NUTRITION IN PLANTS

- Plants are the **only organisms that can prepare food for themselves** by using water, carbon dioxide and minerals.
- The nutrients enables living organisms to **build their bodies**, **to grow**, **to repair damaged parts** of their bodies and **provide the energy** to carry out life processes.
- The process of taking food by an organism and its utilization by the body is called **Nutrition**.

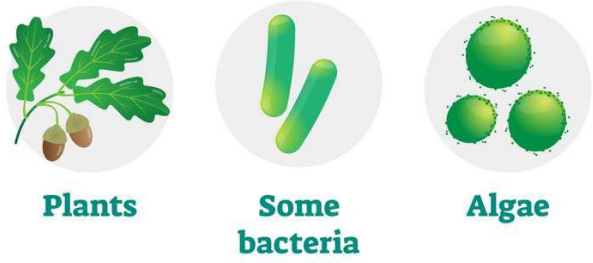
MODES OF NUTRITION IN PLANTS -

The method of obtaining food are called modes of nutrition. On the basis of mode of nutrition, organisms are divided into two main groups -

a) **Autotrophic Nutrition** -

The mode of nutrition in which **organisms make their food themselves** are called Autotrophic Nutrition. The organisms which can make their food themselves are called **Autotrophs**.

Example – A **plant** is an autotroph.

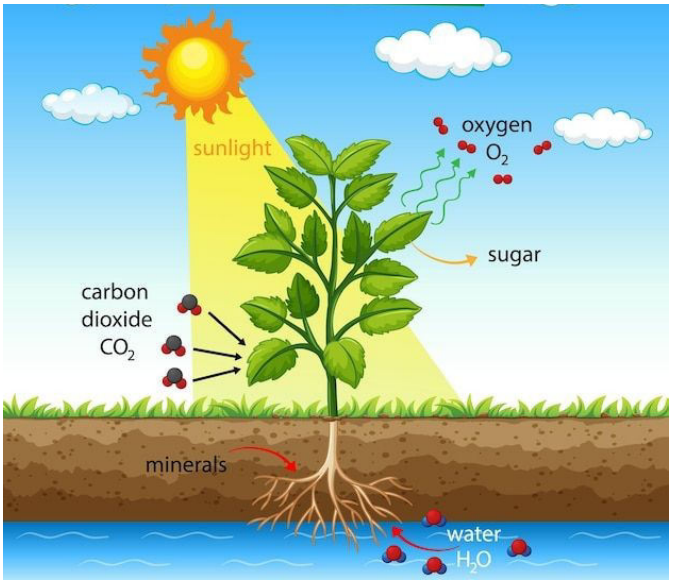


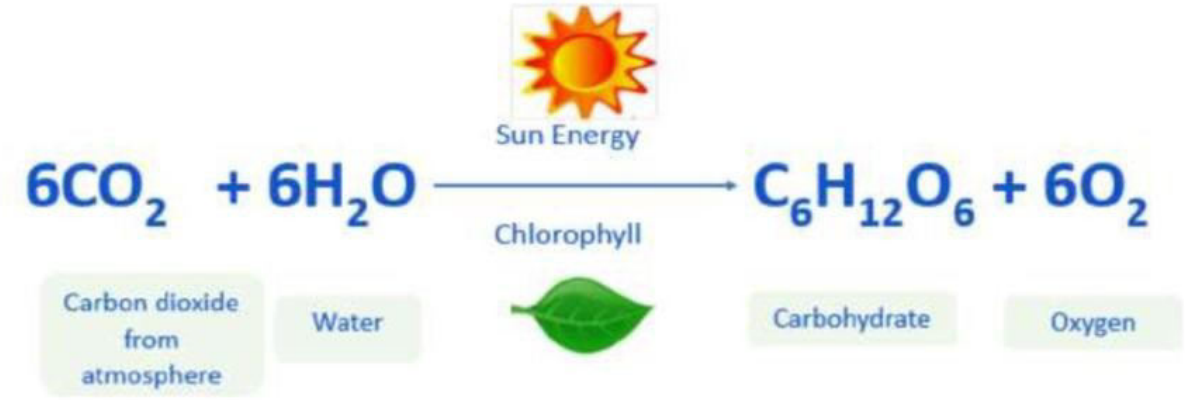
b) **Heterotrophic Nutrition** -

The mode of nutrition in which **organisms depend on others for their food** is called Heterotrophic Nutrition. The plants and animals which depend on others for their food are called **Heterotrophs**.

Example – The **dog** is a heterotroph.

