

Let's Begin

Different plants have different types of leaves. Leaves differ in their colour, size, shape and texture.



Neem



Rose



Gulmohar

Leaf

All living things are dependent directly or indirectly on plants for their food. All plants depend on their leaves to make food.

A substance called chlorophyll gives green colour to a leaf. Only green leaves can make food for the plant in the presence of sunlight. Due to this, they are called the 'food factory' of a plant.

Parts of a Leaf

A leaf has many parts like leaf stalk, leaf apex, leaf blade, midrib and side veins.

Side veins: Several small veins that run from the midrib to all over the leaf blade are called side veins. They help to carry water, minerals and food to different parts of the leaf.

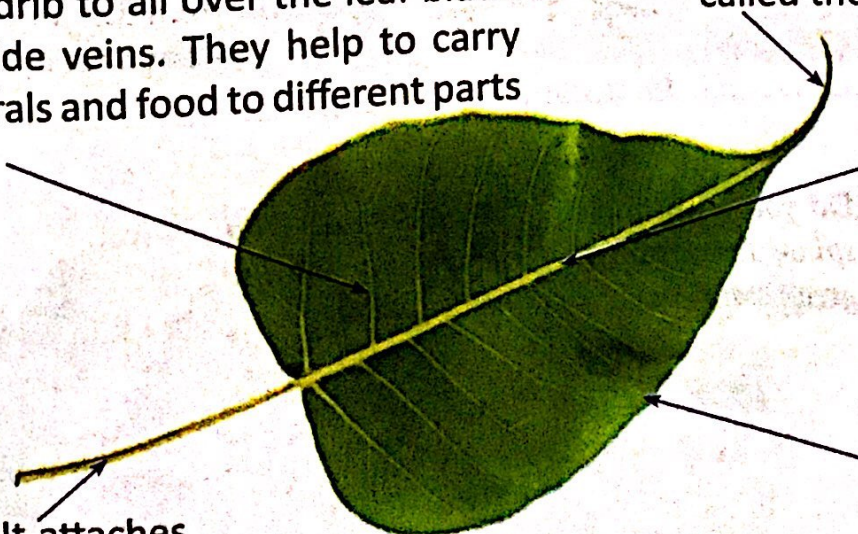
Leaf apex: The tip of the leaf is called the leaf apex.

Midrib: The main vein that runs down the centre of the leaf is called the midrib.

Leaf blade: The flat part of the leaf is called the leaf blade.

Leaf stalk: It attaches the leaf to the stem.

Parts of a leaf



The underside of a leaf has many small pores called **stomata**. It is through the stomata that a leaf takes in carbon dioxide and releases oxygen in the air during photosynthesis.

Fact!

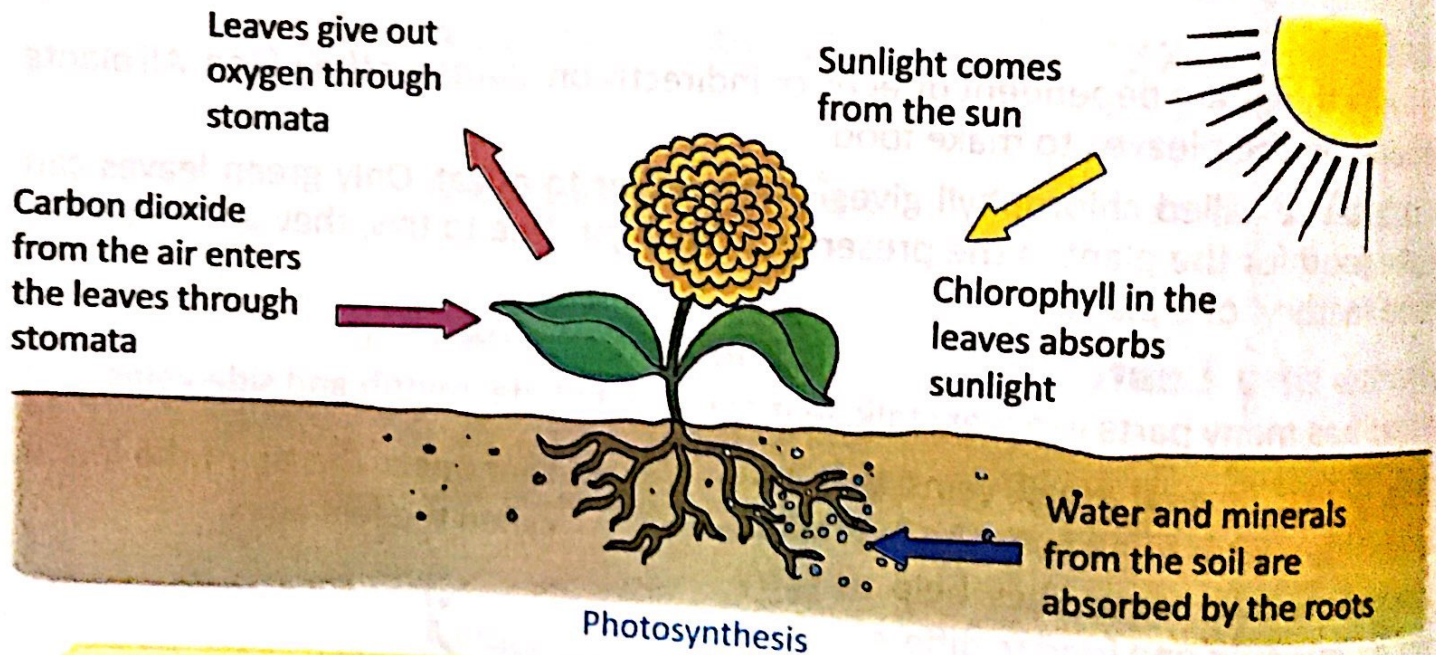
Look at any leaf carefully. Do upper and lower side of the leaf blade have the same colour and texture?



