



Start *With* Science

Book 4

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Edited by







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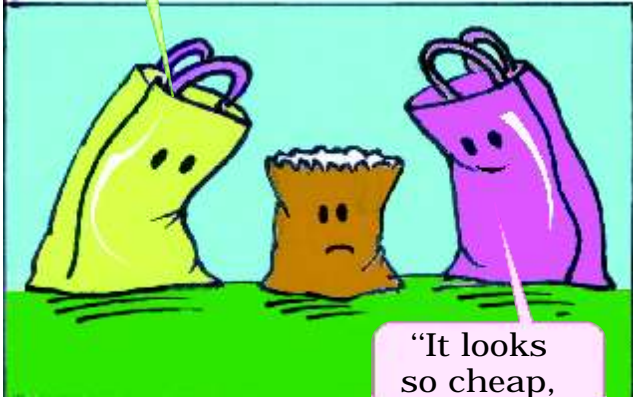


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Polybag Versus Paper Bag (An Environment Story)

"Ha! Ha! Ha! Ha! Look at this bag!
How ugly it looks. It looks like a
poor bag."

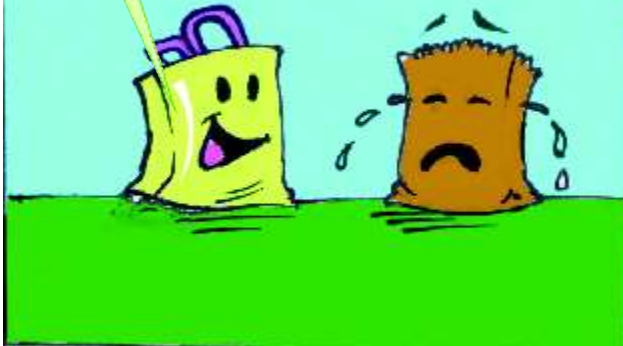


"It looks
so cheap,
so dull!"

"Look at us! We are so colourful,
pretty and good looking."



"Ladies, gents and even children
love to carry us."



"They feel happy and proud when
they carry us in their hands.
Even women put their expensive
sarees and jewellery in us. Most
of us live in air-conditioned
showrooms."

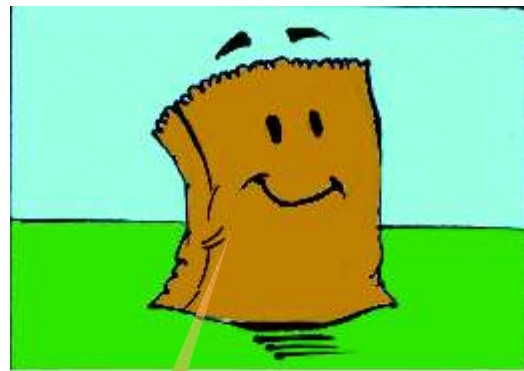
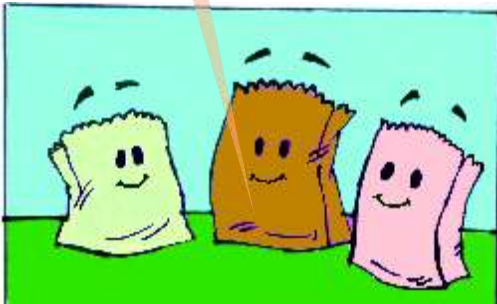
"People are dependent on us.
They cannot live without us.
We are their daily need."



"I agree that you are very beautiful.
People love you because you are
good looking ."



"But now people have come to know that you are very harmful. You are non-biodegradable. Now, they are coming to me. Don't you know I also come in different colours?"



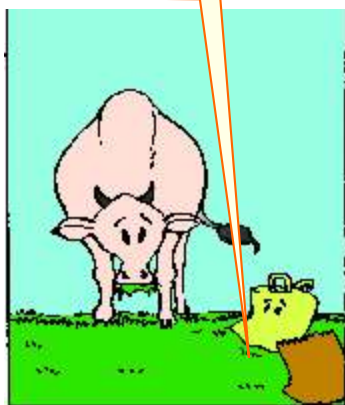
"I also look good. People love to carry me because I protect their environment. I am proud of myself."

"Hey! You ugly paper bag. How can you say we are harmful?"

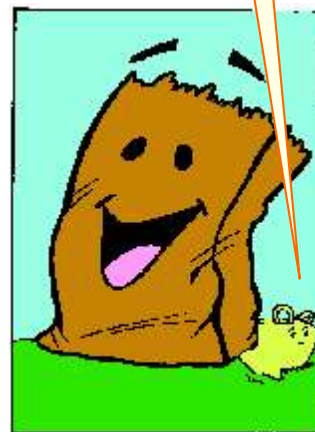


"Dear friends! Don't you know that Government has banned the use of polybags everywhere? I am a biodegradable substance. I can be recycled. I don't cause pollution. I don't harm animals."

"Look at this cow! She is coming here only. She might eat you mistakenly. If she eats you, she will get choked and die. Please go away otherwise you will be the cause of the death of this innocent animal."



