UNIT-I PLANTS AND ANIMALS

1 Plants — Our Green Friends

You will now learn about

- Food made by green plants
- Parts of a leaf
- Use of food by plants
- Some unusual plants
- Energy flow in living things
- Balance in nature.

Can you think of life without green plants? No. In fact, life would not be possible without plants on Earth. Plants are the primary source of food for all organisms either directly or indirectly. This is because plants can make their own food. Other living things depend on plants for food. There would be no food on Earth without green plants.

How Green Plants Make Food — Photosynthesis

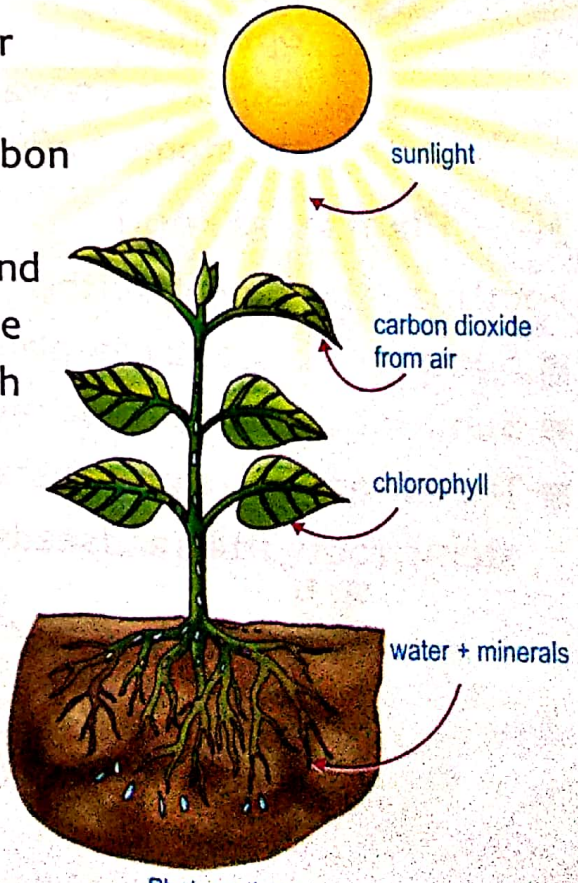
Green plants have many leaves. Leaves prepare food for the plant. Leaves are green in colour due to the presence of a green pigment called chlorophyll. Leaves need sunlight, carbon dioxide, water and minerals to prepare food.

The roots absorb water and minerals from the soil and the stem carries these materials to the leaves. The leaves take in carbon dioxide from the air through pores called stomata.

The special method by which plants make their food is called photosynthesis. 'Photo' means *light* and '*synthesis*' means *putting together*.

The food that plants make is called glucose, which is a kind of sugar.

When plants store the food, the sugar is converted into starch.



Photosynthesis

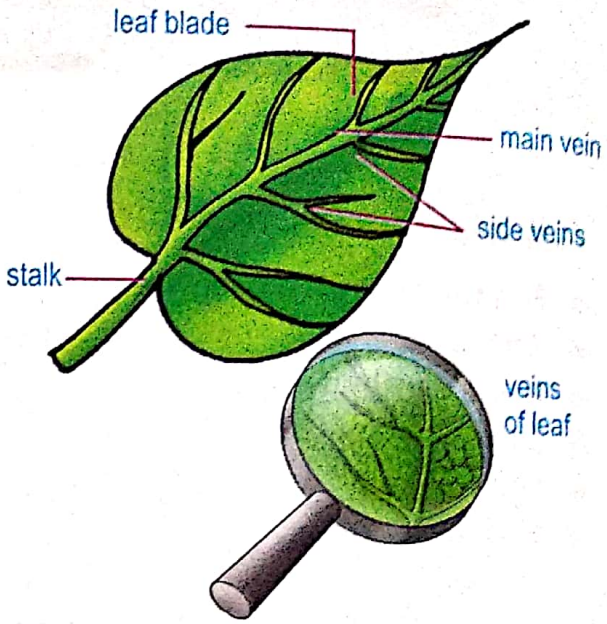
Parts of a Leaf

A leaf has the following parts:

Leaf blade – It is the flat part of the leaf.