Stomata

Photosynthesis

The process by which green plants make their own food is called **photosynthesis**. *Photo* means 'light' and *synthesis* means 'preparing or putting together'. The chlorophyll helps to trap the sunlight. The green leaves use this sunlight along with water and carbon dioxide to make food. The veins and the stem help to carry this food to all parts of the plant.



Do you know leaves of a cactus turn into spines to prevent the loss of water? So the green stems make food for the plant.

**Need for food**

The plants need food:

1. **To grow**

By building new cells and repairing the damaged parts.

2. To get energy

Extra food is stored in parts of a plant like leaves, stem or roots in the form of starch.

Fact!

You must have seen some greenish cottony patches on a stale bread due to moist conditions. It is a '**fungus**' called the **bread mould**. Fungi are non-green plants which cannot make their own food. They get food from decaying plants and animals. Mushrooms are also a type of fungi.

Let us carry out an activity to know that green leaves need sunlight to prepare food.



Take a potted plant with green leaves.

Cover one of its leaves partly with a black paper strip.

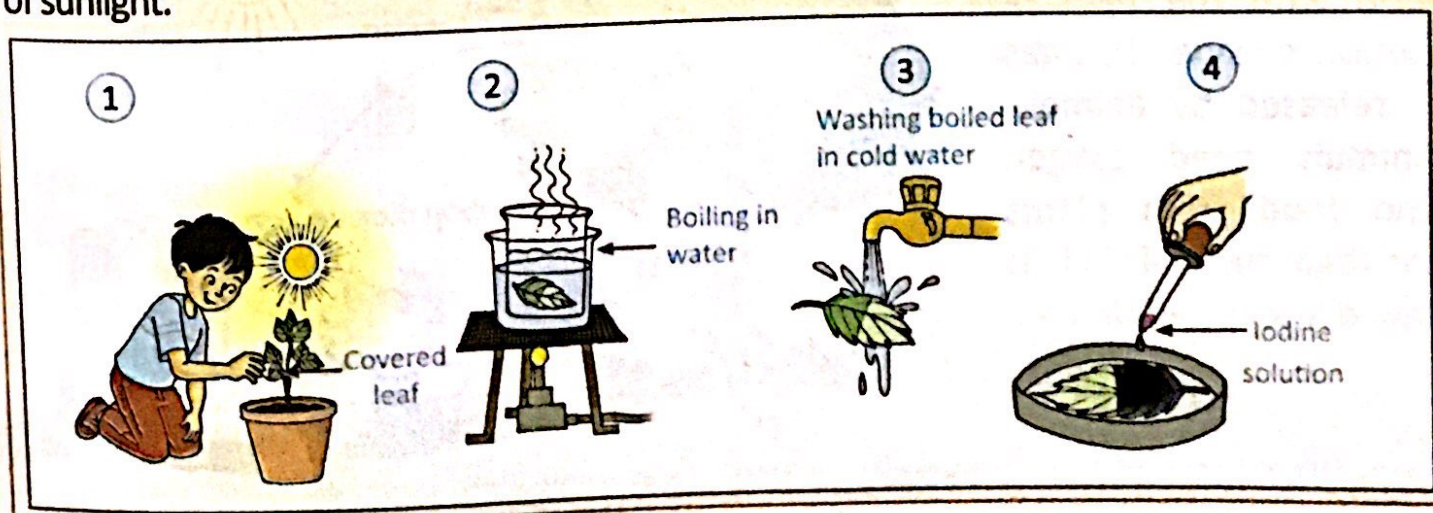
Keep it in sunlight and let it stay outdoors for a day.

