

17/4/20

Biology

Life Processes

→ Life processes - The basic function performed by all living organism to maintain their life on this earth are called life processes
eg - Transport and excretion, control and coordination, growth, movement, Nutrition, Respiration and reproduction.

→ characteristics of living things

- They can move by themselves
- They need food, air and water
- They can grow
- They can respond to the change around them.
- They can respire.
- They can excrete
- They can reproduce
- They are sensitive

→ Nutrition → The process of intake of nutrients ex- protein, minerals, water and vitamins etc. by an organism as well as the utilization of these nutrients by the organism to obtain energy.

for performing various metabolic activities.

→ Nutrients - It is an organic and inorganic substances for the maintenance of life and survival of living organism.

→ Mode of Nutrition - These are the methods of procuring and obtaining food by an organism.

→ Autotrophic mode of Nutrition - It is that mode of nutrition in which an organism prepare its food from simple inorganic material like carbon-dioxide and water present in the atmosphere. The organism which can prepare their own food are called autotrophs. Ex - Green Plants and some bacteria.

→ Heterotrophic Mode of Nutrition - It is that mode of nutrition in which an organism can not synthesise their own food from simple inorganic material like carbon-dioxide and water. These organism which can not prepare their own food and depend on autotroph for their nutrition are called heterotrophs.

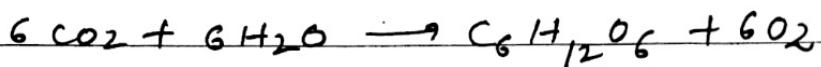
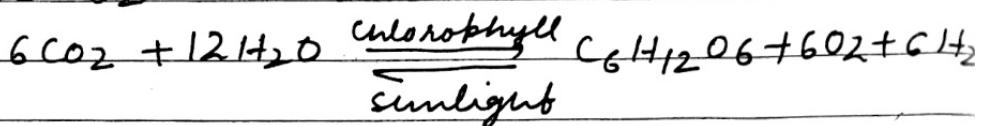
Ex - All animals, Human beings, most bacteria and fungi

→ Types of Heterotrophic Mode of Nutrition

- Saprophytic Mode of Nutrition - It is that mode of nutrition in which an organism obtain its food from dead and decaying organic matter of plant, animal etc. Organism with saprophytic mode of nutrition are called as saprophytes.
eg- yeast, mushroom, Rhizopus
- Parasitic Mode of Nutrition → It is that mode of nutrition in which an organism derives its food from the body of another living organism called host without living it. A parasite is an organism which feeds on another living organism is called its host. ex- Amoeba, leech
- Holozoic Mode of Nutrition → It is that mode of nutrition in which the organism takes the organic food material into its body by the process of ingestion. The ingested food is digested and absorbed into the body of the organism.

Nutrition in plants -

→ Photosynthesis → The process by which green plant make their own food from CO_2 and H_2O by using sunlight energy in the presence of chlorophyll is called photosynthesis. During this process O_2 is released.



→ Events that takes place during Photosynthesis - It take place in three steps

- (i) Absorption of Sunlight energy by chlorophyll
- (ii) conversion of light energy into chemical energy splitting water into Hydrogen and oxygen by light energy
- (iii) Reduction of CO_2 by hydrogen to form carbohydrate like glucose by using chemical energy.

How does desert plant Photosynthesis -

desert plant takes up CO_2 at night and prepare an intermediate which is acted upon by the energy absorbed by the chlorophyll during the day

Note - Enzymes are bio catalyst helps in chemical digestion of food

- (i) carbohydrate are used in the form of starch in plants
- (ii) In human beings food is stored

in the form of glycogen.

→ How does the plant obtain CO_2 - The green plant take CO_2 from air for photosynthesis through stomata present on their surface and each stomatal pore is surrounded by a guard cell which control the opening and closing of stomata - when water flows in to guard cells they swell, becomes curved and causes the pores to open and when it loses H_2O they shrink & become straight and causes pores to close.

* Stomatal pores are also present in stem
How does plant obtain H_2O - green plant absorb water by the roots from the soil through the process of osmosis it is transperated upward through the xylem.