"Sorry Friend! I have understood my mistake. I don't want to harm mankind and animals. I am going. You take care of this Earth and help the people around you."



UNIT 1 : PLANT LIFE

Food-Making in Plants



1

You will learn about :

- Photosynthesis.
- Structure of a leaf.
- Flow of energy.
- Interdependence of plants and animals.
- Balance in nature.

Key words

Photosynthesis : The process of making food by green plants.

Chlorophyll : The green pigment present in leaves.

Stomata : Tiny holes present on the lower surface of leaves.

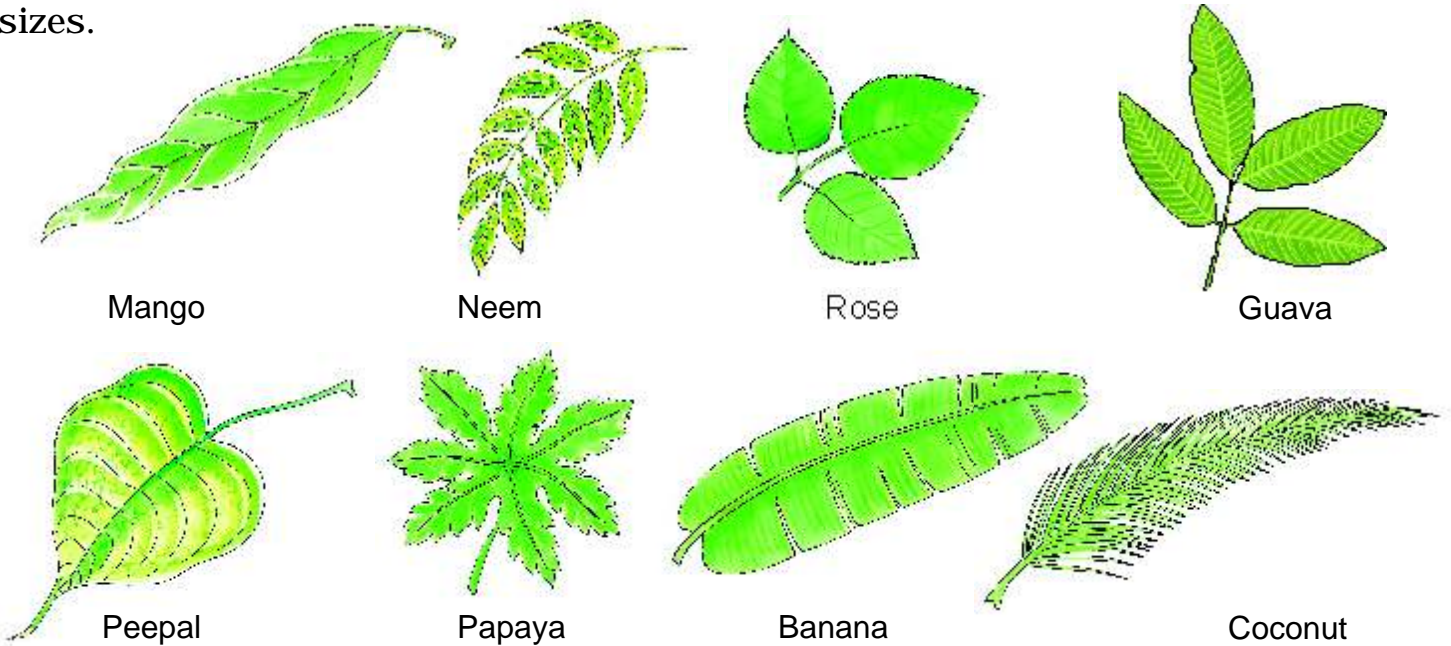
The world around us is made of different types of plants and animals. They are all of different shapes and sizes. Look around and observe the plants present around you or outside your classroom. Do you observe anything common between them? Most plants are green in colour. Plants are green because their leaves contain a green-coloured pigment called chlorophyll. This chlorophyll gives green colour to the leaves. It also helps plants to make their own food.



Different types of plants around us.

Types of leaves

Different plants have different types of leaves. They are of different shapes and sizes.



Parts of a leaf

The leaf has a flat and broad surface called leaf blade or lamina. It has a midrib, passing through the centre of the leaf called midvein. We can see side veins branching out from the main vein. The leaf is attached to the stem with a stalk called petiole.

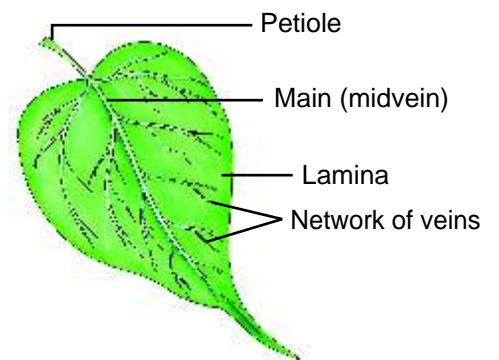
This network of veins helps in the transport of water and minerals to leaves and transport of food from leaves to different parts.