Pluck this covered leaf, remove the strip and boil it in water.

After washing it in cold water, put a few drops of iodine solution on it.

You will notice that the green portion of the leaf turns blue-black because of the presence of starch in it.

The covered part does not change colour, because it could not prepare food in the absence of sunlight.



Functions of a Leaf

The leaves of plants generally perform the following functions:

1. They prepare food for the plants.
2. They help the plants to take in and give out air through the stomata.
3. Some leaves even store extra food. For example, leaves of fenugreek, collard, cabbage and spinach store food. We eat these as vegetables.



Fenugreek



Collard



Cabbage



Spinach

Fact!

Plants like Venus flytrap, sundew and pitcher plants attract, capture, kill and digest small insects. They are called **insectivorous** or **carnivorous** plants.



Venus flytrap



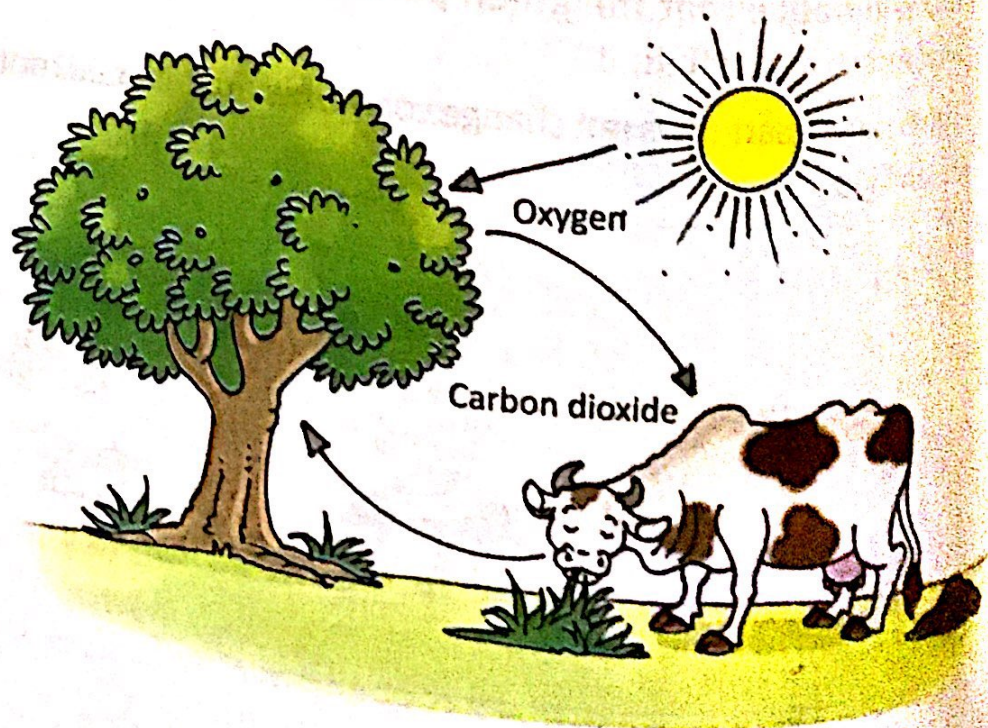
Sundew



Pitcher plant

Interdependence between plants and animals

Plants and animals are dependent on each other for their survival. Plants prepare their food with the help of carbon dioxide. This gas is released by animals. Animals need oxygen and food from plants for their survival. This is called interdependence.