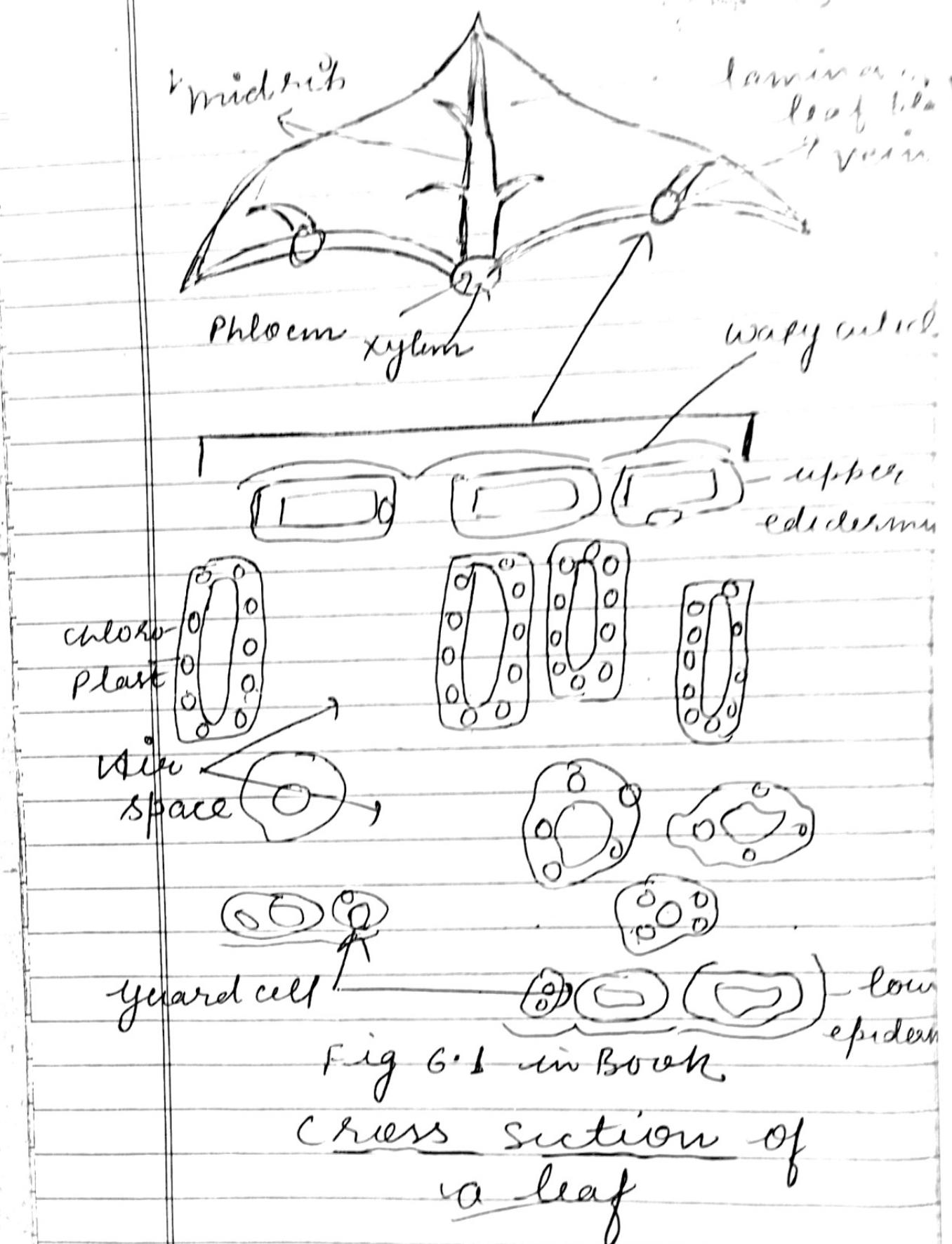
Site of Photosynthesis -

chloroplast - (i) These are present in the mesophyll cells of green plants. It can be easily seen by light microscope.