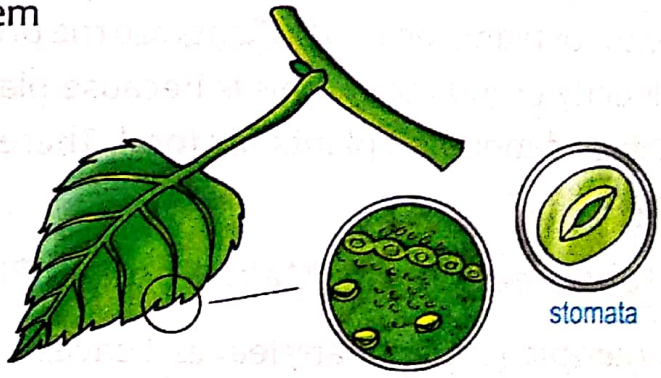
Main vein – It is a double pipeline of cells that runs in the centre of the leaf.

Side veins – They run parallel to one another from the main vein. The veins carry water and minerals to the leaf. Food prepared in the leaves is carried by the veins to different parts of the plant.



Stalk – The leaf is attached to the stem with a stalk.

Stomata – The leaf has tiny openings between the cells called stomata. The leaf takes in carbon dioxide and gives out oxygen through these openings. Sometimes the leaf has extra water. This goes out through the stomata as water vapour. This is called transpiration.



Parts of leaf

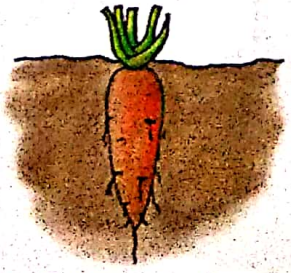
How Plants Use Food

Food made by the leaf is in the form of sugar:

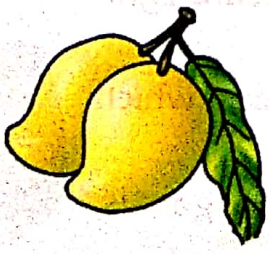
- Some food is used by the plant to grow.
- Some food is used to repair a damaged part.
- The extra food is stored as starch in different parts of the plants — leaves, stems, roots, fruits and seeds. This is eaten by animals and humans.

Did You Know?

Potato leaves and young stems are poisonous.



a root that we eat (carrot)



a fruit that we eat (mango)

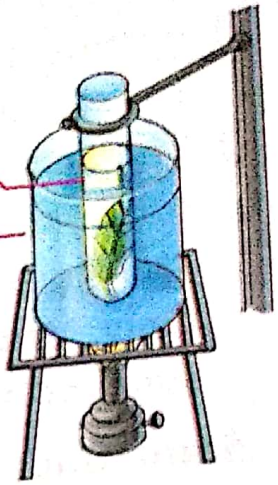
leaves that we eat (spinach and cabbage)

a stem that we eat (sugar cane)

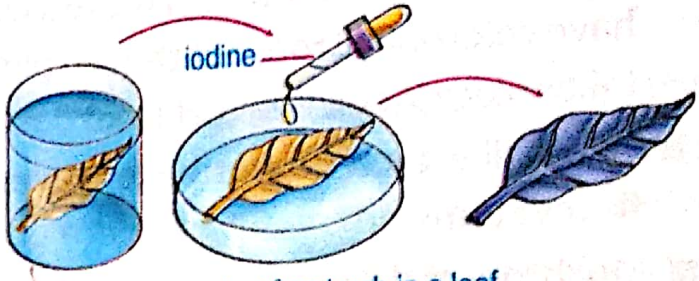
Activity

I. Test for starch in a leaf

- Boil a green leaf in water, then boil it in alcohol (remember, never heat alcohol directly on a flame, it will catch fire). Put alcohol in a test tube with the leaf and put the test tube in a beaker with water and then heat it on a flame.



- This will remove the chlorophyll from the leaf. The process of removing green colour from a leaf is called bleaching.
- Wash the leaf in cold water.
- Put a few drops of iodine on the leaf, it will turn blue-black. Iodine always turns starch blue-black. This confirms the presence of starch.



test for starch in a leaf

Activity

II. Chlorophyll is needed for photosynthesis

- Take a coloured leaf like Coleus. Make a sketch of the leaf on a paper, clearly marking the green parts of the leaf.
- Test for starch as done in Activity – I.
- Compare the blue-black part of the leaf with your sketch.
- Only the part that was somewhat green turns blue-black showing the presence of starch in it. Thus, it is confirmed that photosynthesis has taken place only in those green parts. This shows that chlorophyll is needed for photosynthesis.