Balance in nature

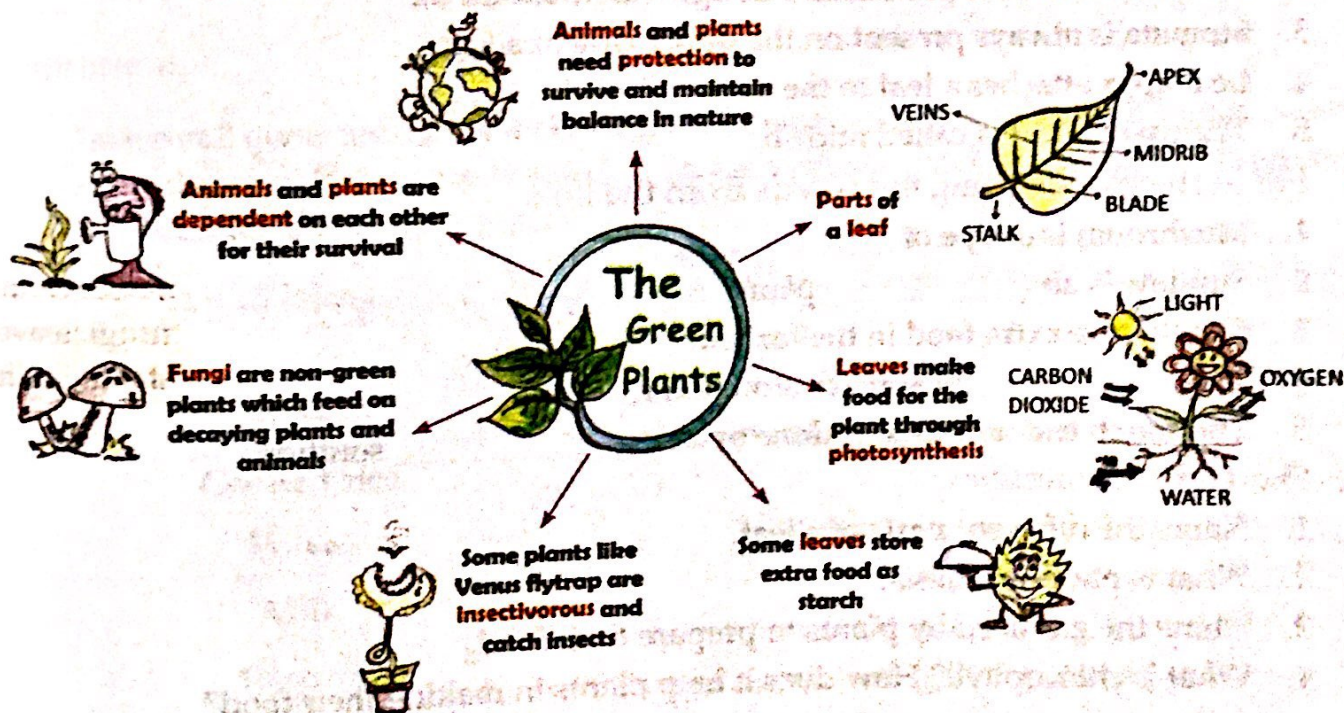
A balance between the number of plants and animals in nature is very important. If there is an increase in the number of animals, the plants may not be able to supply enough food and oxygen to all. Similarly, if there is an increase in the number of plants, the carbon dioxide supplied by animals may not be enough for the plants. To maintain the balance in nature, wild animals are protected in many wildlife reserves and sanctuaries.

Programmes like "Van Mahotsava Festival" promote the planting of trees. They spread awareness among people about the ill effects of cutting down the trees.

To continue life on earth, balance in nature should be maintained.

Now We Know

(Mind Map)



KEYWORDS

chlorophyll	photosynthesis	blade	stalk	apex	vein
midrib	stomata	starch	insectivorous	oxygen	
interdependence		survival	growth	energy	balance
nature	reserve	sanctuary	carbon dioxide		

EXERCISES

I. Tick (✓) against the correct option. (Multiple Choice Questions)

- Green leaves contain:
 (a) chlorophyll ☐ (b) energy ☐ (c) sugar ☐
- The pores on a leaf through which exchange of gases takes place are called:
 (a) stomata ☐ (b) apex ☐ (c) veins ☐
- _____ is an example of insectivorous plants.
 (a) Venus flytrap ☐ (b) Rose ☐ (c) Fenugreek ☐
- The flat part of a leaf is called:
 (a) leaf blade ☐ (b) side vein ☐ (c) leaf stalk ☐
- Chlorophyll in the leaves absorbs:
 (a) sunlight ☐ (b) water ☐ (c) oxygen ☐

II. Write 'T' for True and 'F' for False statements.

- Fungi feed on decaying plants and animals.
- Planting of trees is promoted through Van Mahotsava.
- Stomata is always present on the upper side of a leaf.
- Leaf apex attaches a leaf to the stem.
- The tip of a leaf is called midrib.