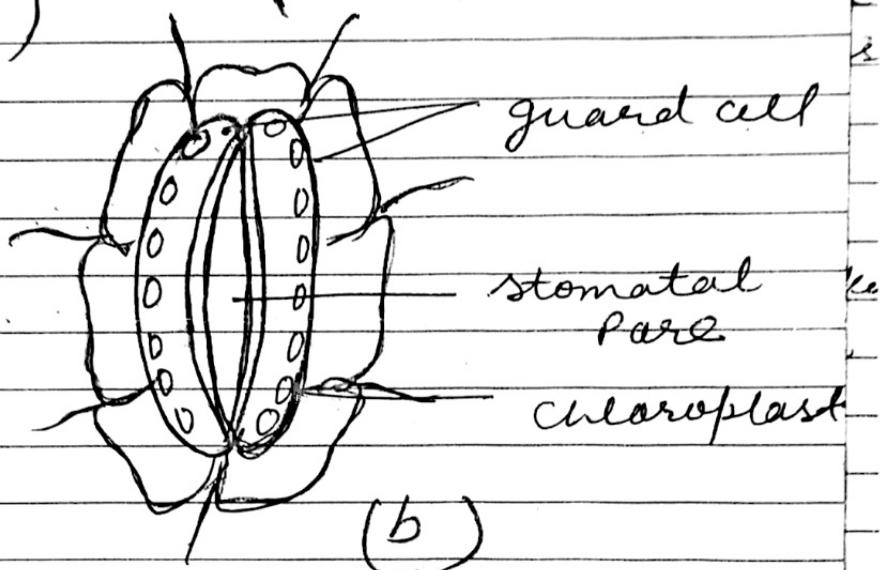
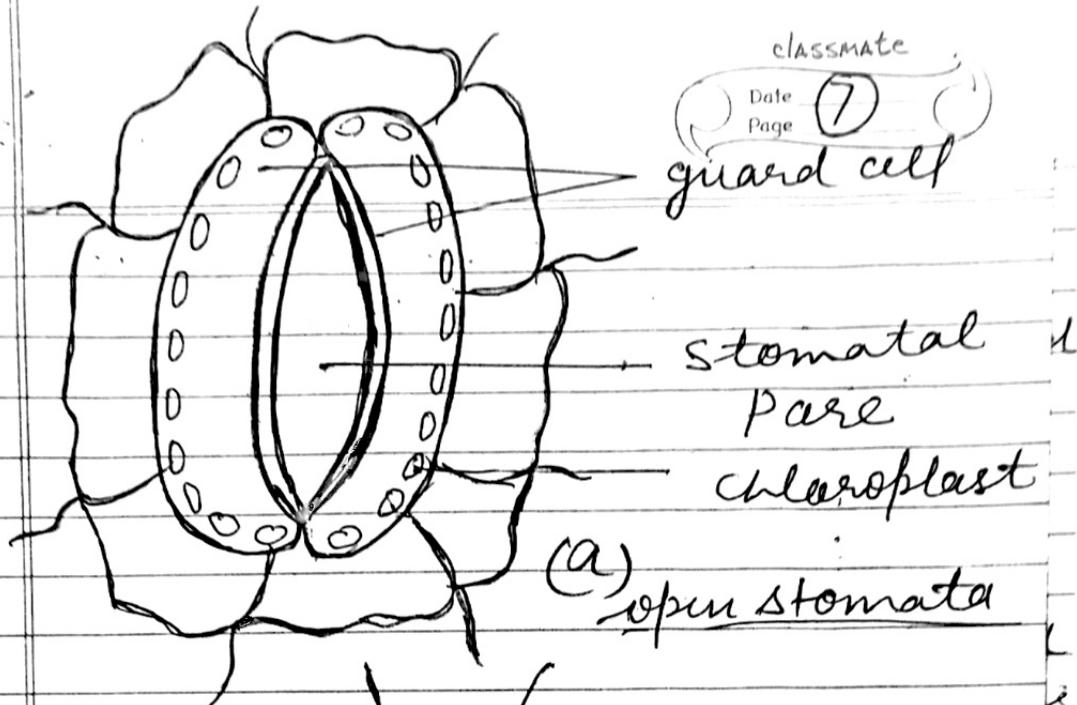
(ii) A typical mesophyll cell contains 100 or more tiny chloroplast

(iii) A whole leaf contain 1000 of mesophyll cells

(iv) CO_2 needed for photosynthesis enters from the air into leaf through stomata in its lower epidermis and then diffuse into mesophyll cell and reaches chloroplast



Q. - Write the structure of stomata and also write the process of opening and closing of stomata.

Ans.

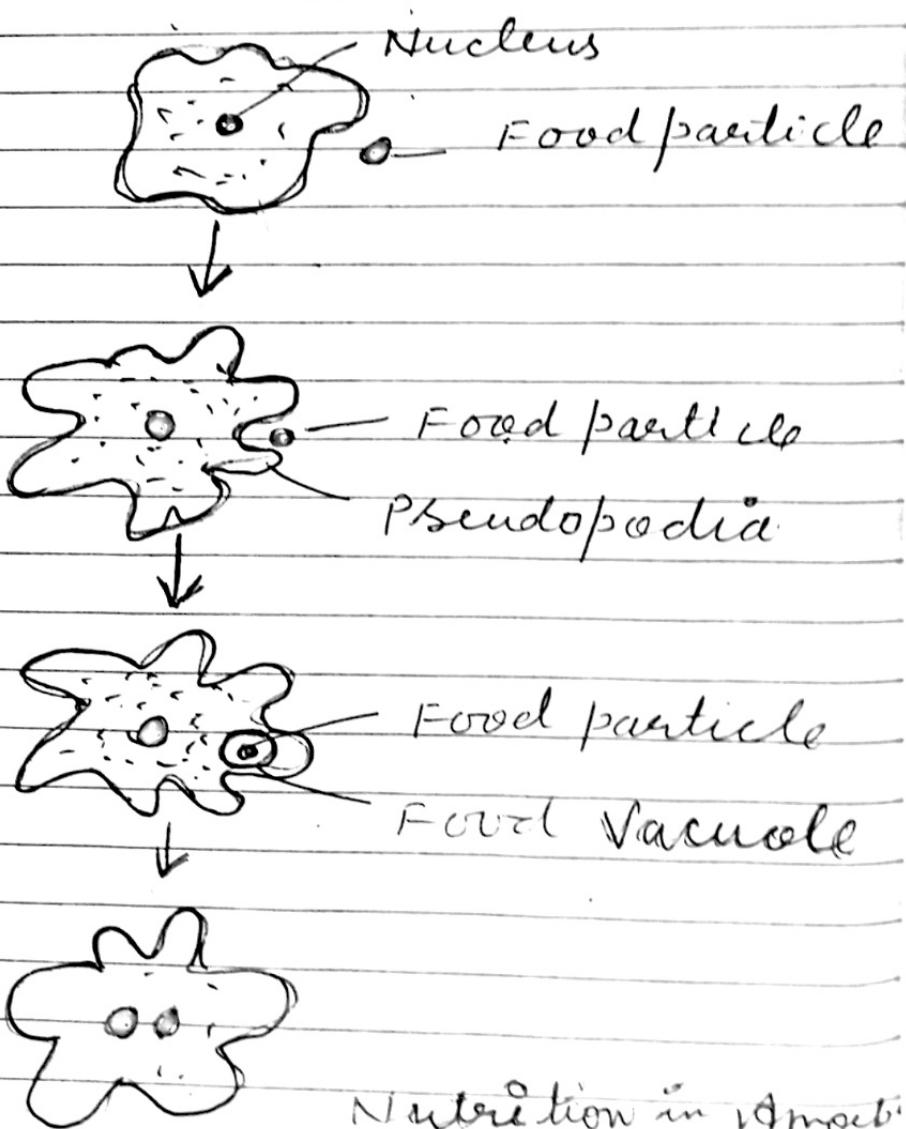
each stomata consists of two guards cells. each guard cell consists of chloroplast, nucleus and cytoplasm. Between the two guard cells stomatal pore is present.

