate in cytoplasm.

2] Krebs cycle:

3] Electron transport:

• Total yield: 38 ATP

Location: Cytoplasm & mitochondria

• Product:  $CO_2$ ,  $H_2O$

• Complete

• Oxidation of glucose is complete

1] Glycolysis

2] Fermentation

• NADH and ATP is produced.

• Total yield: 2 ATP

Location: cytoplasm

• Product: Yeast:  $CO_2$ , ethanol

Mammals: lactic acid

• Incomplete

• Oxidation of glucose is incomplete

| Breathing                                     | Respiration   |
|---|---|
| 1. intake of fresh air & removal of foul air. | 1. oxidation of food to form $CO_2$ , $O_2$ water & energy. |
| 2. Physical process                           | 2. Biochemical process.                                     |
| 3. no energy is released                      | 3. Energy released in the form of ATP.                      |
| 4. Extracellular process                      | 4. Intracellular process                                    |
| 5. No enzymes involved.                       | 5. large number of enzymes involved.                        |
| 6. confined to certain organs                 | 6. Occurs in all cells of body.                             |

CHEM CH 1

CHEM CH 2

CHEM CH 4

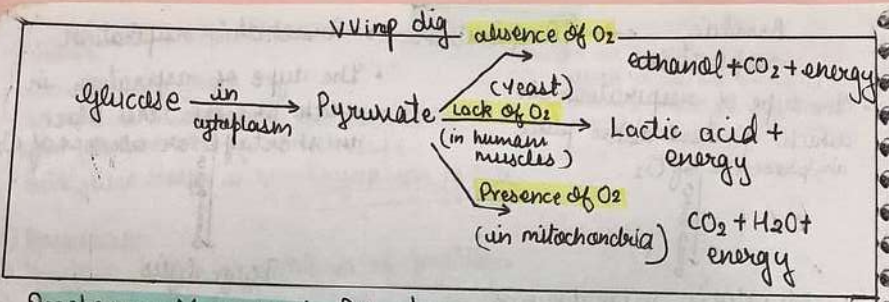
BIO CH 6

PHY CH 9

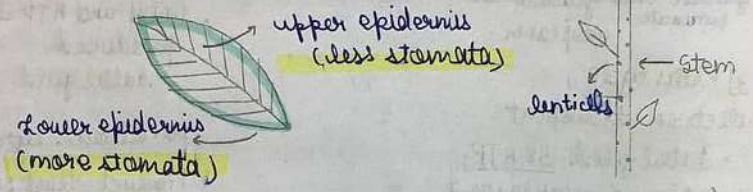
PHY CH 10

PHY CH 11

PHY CH 12

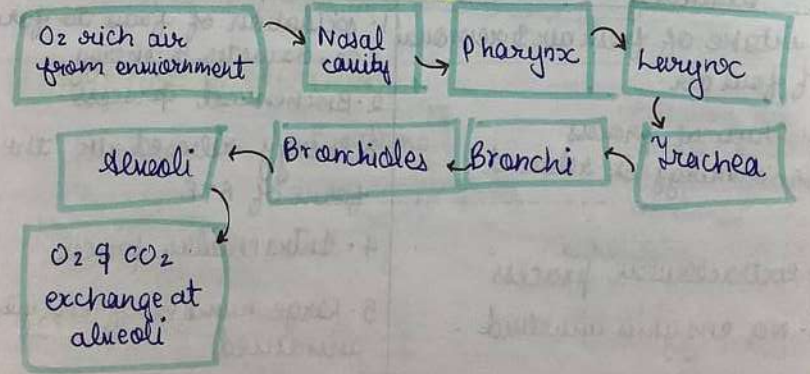


Exchange of gases in Plants:



$\Rightarrow$  at night, when there is no photosynthesis & covering  $CO_2$  elimination is the major exchange activity going on. During the day,  $CO_2$  generated during respiration is used for photosynthesis hence no  $CO_2$  is released, instead  $O_2$  is released in major times.

