 INDIAN SCHOOL AL WADI AL KABIR DEPARTMENT OF SCIENCE (2020 – 2021)		
Class: X	SUBJECT: BIOLOGY	Date : 29 .11.2020
HANDOUT	Topic: LIFE PROCESSES I (Nutrition)	A4 FILE FORMAT (PORTFOLIO)
CLASS & SEC: X -.....	NAME OF THE STUDENT:	ROLL No.

Life Processes: The basic functions performed by living organisms to maintain their life are called life processes.

Nutrition: The process of taking in food and utilizing it is called nutrition.

Modes of nutrition: There are two modes of nutrition –

(I) Autotrophic nutrition and (II) Heterotrophic nutrition

(I) **Autotrophic mode of nutrition:** Mode of nutrition in an organism makes its own food from inorganic materials like carbon dioxide and water from its surroundings using the sunlight energy.

All green plants and some autotrophic bacteria follow autotrophic mode of nutrition.

(II) **Heterotrophic mode of nutrition:** Mode of nutrition in an organism cannot make its own food from inorganic materials like carbon dioxide and water from its surroundings using the sunlight energy. They depend on the autotrophs for their nutrition directly or indirectly.

Animals, fungi and most bacteria follow heterotrophic mode of nutrition.

Heterotrophic mode of nutrition is of three types: -

(i) **Saprophytic mode of Nutrition:** Some organisms break-down the complex organic food material outside the body into simple soluble form and then absorb it. Examples are fungi like bread moulds, yeast and mushroom.

(ii) **Parasitic mode of Nutrition:** Some other organisms derive nutrition from plants or animals without killing them. This parasitic nutritive strategy is used by a wide variety of organisms like Cuscuta (Amar-bel), ticks, lice, leeches and tape-worms

(iii) **Holozoic mode of nutrition:** Mode of nutrition in an organism in which complex food is taken in by the process of ingestion and broken into simple soluble form by the process of digestion and then absorbed and assimilated into the body cells, and the undigested food is thrown out by the process of egestion.

Examples range from unicellular organisms like amoeba to complex organisms like cat, cattle, elephants including humans.

Nutrition in plants: The process, by which green plants make their own food from carbon dioxide and water by using sunlight energy in the presence of chlorophyll, is called **photosynthesis**.



Events/ Steps of photosynthesis

During the process of photosynthesis. The following events occur during this process –

- (i) Absorption of light energy by chlorophyll.
- (ii) Conversion of light energy to chemical energy and splitting of water molecules into hydrogen and oxygen.
- (iii) Reduction of carbon dioxide to carbohydrates.

Photosynthesis in desert Plants:

The steps of photosynthesis need not take place one after the other immediately all the time. For example, desert plants take up carbon dioxide at night and prepare an **intermediate** which is acted upon by the energy absorbed by the chlorophyll during the day.

Gaseous exchange-

- (i) Gas used- Carbon dioxide
- (ii) By product – Oxygen

Source of raw materials-

- (i) **Carbon dioxide**
– Land plants- Air,
Aquatic plants- Water
 - (ii) **Water & Minerals** – Soil
 - (iii) **nitrogen, phosphorus, iron and magnesium** - Soil
- Nitrogen is an essential element used in the synthesis of proteins and other compounds. This is taken up in the form of inorganic nitrates or nitrites or

it is taken up as organic compounds which have been prepared by bacteria from atmospheric nitrogen.

Mechanism of opening and closing of stomata- The opening and closing of the pore are a function of the guard cells. The guard cells swell and become curved, when water flows into them, causing the stomatal pore to open. Similarly, if the guard cells lose water they shrink, become straight causing the pore to close.