opening and closing of stomata
at
guard cells swell when water flows into them causing stomatal pore to open.
similarly stomatal pore close

If the guard cells shrink
ones - in which form N_2 is taken
up by the plants?

Ans - Nitrogen is taken up by the
plants in the form of inorg-
anic nitrates or nitrites or
it is taken as organic compound
which have been prepared by
bacteria from atmospheric N_2 .

Nutrition in Amoeba -



① Nutrition in amoeba is

Holozoic type

- ② When the food particles comes near amoeba then it extend its pseudopodia.
- ③ In this way it encircle the food particle.
- ④ Later on the tips of the encircling pseudopodia dissolved food in the form of food vacuole comes in cytoplasm.
- ⑤ Now the digestion of food takes place with the help of enzymes present in cytoplasm.
- ⑥ Then this digested food gets diffused into cytoplasm and is utilised to obtain energy by amoeba.
- ⑦ While undigested food is thrown outside.
- * Paramecium has a definite shape so in paramecium the food is taken in at a specific spot by the movement of cilia.

Nutrition in Human beings -

Human digestive system consist of alimentary canal and digestive gland

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Human being alimentary canal nearly 9m long extended from mouth to anus. Various parts of alimentary canal are

1. Mouth
2. Buccal cavity
3. Oesophagus
4. Stomach
5. Small intestine
6. Large intestine

Digestive gland associated with the digestive system are

1. Salivary gland
2. Pancreas
3. Liver (largest digestive gland)

In human being there is Holozoic mode of nutrition so different steps of nutrition are

1. Ingestion
2. Digestion
3. Absorption
4. Assimilation
5. Egestion

1. Ingestion - The food is taken in with the help of mouth.

2. Digestion - (a) Digestion in Buccal cavity - Buccal cavity consists of teeth, tongue, salivary gland &

1 Teeth - They help in chewing and grinding the food.

2 Tongue - The taste buds present on the tongue give the taste. Tongue also help in mixing the food with saliva and it also help in swallowing the food.

Salivary gland - They secrete saliva. Saliva contains an enzyme salivary amylase or Ptyalin which breaks down starch into sugar.

(i) It mix the saliva with food.

B) Digestion in oesophagus - No digestion takes place in oesophagus. In oesophagus the lining of alimentary canal has muscles that contract rhythmically in order to push the food forward.

These movements are called peristaltic movements.

C) Digestion in stomach - In stomach the food is churned for about 3 hours. In this time the food breaks down into smaller pieces and form a semi solid paste.

The inner wall of stomach

contain gastric gland which secretes gastric juice
gastric juice contains 3 substances
(1) HCl (2) Pepsin (3) Mucus

1) HCl → HCl maintains acidic medium in stomach which is required for the action of pepsin. It also kills the harmful microorganisms of food.

2) Pepsin - It helps in digestion of Proteins. (The enzyme of stomach is pepsin).

3) Mucus - It protects the inner lining of stomach from the actions of the acid.

* Viscosity in stomach is due to the formation of mucus acids

D) Digestion of small intestine

It is the longest part of alimentary canal. It receives the secretion of liver and pancreas.