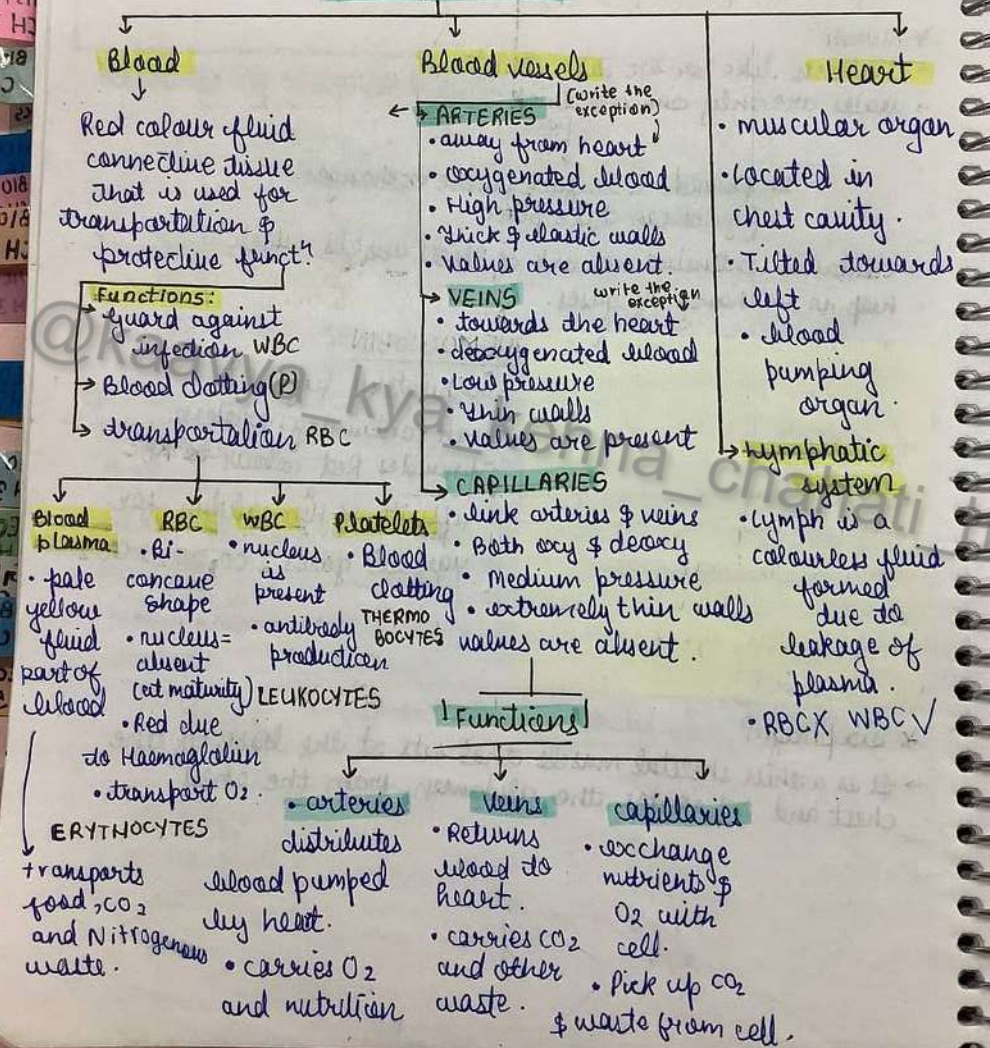
HUMAN RESPIRATORY SYSTEM



# TRANSPORTATION:

Transportation is a life process which allows useful substances such as  $O_2$ , food salts,  $CO_2$ , nitrogenous waste & other substances in a multicellular organism to move from one part to another part of body

## Transportation



- Ring of cartilage are present in the throat. These ensure that the air passage does not collapse.
- In human body air is taken into up by nostrils.
- The air passing through the nostrils is filtered by fine hairs that line the passage, is also lined with mucus which helps in this process

#### \* Alveoli:

- Sack-like or sac like structure.
- walls are only one cell thick

to provide a surface where exchange of gases can take place.

- contains extensive network of blood vessels which help in exchange of gases.

#### Alveolus gas exchange

→ The blood brings  $\text{CO}_2$  from the rest of the body for release into alveoli, and the  $\text{O}_2$  in the alveolar air is taken up by blood in the vessels to be transported to all cells in the body.

#### \* HEMOGLOBIN:

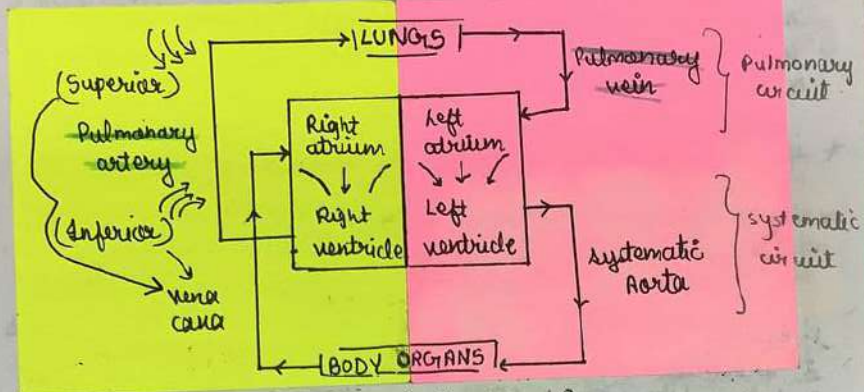
- respiratory pigment
  - Iron containing protein
  - provides red colour to RBC
- ability of Hemoglobin for various gases:  $\text{CO} > \text{O}_2 > \text{CO}_2$

#### \* Diaphragm

- It is a thin skeletal muscle that sits at the base of the chest and separates the abdomen from the chest.