III. Fill in the blanks using the words from the box.

- Mushroom is a type of _____.
- Sundew is an _____ plant.
- Plants store extra food in the form of _____.
- The _____ of spinach store food.
- The starch test on leaves is done by using _____ solution.

insectivorous,
fungi, leaves,
starch, iodine

IV. Short answer questions.

- Name the different parts of a leaf.
- What is photosynthesis?
- Name the gas used by plants to prepare their food.
- What is chlorophyll? How does it help plants in making their food?
- What are insectivorous plants? Give two examples.
- Why do leaves have stomata?

V. Long answer questions.

- Describe the important functions of a leaf.
- Explain the process by which leaves make food for plants.
- Explain the various parts of a leaf with the help of a diagram.
- 'Plants and animals are interdependent on each other'. Justify this statement with the help of an example.

VI. Think and Answer.

What will happen if all animals become herbivores?

LET'S DO MORE

Explore

Identify the following and write an important feature about each.



Experiment

Take small quantities of the following food items in different dishes. Take iodine solution and a dropper. Put a drop of solution on each item to check the presence of starch. Fill in the given table with your results.

Food Items	Presence of Starch	
	Yes (✓)	No (X)
Bread		
Cooked rice		
Potato		
Milk		
Banana		
Orange		



LIFE SKILLS

Some leaves are considered auspicious and are used for performing various rituals and religious activities. Find out from your family members about such leaves and their importance associated with those rituals.

Adaptations in Plants

Let's Begin

Can you name a few plants? Can you name a few plants that grow in hilly areas.

Plants are all around us. They grow in all kinds of climatic conditions whether it's cold or hot. The natural home of a plant or an animal is called its **habitat**. Plants growing in different habitats have to adjust or modify themselves to suit their natural surroundings like soil and weather conditions. The process by which plants adjust themselves to suit their habitats is called **adaptation**.

Based on their habitats, plants can be broadly grouped as terrestrial plants and aquatic plants.

Terrestrial Plants

The plants that grow on land are known as **terrestrial plants**. Land has different habitats like plains, mountains, deserts, marshes, and coastal regions.

Plants in plains

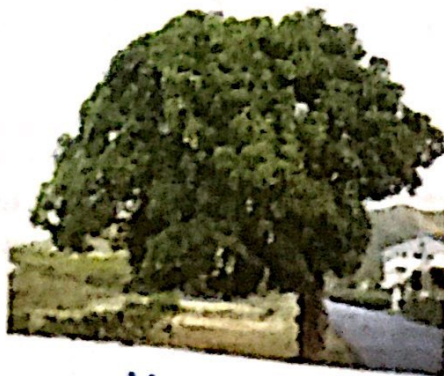
Plains are large flat areas of land. The weather in this region is neither very hot nor very cold. It usually rains in this region. Overall it has a moderate climate.

Examples: Some common trees found in this region are peepal, neem, mango, sheesham, gulmohar, sal, etc.

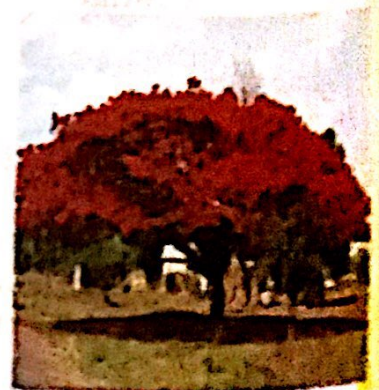
Adaptation: These trees shed their leaves during winters to protect themselves from cold climatic conditions. Their fresh and new leaves appear in the spring season.



Neem tree



Mango tree



Gulmohar tree

Plants in mountains

Mountains are higher than the plains. The weather in this region is cold most of the time. Many hilly areas experience snowfall also.

Examples: Most of the trees that grow in this region are fir, pine, cedar, spruce, etc.

Adaptation: These trees grow tall and straight. Most trees do not have flowers. They bear cones and have seeds inside them. These have conical shape and sloping branches which help them to slide off the snow easily. Their leaves are long, needle-like and the plants have leaves all through the year. These trees are also called **coniferous trees**.

Do you know
coniferous trees
are also called
evergreen trees?
Can you tell why?