On the lower surface of a leaf, tiny pores are present. They are called stomata. Stomata are bean-shaped tiny cells. They can be seen with the help of a microscope only. Stomata help in the exchange of gases like carbon dioxide, oxygen and water vapour.

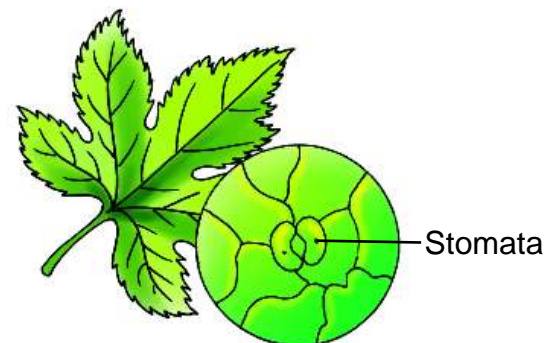
How do leaves make food?

The green leaves are called 'kitchen of the plant' because they make food for the plant.

The process of making food by plants with the help of sunlight,



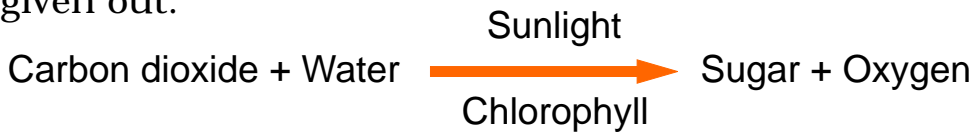
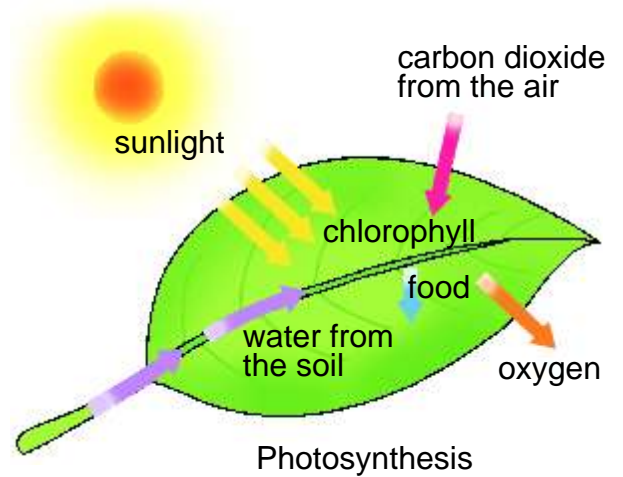
Parts of a leaf



water and carbon dioxide is called photosynthesis. Photo means 'light' and synthesis means 'making'. The green plants make food with the help of carbon dioxide and water in the presence of sunlight.

Green leaves contain chlorophyll.

- Plants absorb water and minerals from the soil with the help of roots.
- They absorb carbon dioxide from the air with the help of stomata.
- They get energy from the sun.
- They make food in the form of glucose (which is a simple sugar) and oxygen gas is given out.

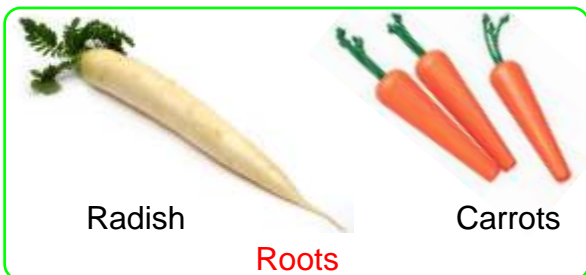
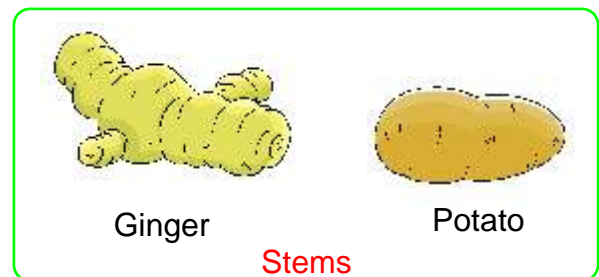
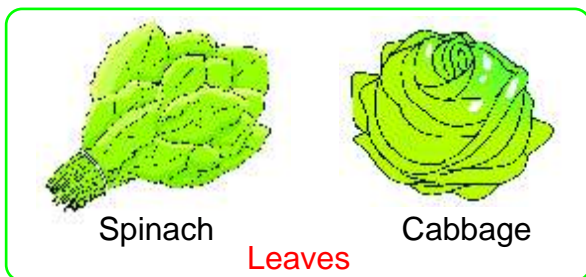


Now can you tell why plants cannot make their food at night?

Utilisation of prepared food

1. Once the food is prepared, it is transported to various parts to give energy.
2. It is also used for the formation and the growth of new cells.
3. Extra food is stored in leaves, roots, stems or flowers in the form of starch.