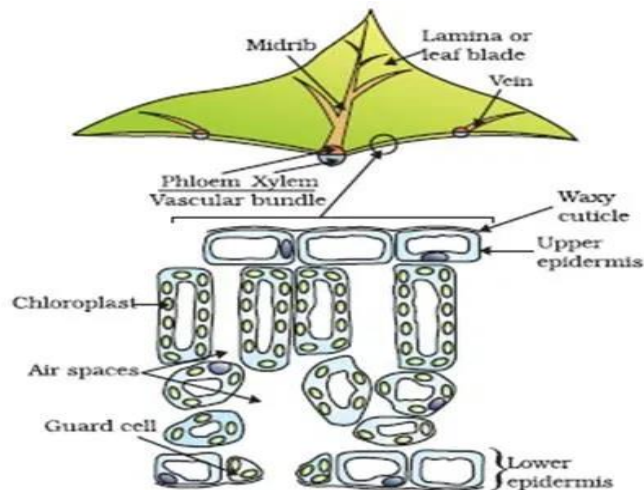


Figure 6.1
Cross-section of a leaf

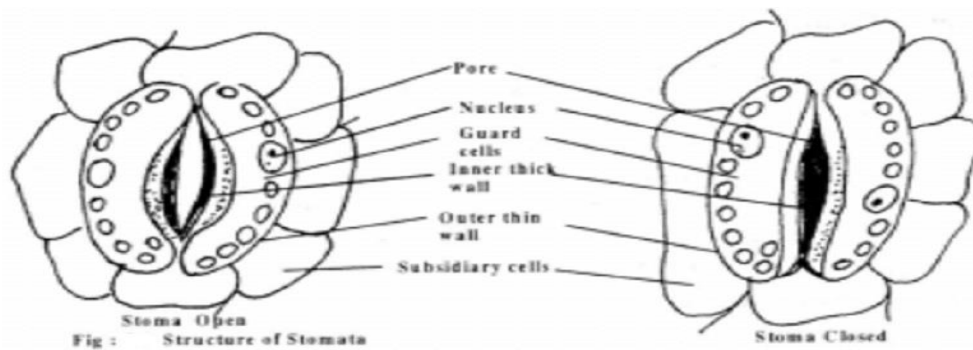


Fig : Structure of Stomata

Refer text book (page 96,97 for the activities below) Activity 6.1 & 6.2.

Experiment to demonstrate that sunlight is essential for photosynthesis

To prove the necessity of sunlight in photosynthesis following steps need to do

Take a plant with de-starched leaf.

Leaf is partially covered with black paper on which a design is cut.

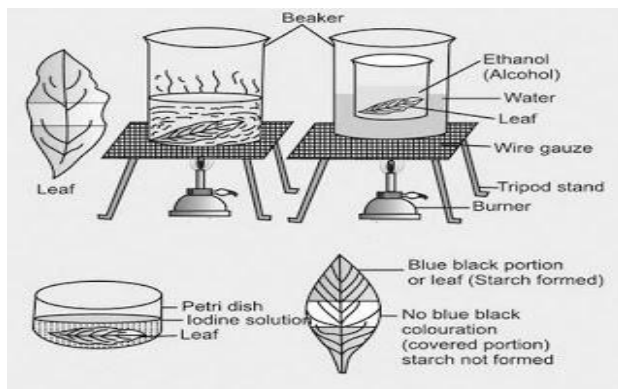
Expose this plant to sunlight for few hours and perform a starch test with iodine solution.

Observation-

- Covered leaf part shows brown colouration.
- Exposed leaf shows blue-black colour.

Result- Starch is present in the exposed leaf.

Conclusion- Leaf exposed to sunlight give iodine test, proving that sunlight is necessary for photosynthesis.