1) Liver - (Largest gland) - Liver secretes Bile juice converts large globules of fats into smaller globules (Bile juice helps in emulsification of fats)

Bile juice also maintains alkaline medium in small intestine which is essential for the functioning of Pancreatic enzymes.

Pancreatic enzymes.

- 2) Pancrease - Pancrease secrete pancreatic juice. Two enzyme present in Pancrease are trypsin and pancreatic lipase enzyme.
- Trypsin helps in digestion of protein
 - Pancreatic lipase break down fat into fatty acid.

- 3) The wall of small intestine contain glands which secrete intestinal juice. The enzyme present in it finally convert protein into amino acids, fats into fatty acid and glycerol, carbohydrate into glucose. Thus complete digestion of food takes place in small intestine.

- Absorption - digested food is absorbed by the walls of small intestine. The inner lining of small intestine has a large number of finger like projection called villi. These villi increases the surface area for the absorption of food

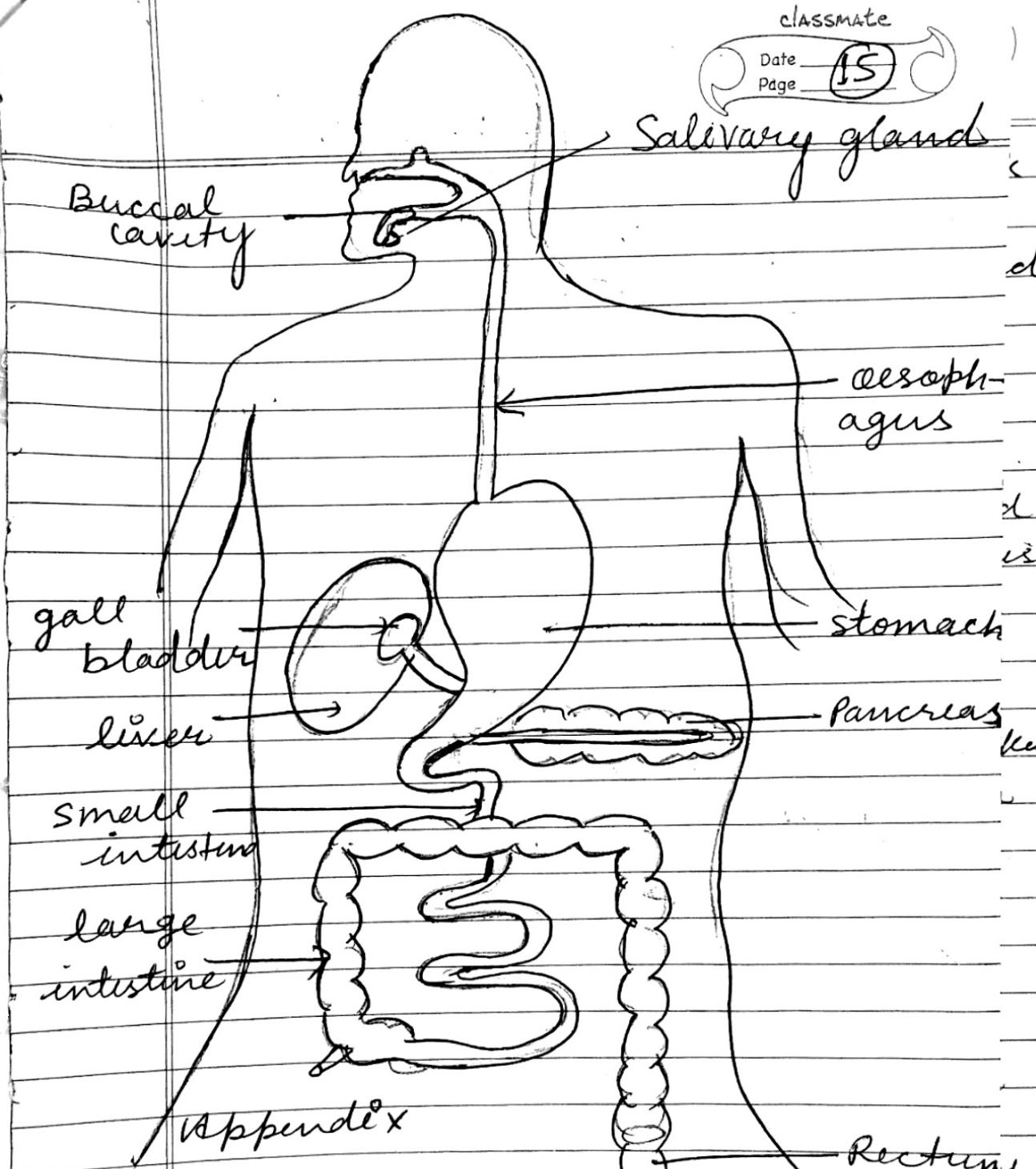
- Assimilation - These villi are richly supplied with blood

vessels which take the absorbed food to each and every cell of the body where it is utilized for obtaining energy, 5 egestion. The unabsorbed food is sent into large intestine where more villi absorb water from it and rest of the material is removed from the body via anus.