It is, thus, stored food which is eaten by human beings.



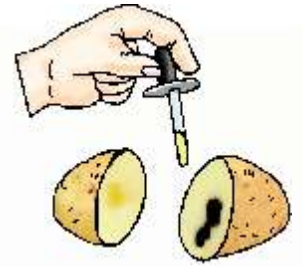
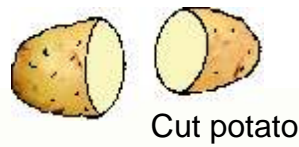
Food stored in different parts of a plant.

Activity

1. Aim : To test for starch.

1. Take a potato.
 2. Cut it into two halves.
 3. Put a few drops of iodine solution on one part.
- Iodine solution turns bluish black.

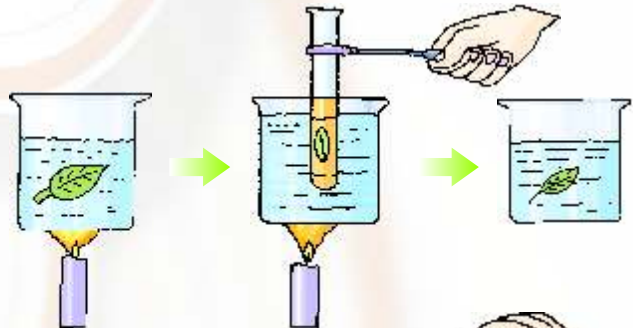
The blue-black colour shows the presence of starch.



Blue black colour shows the presence of starch

2. Aim: To show that sunlight is needed for photosynthesis.

1. Take a potted plant.
2. Cover one of its leaves partly with a black paper and then keep the pot in sunlight for 4-5 hours.
3. Now, pluck the covered leaf.
4. Bleach the leaf by boiling it first in water and then in alcohol.
5. Wash the leaf in cold water.
6. Now, put a few drops of iodine solution on the leaf.
7. The part of the leaf that was covered with black paper does not turn blue-black in colour.



Can you give the reason?

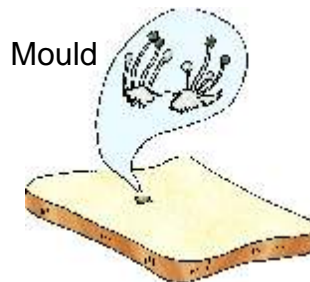
The uncovered leaf gets the sunlight and so it prepares food in the form of starch. Starch gives blue-black colour with iodine solution.

Green part turns blue black



Some unusual plants

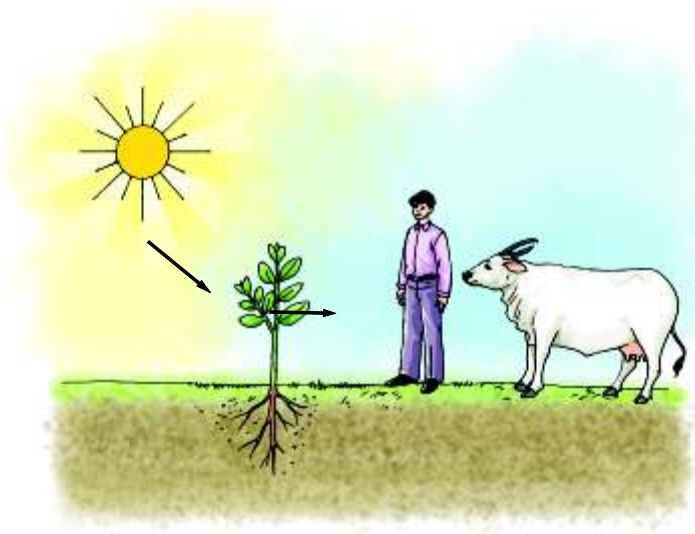
Plants like moulds and mushrooms are non-green plants. They do not contain chlorophyll. Therefore, they cannot make their own food. They depend upon dead and decaying plants and animals for their food.