# HEART:

## double circulation



Q. Why do we need chambers in the heart?

- A. to prevent mixing of oxygenated and deoxygenated blood.
- more O<sub>2</sub> will be supplied in a better way.
  - efficient supply.
  - more respiration = more energy.

| Blood  | Lymph.  | Atrium  | Ventricle   |
|--|---|---|---|
| <ul style="list-style-type: none"> <li>• forms circulatory system</li> <li>• Red in colour</li> <li>• contains plasma, RBC, WBC, platelets</li> <li>• flows inside arteries, veins and capillaries</li> <li>• It flows rapidly</li> <li>• transport material to one organ to another</li> </ul>                    | <ul style="list-style-type: none"> <li>• forms lymphatic system</li> <li>• colourless</li> <li>• contains plasma &amp; WBC</li> <li>• flows inside vessels &amp; lymph capillaries</li> <li>• It flows slow.</li> <li>• mainly conveys material from tissue cells into the body.</li> </ul> | <ul style="list-style-type: none"> <li>• forms the upper chambers.</li> <li>• 2 types → RA, LA</li> <li>• thin wall</li> <li>• collects blood &amp; supplies to ventricle.</li> </ul> | <ul style="list-style-type: none"> <li>• forms the lower chambers</li> <li>• 2 types → RV, LV</li> <li>• thick wall</li> <li>• Pushes blood throughout body.</li> </ul> |
| <p><b>Functions of Lymph:</b></p> <ul style="list-style-type: none"> <li>• facilitates absorption of fats back to circulatory system.</li> <li>• removes excess fluid from body tissues.</li> <li>• forms immune system.                     <ul style="list-style-type: none"> <li>↑ [WBC]</li> </ul> </li> </ul> |   |   |   |



## TRANSPORTATION IN PLANTS:

Transportation is a life process which allows useful substances such as  $O_2$ , food, salts, carbon dioxide, water & other substance in a multicellular organism to move from part of the body.

- \* if distance between 2 cells is small diffusion and osmosis occurs.
- \* if distance is increased then we need:

### XYLEM

1. Vessels
2. Tracheids
3. Xylem fibres
4. Xylem Parenchyma

• transport of substance in xylem occurs only in the upward directions.

- transport is unidirectional
- it is composed of mainly dead elements

Ascent of Sap: The upward movement of  $H_2O$  and minerals from the roots to the upper part of plant via xylem against the gravity is called Ascent of sap.

### Why plants have slow transportation system?

- Plts do not move
- Plts have larger proportion of dead cells  $\therefore$  have low energy needs so no rush to transport.

### PHLOEM

1. Sieve tubes
2. Companion cells
3. Phloem parenchyma
4. Phloem fibres

• transport of substances in phloem occurs in both upward & downward direction.

- transport is bidirectional
- it is composed of mainly living cells.



### Root pressure:

When water enters into root cells by the process of osmosis a pressure is generated in the roots which help in transporting the water and other ions from the soil in upward direction into the xylem.

### Transpiration:

• loss of water in form of water vapour from the surface of leaf.

#### • Functions:

i] transpiration ~~help~~ helps in absorption and upward movement of  $H_2O$  and minerals dissolved in it from roots to the leaves.

ii] helps in regulating temperature.

iii] get rid of excess water

Evaporation of  $H_2O$  from the cells of a leaf creates a suction which pulls  $H_2O$  from the xylem of roots.

### Animals

↳ Kidney: are 2 bean shaped organs found on the left and right side of the body that are responsible for filtering blood, removing waste & controlling the body's fluid balance.

• Blood ~~and~~ ~~enter~~ <sup>enters</sup> through Renal artery.

• Filtered blood leaves through Renal vein.

### EXCRETION

Def: The biological process involved in the removal of harmful metabolic waste from body.

### Plants

•  $O_2$  and  $CO_2$  is diffused through stomata

• excess  $H_2O$  is removed by transpiration

• Plants can even lose some of their old parts like old leaves and bark of tree.

• many plants waste products are stored in cellular vacuoles.

• other waste products like latex, resins & gums are stored in old xylem.

• Plants also secrete some waste substances into soil around them.

CHEM  
CH 1

CHEM  
CH 2

CHEM  
CH 4

BIO  
CH 6

PHY  
CH 9

PHYSICS  
CH 10

PHY  
CH 11

PHY  
CH 12



## NEPHRON:

- Structural and functional unit of kidney.
- Responsible for filtration of blood.
- There are millions of Nephron in each kidney.

### Formation of Urine:

#### 1. glomerular filtration

nitrogenous waste, glucose, water, amino acids, excessive salts from blood are filtered and initial filtrate enters into Bowman's capsule.

#### 2. selective reabsorption

Useful substances like glucose amino acids salts & major amt of water from the filtrate are reabsorbed back by capillaries surrounding nephron

#### 3. Tubular secretion

Urea, extra  $H_2O$  & salts are secreted into the tubules which open up into collecting ducts & then water.

Micturition: process of expelling urine out of body.