Fir



Pine



Cedar

Plants in coastal regions

The coastal regions lie near sea coasts. They receive heavy rainfall. The weather in this region is hot and humid.

Examples: The trees that grow in this region are coconut, pepper and rubber.

Adaptation: These trees have adapted themselves to survive in the salty sea water. They disperse their seeds through water itself.



Coconut



Pepper



Rubber

Plants in deserts

Deserts receive very less rainfall. The days are hot in deserts. The weather in this region is very dry and dusty. There is little water in this region.

Examples: A variety of cactus, acacia, babool and palm trees are found in this region.

Adaptation: The stem of cactus is green and helps in photosynthesis. Its leaves modify into spines to prevent loss of water. Their roots also spread out deep and wide to reach the ground water.



Cactus

Fact!

The process by which the leaves lose water through their stomata is called transpiration.

Plants in marshy regions

There is so much water in marshy regions that the land never dries up. The soil is also sticky and clayey.



Mangroves

Examples: Mangroves are commonly found in this region.

Adaptation: The roots of these plants grow above the ground and help the plants to breathe. This helps them to take in fresh air and avoid rotting in water.

Fact!

The leaves of lotus and water lily have stomata on their upper surface.

Aquatic Plants

The plants that grow in water are called **aquatic plants**. They are of three types - fixed plants, floating plants and underwater plants.

Fixed plants

The roots of these plants are fixed to the soil in the water but the leaves and flowers grow above the water surface.

Examples: Some common fixed plants are lotus and water lily.

Adaptation: The leaves are broad to help stay afloat and get enough air and sunlight. Hollow, flexible and long stems help them to reach the surface of water from the bottom. Their leaves have waxy coating on the surface to keep them waterproof.



Lotus



Water lily

Floating plants

Plants that freely float on water are called floating plants.

Examples: Some common floating plants are duckweed, water hyacinth and water lettuce.

Adaptation: They have light and spongy bodies filled with air. This helps them to float on water.



Duckweed



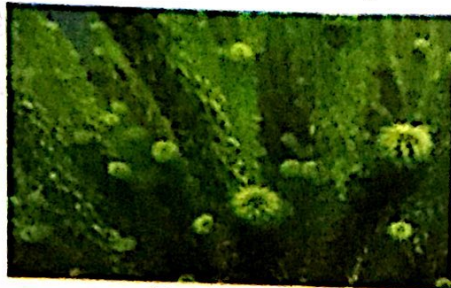
Water lettuce

Underwater plants

These plants grow completely under water.

Examples: Some common underwater plants are tape grass and hydrilla.

Adaptation: Their roots are fixed to the soil under water. They have thin and narrow leaves with no stomata. They take in air through their body surface. Tape grass has thin, ribbon-like leaves whereas hydrilla has tiny leaves.