Mushrooms

Energy flow in living things

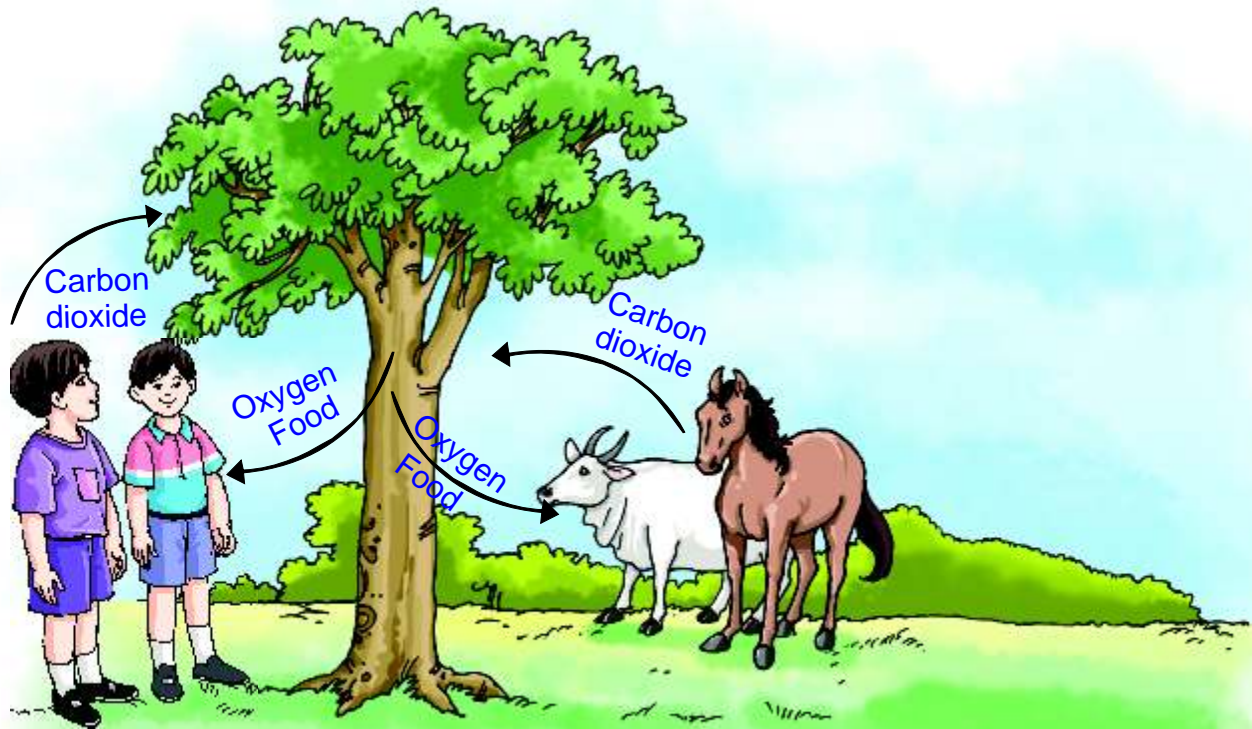
The green plants utilise sun's energy to make food. We all need energy to do work. Animals and human beings get energy from the plants when we eat them as food. In this way, energy passes from the sun to plants, then to human beings and animals.



Energy flows from the sun to plants and from plants to human beings and animals.

Interdependence of plants and animals

Animals need food and oxygen to live. They eat plants as their food. Plants make their food by photosynthesis and give out oxygen to breathe. On the other hand, animals breathe out carbon dioxide and help the plants to carry on their process of food-making. In this way, this exchange of oxygen and carbon dioxide between plants and animals maintains the balance in nature.



Interdependence of plants and animals.

Balance in nature

Plants and animals depend on each other but a balance should be maintained between the number of plants and animals. If all of a sudden, the number of plants increases, then the animals would not be able to give enough of carbon dioxide to them for photosynthesis. In the same way, if the number of animals increases, the plants would not be able to supply enough of oxygen to them to breathe and as a result the balance of nature will get disturbed.

To maintain the balance in nature, we must protect plants and animals. The Government has established wildlife sanctuaries to protect the wild animals. Here, hunting and killing of wild animals is banned. Government has launched programmes like 'Vanmahotsav'. Under this programme, new trees are planted. Now, people are aware of the harm caused due to the cutting of trees.



Children planting saplings.

Remember

- Green plants have chlorophyll in them so they can make their own food.
- A leaf has a main vein and side veins to transport food and water.
- Photosynthesis is the process of making food by green leaves in the presence of sunlight with the help of carbon dioxide and water. Oxygen is given out and glucose is formed as food.
- Starch gives blue-black colour with iodine solution.
- Energy flows from the sun to plants and then to human beings and animals.
- Animals and plants depend on each other for their survival.
- We should protect plants and animals to maintain a balance in nature.

Exercises

A. Tick (✓) the right answer and fill in the blanks.

1. Leaves are green because of the presence of a pigment called

- (a) Carbon dioxide (b) Chlorophyll (c) Haemoglobin

2. Carbon dioxide and water combine to form during photosynthesis.
 (a) Hydrogen (b) Glucose (c) Iodine
3. During photosynthesis gas is given out.
 (a) Oxygen (b) Hydrogen (c) Nitrogen
4. Starch with iodine solution gives colour.
 (a) Blue black (b) Blue grey (c) Red
5. The process of making food in plants is called.....
 (a) Respiration (b) Photosynthesis (c) Excretion
6. During new trees are planted.
 (a) *Vanmahotsav* (b) *Basant panchami* (c) Holi

B. Name the following.

1. Two things needed for photosynthesis. ,
2. Two things needed for the test of starch. ,
3. Two food items having starch. ,
4. Two types of veins in leaves. ,
5. Two gases exchanged with the help of stomata. ,

C. Answer these questions.

1. Why is the leaf called 'the kitchen of a plant'?
2. What is photosynthesis?
3. Draw and label parts of a leaf.
4. How can you say that plants and animals are dependent on each other?
5. What happens to the food prepared by the plant?