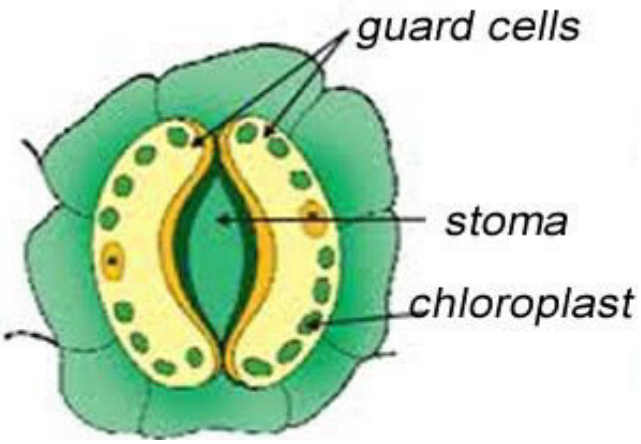
PHOTOSYNTHESIS





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**.

- ✗ The synthesis of food in plants usually occurs in leaves. Carbon dioxide from air is taken through the tiny pores present on the surface of the leaves. These **tiny pores present on the surface of leaves** are called **Stomata**. These pores are surrounded by '**Guard Cells**'.



- Water and Minerals present in the soil are absorbed by the roots and transported to the leaves by the **vessels** which run like pipes throughout the root, the stem, the branches and the leaves. They form a continuous path for the nutrients to reach the leaf.

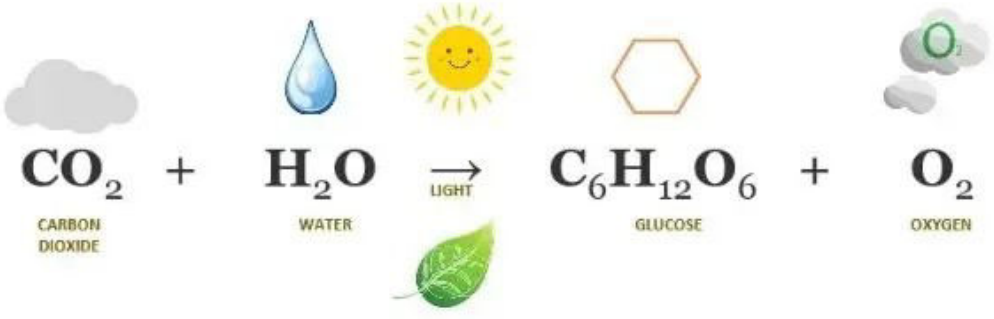
- **Leaves are the food factory of the Plants.** The leaves of plants can synthesize food because they contain green pigment called **Chlorophyll** (*helps leaves to capture the energy from the sunlight*).

Photosynthesis by Plants other than Leaves

Cactus is a desert plant which have tiny, spine-like leaves to reduce the loss of water by transpiration. These **leaves of cactus plant cannot do photosynthesis**.

The **stem and branches** of a cactus plant are green which contain chlorophyll, so they **carry out process of photosynthesis**.

- The process of photosynthesis first produces a simple carbohydrate called **glucose** (carbohydrate) as food. This glucose is then converted into a complex carbohydrate called **Starch**. This Starch gets stored as food in the various parts of plants like leaves, fruits, etc.



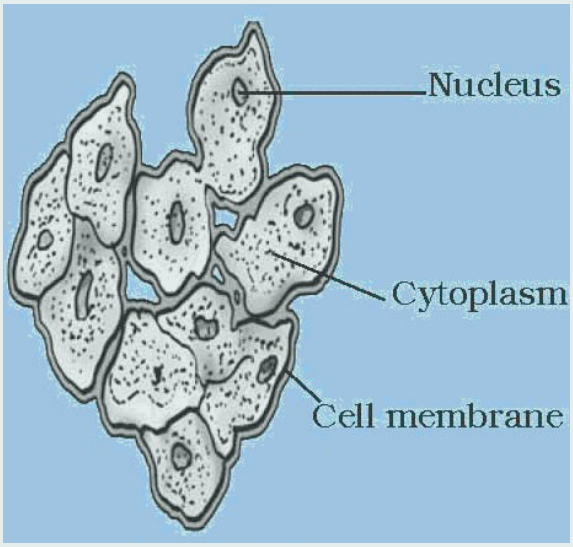
- The presence of starch in leaves indicates the occurrence of photosynthesis.

CELLS

The bodies of living organisms are made up of tiny units called cells. Cells **can be seen only under microscope**.

The cell is enclosed by a thin outer boundary, called the **Cell Membrane**.

Most cells have a distinct, centrally located spherical structure called the **Nucleus**. The nucleus is surrounded by a jelly-like substance called **Cytoplasm**.