- * The exit of waste material is regulated by anal sphincter.
- * The exit of food from stomach is regulated by sphincter muscles which release it in small amount in small intestine.

(Q) Give reason herbivores have longer small intestine than carnivores.
Ans: Because herbivores eats cellulose takes time to digest while carnivores eat meat which easier to digest and takes less time.

Salivary glands

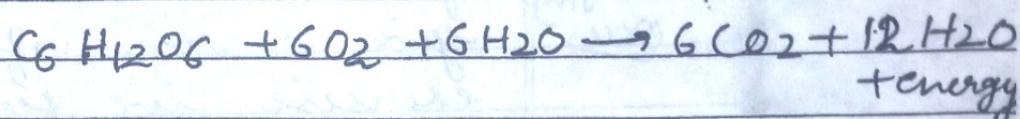


Nutrition in

human beings

Respiration

Respiration - The process of breakdown of food to release energy is called respiration



It involves mitochondria in the cell.

There are the two ways to break down the glucose.

- 1) Aerobic respiration
 - 2) Anaerobic respiration
- 1) Aerobic respiration - Respiration which takes place in the presence of oxygen is known as aerobic respiration.

During this process complete oxidation of food take place and energy is released in the form of A.T.P.

- 2) Anaerobic respiration - The respiration which takes places in the absence of oxygen is called anaerobic respiration.

During this process ethanol and CO_2 are formed in yeast and lactic acid in animals.

Muscles of animals

- * sometimes when there is lack of oxygen in our muscles then they respire anaerobically and formed lactic acid
- smp ones- give reason after vigorous exercise we feel cramps in our muscles OR why do we feel stiffness and pain after doing physical exercise

Ans At that time our muscles respire anaerobically and formation of lactic acid takes place in our muscles which causes cramps or pain.

Difference between aerobic and anaerobic respiration

Aerobic

- ① It takes place in the presence of oxygen
- ② End products are CO_2 and water
- ③ Complete break down of food

Anaerobic

- ① It takes place in the absence of oxygen
- ② End products are CO_2 and ethanol or lactic acid in muscles
- ③ Partial break down of food

- | | |
|---|----------------------------------|
| (1) considerable amount of energy is released | (2) Much less energy is released |
| (3) aerobic respiration occurs in both cytoplasm and mitochondria | (4) It occurs only in cytoplasm |

Breathing - The process of taking in oxygen from the atmosphere and giving out CO_2 from the body is called breathing.

- Respiration in Plants - In plants respiration takes place by the process of diffusion. Plants have no specialised organs for gaseous exchange but they have stomata and lenticels for this purpose.
- (i) The roots of plant take O_2 from the air present in between the soil.
 - (ii) In stem of herbaceous plant respiration takes place through stomata in woody plant respiration takes place through lenticels by the process of diffusion.
 - (iii) In leaves plants leaves respiration through stomata by the process of diffusion.

Respiration in Animals -

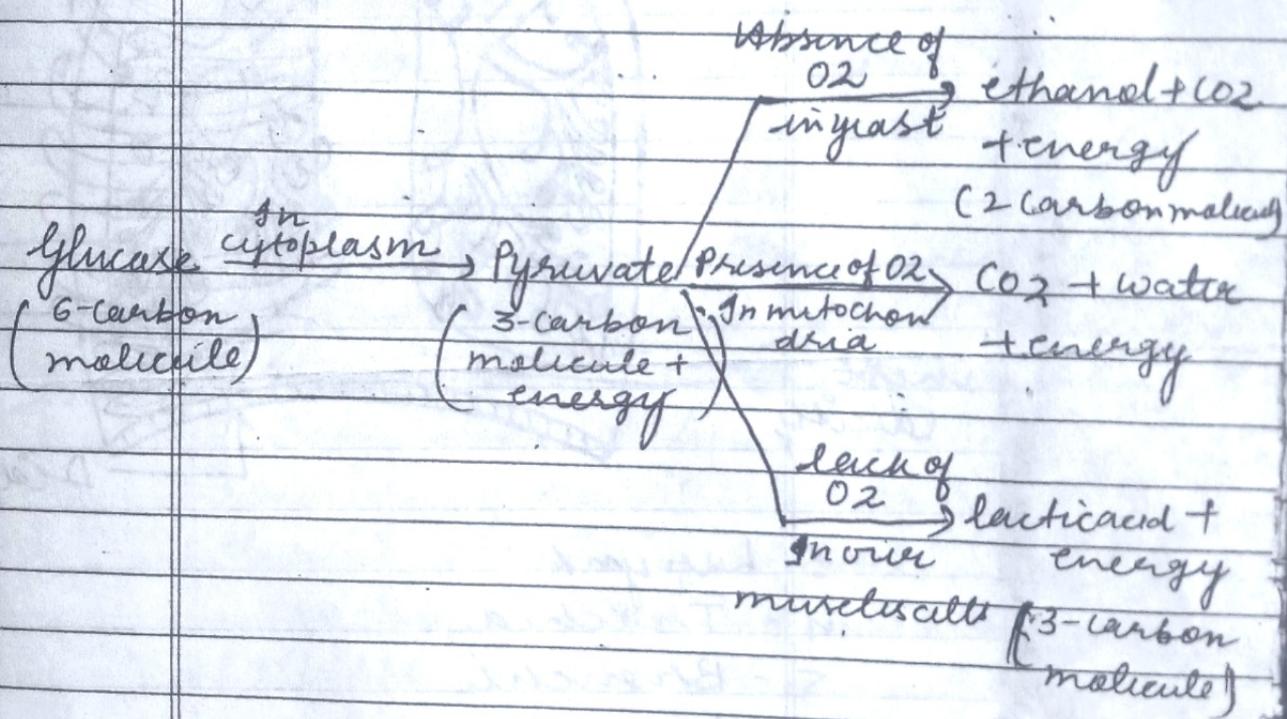
- * In amoeba respiration takes place through cell membrane by the process of diffusion.
- * In earthworm they respire through skin.
- * The aquatic animals like fish and prawns have gills as the respiratory organs which extract oxygen dissolved in water and take away CO_2 from the body.
- * In the insects like grasshopper, cockroach, housefly and in mosquito the tiny holes called spiracles on their body and the air tubes called tracheas are the respiratory organs.