D. How will you show that sunlight is needed for the process of photosynthesis?

E. Complete the following.

1. The process by which green plants make their food. P.....
2. Food prepared by green plants. G.....
3. The place where wild animals are protected. W.....
4. The gas given out during photosynthesis. O.....
5. The gas utilised during photosynthesis. C.....
6. Tiny holes present on the lower surface of a leaf. S.....

F. Write true or false.

- a. Green plants make their food even at night.
- b. Mould and mushroom do not have chlorophyll.
- c. Plants get water and minerals from soil.
- d. We should protect wild animals.
- e. We should cut as many trees as possible.

Activity

Protection of Plants :

- 1. 22 April is celebrated as the Earth Day. Plant a tree and name it.
- 2. Take care of the tree every day as your own friend.



Website for more information

www.homestead-farm.net

HOTS (Higher Order Thinking Skills)

A. What will happen if plants stop making food or the process of photosynthesis?

Hint : (Plants give out a gas during photosynthesis.)

B. Why does a green plant not make food at night?

Hint : (Recall the things needed by a plant to make food.)

Teacher's Notes

Take the children out in the school garden and ask them to observe various plants and their parts. They can be asked to observe the structure of a leaf. Show various vegetables in the class to explain how food is stored in various parts of a plant.



2

UNIT 1: PLANT LIFE

Different Ways of Living in Plants

You will learn about :

- Terrestrial plants.
- Aquatic plants.
- Plants of grass family.
- Insectivorous plants.

Key words

Terrestrial plants : Plants growing on land.

Aquatic plants : Plants growing in water.

Insectivorous plants : Insect-eating plants.

Evergreen trees : Trees which do not shed leaves.

Deciduous trees : Trees which shed their leaves.



Plants are found almost everywhere. We can see plants growing on mountains, seashores, deserts, plains and even in water.

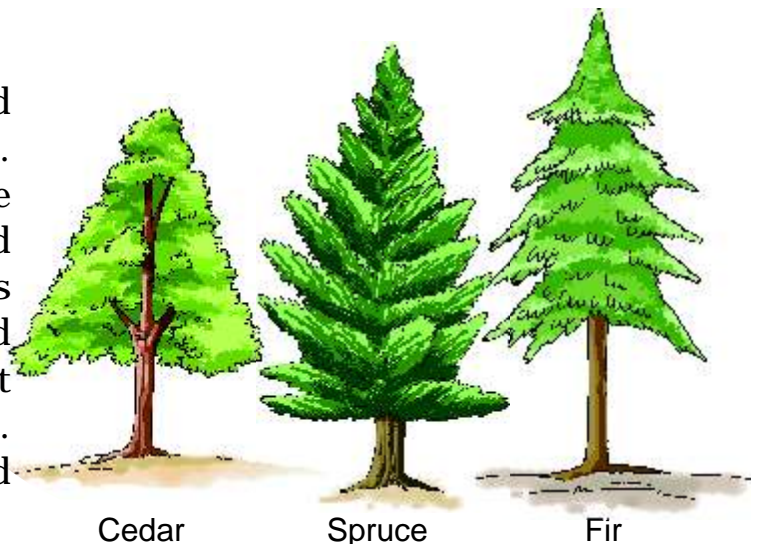
Plants growing in different areas have different features. Depending on the place where they grow, plants can be divided into two groups:

1. Terrestrial plants
2. Aquatic plants

Terrestrial Plants : Terrestrial means growing on land. So, plants which grow on land are called terrestrial plants.

Plants growing on mountains

Plants growing in mountains or cold regions are generally tall and straight. They are cone shaped. This shape protects them from strong winds and rainfall. They have needle - like leaves with waxy coating which helps water and snow to slip off easily. These trees do not bear flowers, instead they bear cones. These cone-shaped trees are called conifers, e.g., pine, fir, cedar, spruce, etc.



Trees growing in plains

Trees growing in plains have lots of branches and leaves. They have more space to spread. Their leaves are flat. They shed their leaves once a year, therefore, they are called deciduous trees. Banyan, neem, sal, sheesham, mango, peepal, etc., are deciduous trees.



Banyan



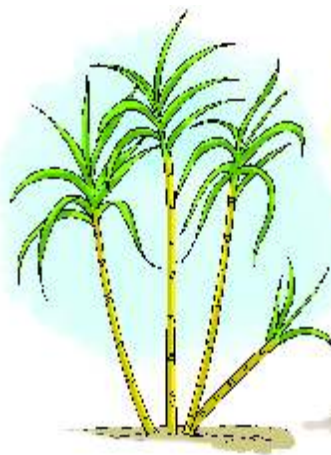
Neem



Mango

Trees growing in hot and damp areas

Trees growing in hot and wet climate have many leaves. They do not shed their leaves at once, therefore, they remain green throughout the year. A few leaves are lost once every year, that is why they are called evergreen trees. Rubber, cotton, coconut, sugarcane, etc., are evergreen trees.