➢ Synthesis OF Plant Food Other Than Carbohydrate:

Nitrogen is required by plants to make proteins. Nitrogen is present in the environment in large amount, but **plants cannot absorb nitrogen in gaseous form**. There are some **bacteria that convert gaseous nitrogen into a soluble form** and release it into the soil. These soluble form of nitrogen are absorbed by the plants along with water.

OTHER MODES OF NUTRITION IN PLANTS

Heterotrophic mode of Nutrition -

Most of the plants have chlorophyll and can make their own food. But there are some **plants that do not have chlorophyll and cannot make their own food**. They are called **Heterotrophs** and such plants **depends on the food produced by other plants**. They use the Heterotrophic mode of nutrition.

- **PARASITE -**

A Plant that lives on or inside another organism and derives food from it, is called a Parasite.

Example – Cuscuta (Amarbel) does not have chlorophyll, it cannot synthesize its own food. It takes ready-made food from the plant on which it is climbing. The tree on which the Cuscuta plant climbs is called Host.

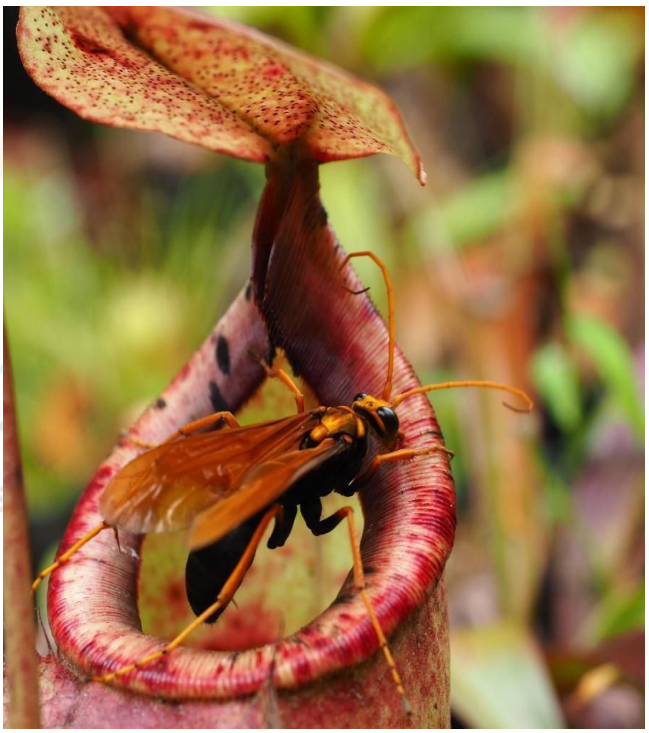
INSECTIVOROUS PLANT

The **plants which eat insects** are called Insectivorous plants. Insectivorous plants are green and carry out photosynthesis to obtain part of food required by them.

But **they do not get nitrogen from the soil** in which they grow. So, they feed on insects to obtain the nitrogen needed for their growth. They are also known as **Carnivorous plants**.

In insectivorous plants leaves are specialized to catch insects.

Example – **Pitcher Plant**



SAPROPHYTES

- The **non-green plant** which **obtains their food from dead and decaying organic matter** are called Saprophytes.
  Example – Fungi grown on bread.

- They secrete digestive juices on the dead and decaying organic matter and convert it into solution and they absorb the nutrients from this solution.

- Fungal spores are present in the air. When these spores land on a humid object in hot conditions, they grow into new fungus plants.

TIP: We should keep shoes, leather object, pickles, etc. In an air tight container. Fungal spores are present in the air and grow fast in hot and humid conditions especially during the rainy season.

Symbiotic Relationship -

- The mode of nutrition in which **organisms live together and share shelter and nutrients** is called a symbiotic relationship.

  Example – **Lichens** is a symbiotic relationship between algae and fungi.

- Algae are autotrophic plants, they contain green coloured chlorophyll pigment. Fungi are non-green saprophytic plants. The **fungus provides shelter, water and minerals to the algae** and in return, **the algae provide food** that is prepared by photosynthesis. In this relationship, both algae and fungi get benefit from one another, so this is a symbiosis relationship.

How Nutrients are Replenished in the Soil?

- ✗ The Plants absorb minerals and nutrients from the soil. So, their amount in the soil keep on declining.
- ✗ **Fertilizers and Manures** contain nutrients such as nitrogen, potassium, phosphorus, etc.
- ✗ These **nutrients need to be added time to time** to enrich the soil.
- ✗ As nitrogen gas is present in large amount in the air but plant need nitrogen in soluble form.
- ✗ **Rhizobium** is a bacterium that can **take atmospheric nitrogen and convert it into a soluble form**. But Rhizobium cannot make its own food. So, they **live in the root nodules** of leguminous plants like gram, peas, pulses, beans etc. **Rhizobium provides nitrogen to the plants** and the **plants provide food and shelter to the bacteria**.