Activity

III. Sunlight is essential for photosynthesis

- Keep a plant in a dark place for a day. The leaves will not be able to make food during this time due to the absence of sunlight.

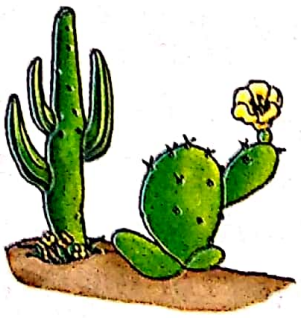
- Cover a part of one leaf with black paper. Now keep the plant in sunlight for about 6-8 hours.
- Remove the paper and test the leaf for starch as done in Activity I.
- The leaf, except the covered part, shows the presence of starch and turns blue-black. Only the part which gets sunlight is able to make and store food.

sunlight is necessary for photosynthesis

Some Unusual Plants

- Some plants like crotons have red leaves because of a red pigment in them. They have chlorophyll too, but the red pigment hides the green colour. Photosynthesis takes place in such leaves also.
- Plants like cacti do not have leaves. Photosynthesis takes place in their green fleshy stems.
- Mushrooms do not have chlorophyll. They cannot make their own food. They get their food from dead plants and animals and hence grow in damp places.

croton



cacti

mushroom

Did You Know?

The death cap mushroom is responsible for most mushroom poisoning in the world.

Energy Flow in Living Things

We need energy for various activities – to run, to play, to write and to do many other things. All this energy comes from the food we eat. During photosynthesis, green plants trap the Sun's energy and make food. This energy is passed on to human beings and animals when they eat the food.

Sun is the main source of energy. The energy flow occurs through a food chain. Grass is eaten by a goat and the goat is eaten by a tiger. In this process of eating and being eaten, various organisms form a chain. This chain is known as the food chain.

A Green Plant ⟶ A Goat ⟶ A Tiger

energy flow

Plants and Animals are Interdependent

We know that plants and animals are interdependent. Human beings and animals need food and oxygen which they get from plants. Plants need carbon dioxide to prepare their food. They get it from human beings and animals when they release carbon dioxide by breathing out.

Balance in Nature

What would happen if the number of plants and trees become much lesser than the number of animals? Oxygen and food would not be enough for animals. Animals would become homeless if forests are cut and trees are cut. In the same way, if the number of animals become lesser than the number of plants, there would not be enough carbon dioxide for plants to make their food. Thus, the balance in nature would be disturbed. It is very important to maintain a balance for life to exist on Earth.

Various wildlife protection programmes have been started to give protection to wild animals, forest reserves and sanctuaries. Programmes like Vanamahotsava promote the planting of trees and make people aware of the harmful consequences of cutting trees.

REMEMBER

- Plants provide us food and oxygen.
- Leaves are the food factories of plants.
- Green leaves make food from water, minerals, carbon dioxide in the presence of sunlight by a process called photosynthesis.
- All plants store food in the form of starch in various parts of their body. Some food is used for its growth and some is eaten by animals.
- A balance between plants and animals is important for life to exist on Earth.

KEY WORDS

- Photosynthesis: the process by which plants make food.
- Chlorophyll: a green pigment present in leaves to trap the sunlight.
- Stomata: the openings in the leaf that help in the exchange of gases.
- Bleaching: removal of green colour from the leaves.
- Transpiration: the process by which leaves give out extra water present in them through the stomata.

A. Answer the following questions:

1. Define: (a) Photosynthesis (b) Stomata (c) Bleaching (d) Chlorophyll
2. Explain the process of photosynthesis.
3. What happens to the food made by a plant?
4. With the help of a diagram explain the parts of a leaf.
5. How are plants and animals interdependent?
6. Why is it essential to maintain a balance between plants and animals in nature?
7. You are given a piece of bread. Explain how you would show that it contains starch.
8. Draw and name: (a) a non-green plant, (b) a plant that makes food in its stem.
9. List the functions of stomata.

B. Give reasons:

1. Cactus makes food in its stem.
2. Mushrooms obtain their food from the dead and decaying matter.
3. A non-green leaf cannot make food.
4. Sun is the main source of energy.
5. No life would exist on Earth if there were no plants.
6. A green leaf is bleached before carrying out a starch test.