Sugarcane



Coconut

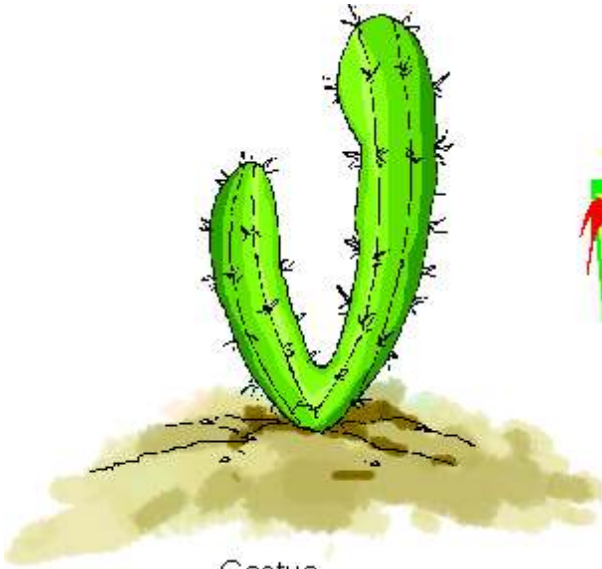


Rubber tree

Desert Plants

In a desert, there is a shortage of water. Plants like cactus, prickly pear and palm grow in desert. In desert plants

1. The leaves are modified into spines to reduce the loss of water. This also protects plants from animals.
2. The stem is green and fleshy. It contains chlorophyll. It prepares food for the plant and also stores food and water.
3. Roots go deep under the ground to absorb water from the soil quickly.



Cactus

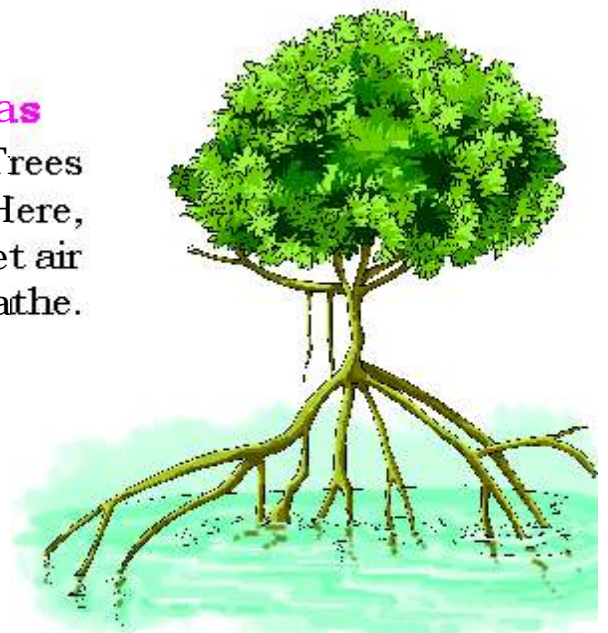
Do you know ?

A date palm produces clusters of 600-1700 dates each year. It produces fruits for 60 years.



Plants growing in marshy (swampy) areas

Marshy areas have clayey and sticky soil. Trees growing in these areas are called mangroves. Here, the soil is covered with water, so roots do not get air to breathe. They come out of the soil to breathe. These type of roots are called 'breathing roots'.



Mangrove trees have roots which come out of the soil to breathe.

Aquatic Plants

Plants growing in water are called aquatic plants. Aquatic plants can be divided into three groups :

1. Floating plants
2. Fixed plants
3. Underwater plants

Floating plants : Floating plants are small, light and spongy. Their roots are not fixed, so they float on water. Duckweed and water hyacinth are floating plants.



Water hyacinth



Duckweed

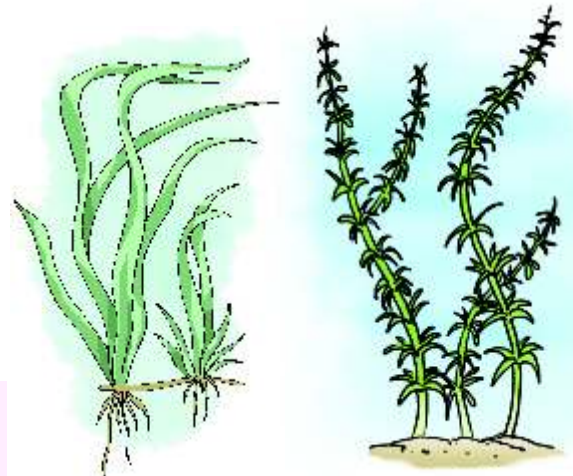
Fixed plants : Roots of these plants are fixed in waterbed, e.g., lotus and water lily. The stem of these plants are long, hollow and light. Leaves are broad and have a waxy coating. They float on water. The stomata are present only on the upper side of the leaf.