Ques - Why is rate of breathing in aquatic organism much faster than in terrestrial organism?

Ans : Aquatic organism use oxygen dissolve in water for breathing while terrestrial organism use O_2 present in atmosphere for breathing since the amount of dissolved oxygen is fairly low as compared to the amount of oxygen in

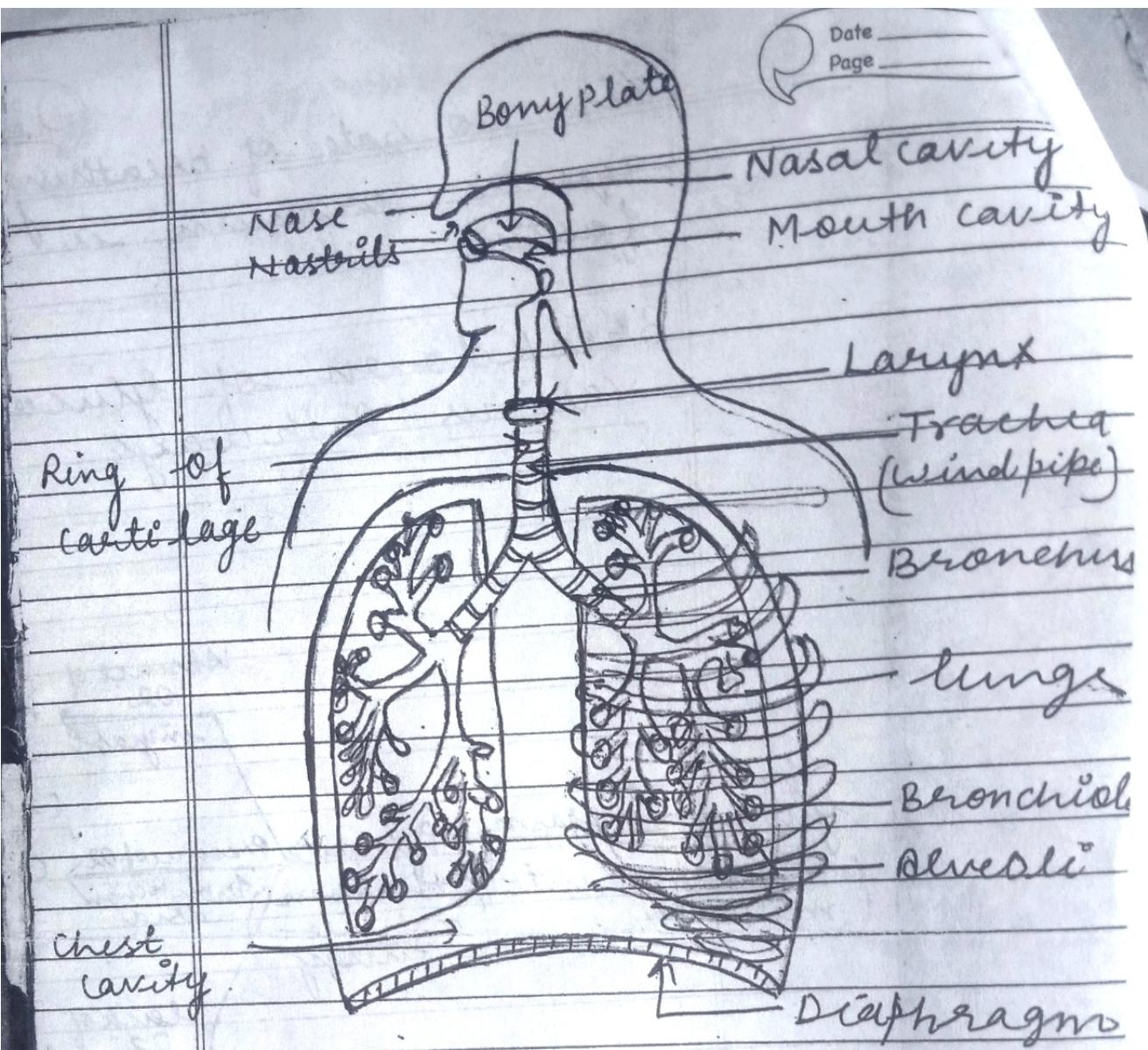
air so rate of breathing in aquatic organism is much faster.