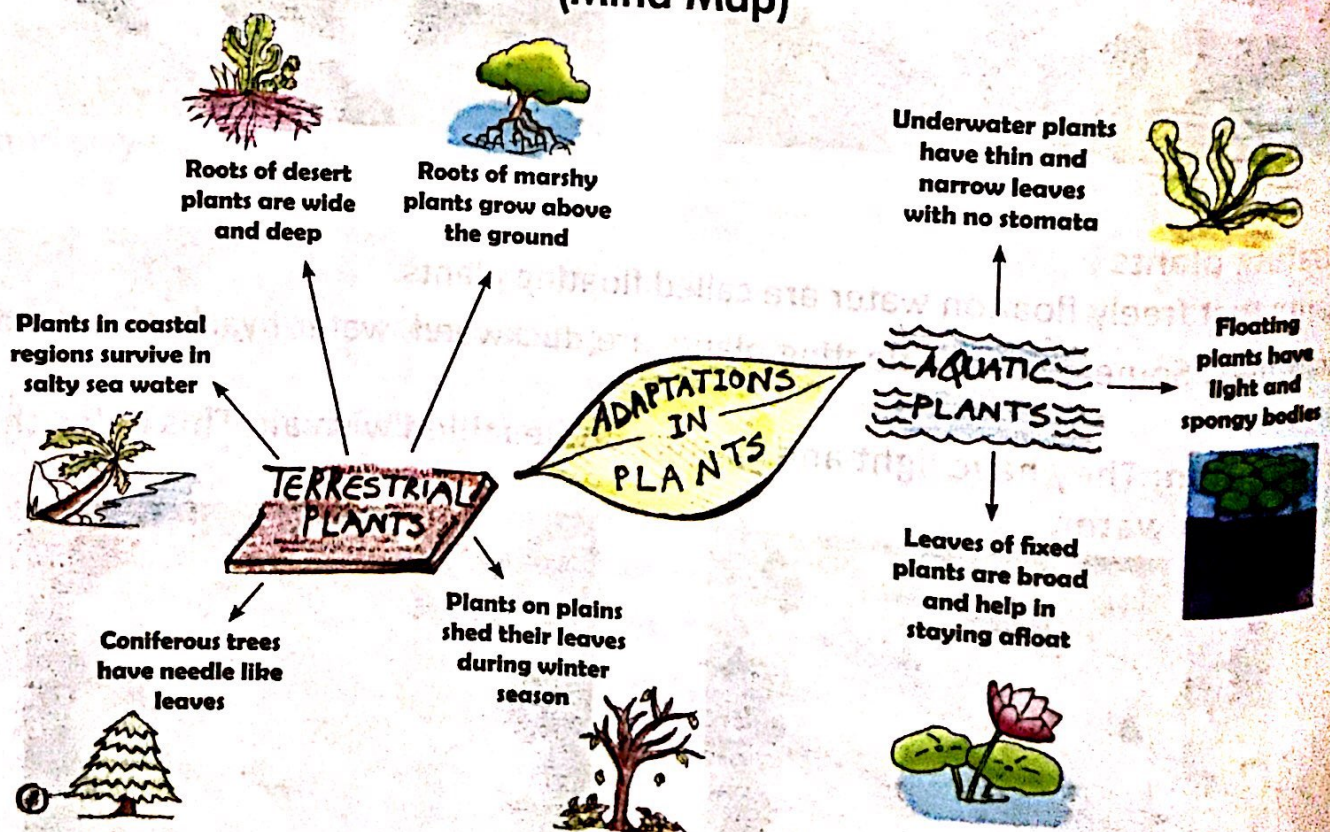


Tape grass



Hydrilla

Now We Know (Mind Map)



KEYWORDS

terrestrial habitat stomata spongy afloat adaptation aquatic coniferous survive

EXERCISES

I. Tick (✓) against the correct option. (Multiple Choice Questions)

1. Mangrove trees grow in _____ areas.
 (a) marshy ☐ (b) plain ☐ (c) desert ☐
2. _____ plants have broad leaves.
 (a) Floating ☐ (b) Fixed ☐ (c) Underwater ☐
3. _____ of underwater plants have no stomata.
 (a) Leaves ☐ (b) Stem ☐ (c) Flowers ☐
4. Coniferous trees are found in:
 (a) plains ☐ (b) mountains ☐ (c) deserts ☐
5. Duckweed is a _____ plant.
 (a) fixed ☐ (b) floating ☐ (c) underwater ☐

II. Write 'T' for True and 'F' for False statements.

1. Plants in coastal regions adapt themselves to survive in salty sea water. _____
2. Mountains are a terrestrial habitat of plants. _____
3. Floating plants have needle-shaped leaves. _____
4. Cactus grows in coastal regions. _____
5. Roots of marshy plants grow above the ground. _____

III. Match the following.

Plants

1. Peepal



2. Pepper



3. Cactus



4. Mangroves



Terrestrial Habitat

(a) Desert



(b) Marshy lands



(c) Coastal regions



(d) Plains



IV. Fill in the blanks using the words from the box.

1. Leaves lose water through a process called _____.
2. Lotus is a _____ aquatic plant.
3. Trees on mountains bear cones instead of _____.
4. The weather in deserts is _____ and _____.
5. Pepper is commonly grown in _____ regions.

fixed,
transpiration,
dusty, flowers,
dry, coastal

V. Short answer questions.

1. What is a habitat? Name the different land habitats.
2. What are aquatic plants?
3. What is transpiration?
4. Why do plants need to adapt?
5. Define the term adaptation?
6. Name two plants having stomata on the upper surface of their leaves.

VI. Long answer questions.

1. Describe the different kinds of aquatic plants with examples.
2. Mention the adaptations found in the plants growing in marshy areas.
3. Describe the adaptations of fixed aquatic plants.
4. Write any two adaptations needed by desert plants. Why does a cactus plant have spines and not leaves?