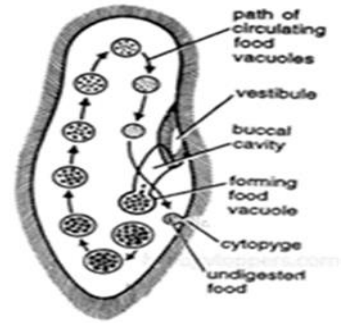
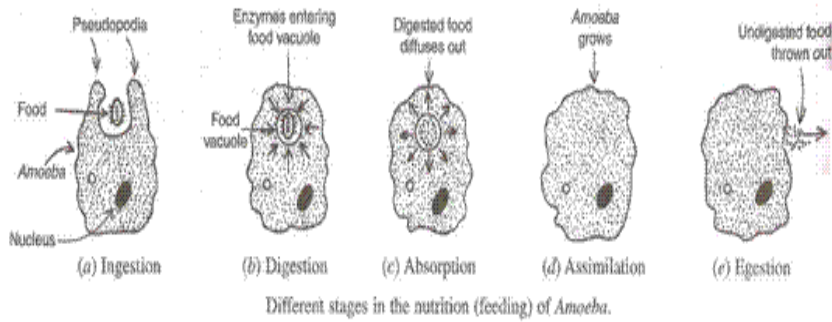
Nutrition in Amoeba: The various steps involved in the process of nutrition are:

Ingestion - Amoeba takes in food using temporary finger-like extensions of the cell surface which fuse over the food particle forming a food-vacuole.

Digestion - Various enzymes from the cytoplasm enter into the food vacuole, complex substances are broken down into simpler ones.

Absorption – The simple soluble food then diffuses into the cytoplasm.

Assimilation - The remaining undigested material is moved to the surface of the cell its cell membrane ruptures and the undigested food thrown out.

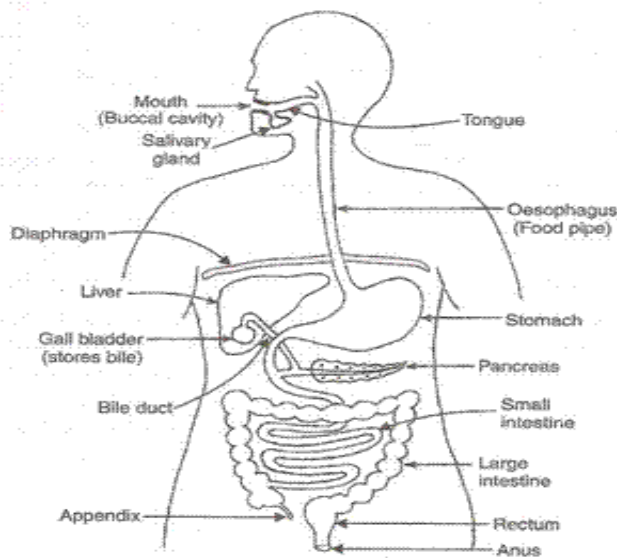


Nutrition in Paramoecium:

In Paramoecium, which is also a unicellular organism, the cell has a definite shape and food is taken in at a specific spot. Food is moved to this spot by the movement of cilia which cover the entire surface of the cell.

Nutrition in Humans: Various **organs** of **Human digestive system** in sequence are: Mouth, Oesophagus (or Food Pipe), Stomach, Small Intestine and Large Intestine. The glands which are associated with this **system** are: Salivary glands, Liver and Pancreas.

The **human** alimentary canal runs from mouth to anus and is about 9 metres long tube.



The human digestive system.

Organ	Gland	Enzyme/Digestive juices	Function
Mouth (Buccal Cavity)	Salivary glands	Salivary amylase (Ptyalin)	Converts starch into maltose (sugar)
Oesophagus	-	-	a transport tube that directs the progression of food and fluids from the mouth to the stomach .
Stomach	Gastric glands	Gastric juice (i) Hydrochloric acid →	(a) Kills harmful bacteria present in the food

Note:

The length of the small intestine differs in various animals depending on the food they eat. Herbivores eating grass need a longer small intestine to allow the cellulose to be digested. Meat is easier to digest, hence carnivores like tigers have a shorter small intestine.

Dental caries

Dental caries or tooth decay causes gradual softening of enamel and dentine. It begins when bacteria acting on sugars produce acids that softens or demineralises the enamel. Masses of bacterial cells together with food particles stick to the teeth to form dental plaque. Saliva cannot reach the tooth surface to neutralise the acid as plaque covers the teeth. Brushing the teeth after eating removes the plaque before the bacteria produce acids. If untreated, microorganisms may invade the pulp, causing inflammation and infection.

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