Lotus

Water lily

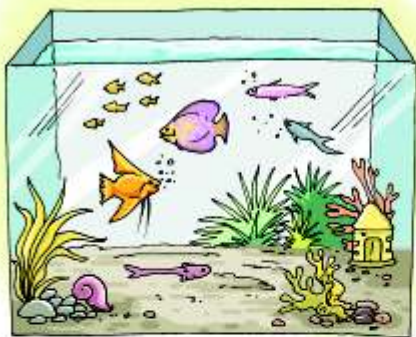
Underwater plants : Plants like hydrilla and tape grass grow under water. They have long, thin, narrow, ribbon-like leaves. These leaves can bend easily in water. Leaves do not have stomata. They clean the water by using carbon dioxide given out by aquatic animals. They also give oxygen to aquatic animals.



Tape grass

Hydrilla

Now, can you give the answer?
 Why do we keep tape grass in an aquarium?



Do you know ?
 Water hyacinth and duckweed have lots of empty spaces. These spaces are filled with air to make the plant lighter than water. So, these plants can float.

Insectivorous plants

There are some plants which eat insects. These plants are called insectivorous plants, e.g., venus flytrap and pitcher plant. In venus flytrap the leaf is folded into two halves when an insect sits on it. The two halves close and the insect gets trapped.

In the pitcher plant, the hollow leaves are filled with nectar. When an insect sits on it, the lid closes and the insect gets trapped in the pitcher.



Venus flytrap



Pitcher plant

Plants of the grass family

Plants belonging to grass family are very useful to us. Grass does not need much water to grow. During rainy seasons, it grows very fast. It keeps the soil intact and prevents soil erosion.

Plants of grass family like wheat, rice, jowar, bajra, etc., give us food.

A plant named papyrus is used to make paper. Dried grass is used as a packing material. Ordinary grass is used by animals for grazing. Bamboo is used for making baskets, chairs, drums, mats, huts, etc.



Rice



Wheat



Bamboo



Do you know?

The destruction of bamboo groves has resulted in the extinction of pandas. Now, only 1000 giant pandas are left.



Remember

1. Plants growing on land are called terrestrial plants.
2. Plants growing in water are called aquatic plants.
3. In mountains, plants have needle-like leaves, plants in plains have many leaves and desert plants have no leaves.
4. Aquatic plants float on water or they are fixed to the bottom of the pond or they are underwater plants.
5. Insect-eating plants are called insectivorous plants.
6. The plants of the grass family are useful to us in many ways.

Exercises

A. Tick (✓) the right answer and fill in the blanks.

- trees do not shed their leaves.
(a) Deciduous (b) Evergreen
- Plants on hilly areas bear
(a) Cones (b) Flowers
- In desert plants, prepares food for the plant.
(a) Leaves (b) Stem
- In roots come out of the soil to breathe.
(a) Peepal tree (b) Mangroves
- Plant-eating insects are called
(a) Insectivorous plants (b) Aquatic plants

B. Name two

- Plants growing on mountains.,
- Plants growing in hot and damp places.,
- Plants of grass family.,
- Floating plants.,
- Two insectivorous plants.,

C. Recognise me.

- I am used to make paper. P
- My roots are fixed in the waterbed. L
- I am used in an aquarium. T
- I trap insects between my leaves. V
- I have breathing roots. M

D. Write true or false.

- Aquatic plants always float on water.
- Plants growing on land are called terrestrial plants.
- Plants growing in plains have needle-shaped leaves.
- Desert plants have green and fleshy stems.
- The plants of the grass family are useful to us.

E. Answer these questions.

1. What are terrestrial plants ?
2. What are aquatic plants? Name three types of aquatic plants.
3. Mention special features of the lotus plant.
4. What are evergreen trees?
5. Write three uses of plants of the grass family.

F. Give reasons.

1. Mangroves have breathing roots.
2. In desert plants, leaves are modified into spines.

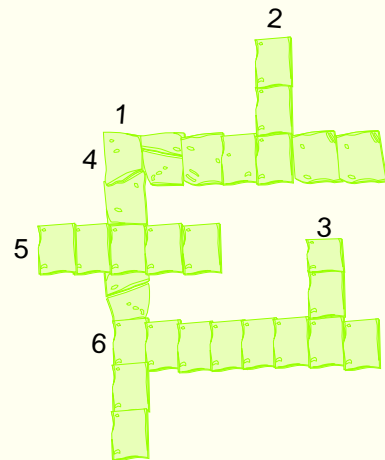
G. Complete the crossword.

Down:

1. I am an insectivorous plant.
2. I am a plant growing in mountains.
3. I grow in plains.

Across:

4. I am used to make paper.
5. I am a fixed aquatic plant.
6. I am an underwater plant.



Activity

Collect leaves of different plants and paste them in your scrapbook.
Collect only fallen leaves.

HOTS (Higher Order Thinking Skills)

Why do roots of mangroves grow above the ground?

Hint : (The soil in these places is sticky and clayey)

Teacher's
Notes

Various types of terrestrial and aquatic plants can be shown to the children. Ask them to make a chart of different types of plants with their special features. Plants like cactus can be shown in the class. The lotus leaf can be shown in the class.