LET'S DO MORE

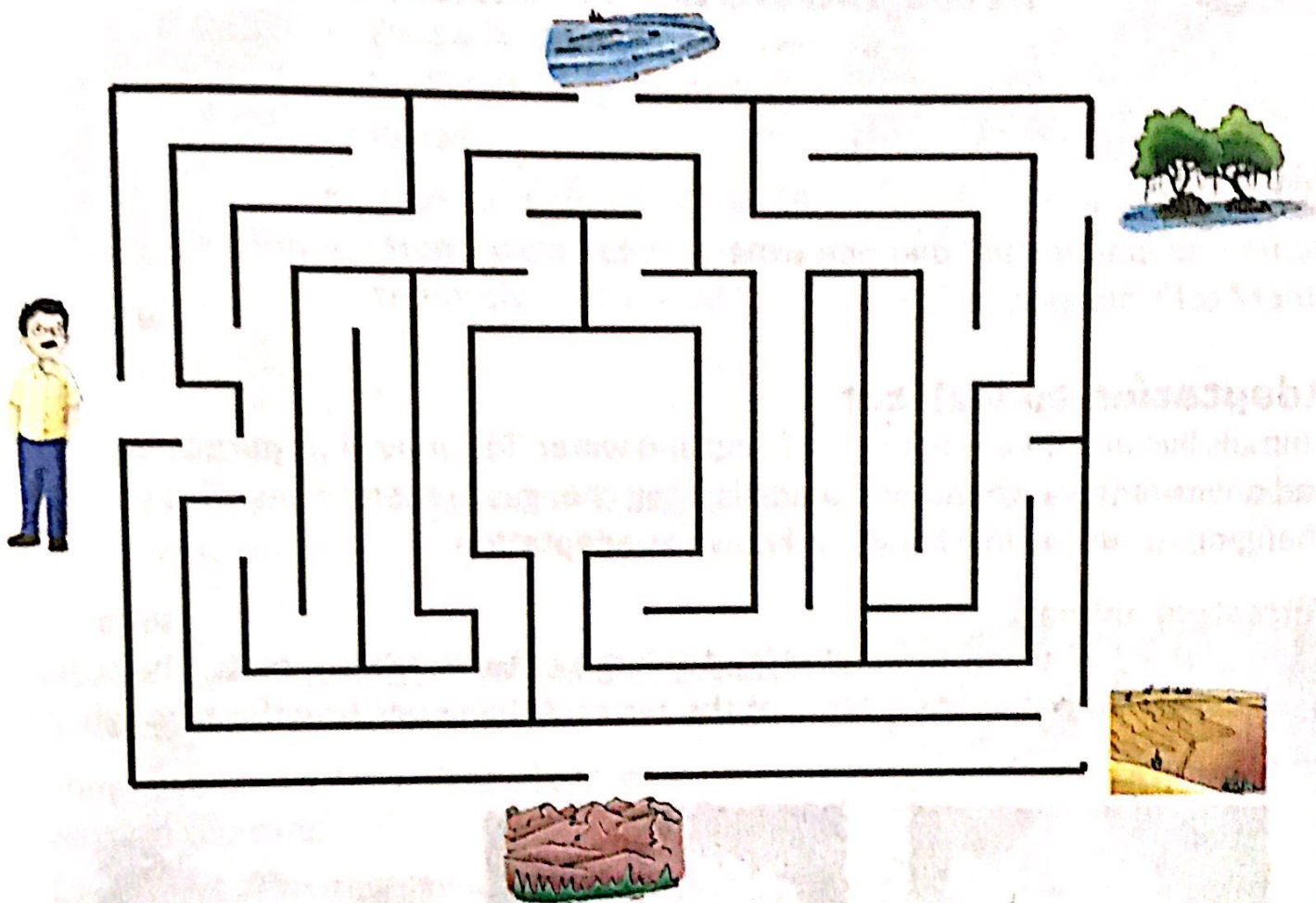
Activity

Draw and colour a scene showing fixed, floating and underwater plants. Label these three types of plants.



Puzzle

Professor Chandran is researching about mangroves. He needs your help to identify the habitat of such trees. Mark the correct way to the place in the given maze.



Project

Along with your friends, collect pictures of different terrestrial and aquatic plants. Prepare a collage on a chart paper and give an interesting caption to your creation.



LIFE SKILLS

Plants grow in so many places whether in land or water. If we pollute these regions, we will spoil their habitats. We must keep land and water pollution free.