Breakdown of glucose by various pathways



Respiratory system in human beings - In human beings respiration takes place by lungs called pulmonary respiration. Respiratory system consist of following parts

- ① Nasal and oral cavities
- ② Pharynx



- 3 Larynx
- 4- Trachea
- 5 - Bronchi
- 6 - Lungs
- 7- Bronchioles
- 8- Alveoli

+ Nasal and nasal cavities. - The human respiratory system begins from the nose. our nose has two holes in it which are called nostrils.

Nasal cavities - air passes through the nostrils is

filtered by the fine hair which are present in nasal cavity. Nasal cavities is also lined with mucus which intercept dust particle so that clean air goes into ~~Respiration~~ lungs.

Pharynx - The part of throat between the mouth and wind pipe is called pharynx.

Trachea - From the nasal cavity air enters into pharynx and then goes into the wind pipe or trachea. Trachea is a tube like structure. The air coming from the nostrils during breathing passes through trachea. Trachea does not collapse even when there is no air in it because it is supported by cartilaginous rings.

Larynx - The upper end of trachea has a voice box called larynx.

Bronchi - Trachea runs down the neck and divided into two smaller tube called bronchi which open into lungs.

Lungs - lungs are present in thoracic cavity which is separated from abdominal cavity by a muscular structure called diaphragm.

The lungs are covered by two thin membranes called pleura. The lung enclosed by rib cage.

Bronchioles - each bronchi divides in the lungs to form a large number of smaller tubes called bronchioles.

Alveoli - each bronchioles have tiny air sacs at their ends. The pouch like air sacs called alveoli. They are balloon like structure. They are CO_2 and O_2 to move between the lungs and blood capillaries.

Function - (i) It is in the alveoli that gaseous exchange takes place
 (ii) It provide large surface area for exchange of gases

Nasal nostril \rightarrow Nasal cavity \rightarrow Pharynx \rightarrow Larynx \rightarrow Trachea \rightarrow Bronchi \rightarrow lung \rightarrow Bronchioles \rightarrow Alveoli \rightarrow Blood capillaries

Mechanism of breathing

Inhalation

- when we breathe in we lift our ribs and flattened our diaphragm
- volume of lungs increase and air enters into lungs and ultimately gets filled in alveoli
- now from the alveoli O_2 rich air comes into the blood present in capillaries and it is then transported to all the cells of the body
- from the body cell CO_2 rich air is brought into alveoli

Exhalation

- when we breath out thoracic cavity contracts
- Ribs and diaphragm come to their original position
- volume of lung decrease and air exit from the lungs.

Ques

How is oxygen and CO_2 transported in Human beings.

Ans. O₂ is transporated through the blood only when it combine with the respiratory pigment Haemoglobin (Present on R-B-C) while CO₂ is transporated when it is dissolved in plasma of blood.

Epiglottis - It is a flap like structure that cover the glottis to prevent entry of food into trachea while swallowing the food.

Q what is larynx or voice box?

Ans. This is an enlarge part of a trachea. In larynx vocal codes are present which air is blown through the larynx, vocal code vibrate & sound is produced.

Inhalation

when we breathe in air classmate
we lift our ribs and
flattened our diaphragm.

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volume of lungs increase and
air enter into lungs and ultimately
get filled in alveoli

- Now from the alveoli, oxygen rich
air comes into blood present
in capillary blood vessels
- The oxygen is carried by blood
to all parts of the body
- This oxygen is carried by a red
pigment called haemoglobin
present in blood
- As the blood passes through
the tissue of the body, the oxygen
present in it diffuse into
the cells
- The oxygen combine with glucose
present in the cells to release
energy
- CO_2 gas produced as a waste
product during respiration
in the cells of the body tissue
- Blood carries the carbon dioxide back to
the lungs where it diffuse into
the alveoli.

Exhalation

- when we breathe out
chest cavity contract

- Ribs and diaphragm come
into original position
- volume of lungs decrease and
air exit from the lungs