

5

Adaptation in Plants



Plants are found almost everywhere on the Earth. Some plants grow on plains, some grow in deserts, some on mountains, and some in water.

► Habitat and Adaptation

*The place where a living organism lives in nature is called its **habitat**. Organisms have certain features suited to their natural surroundings. Features that help a plant or an animal to survive in its natural surroundings are called **adaptations**.*

Plants grow in different habitats. Based on their habitats, plants can be divided into two groups: terrestrial plants and aquatic plants.

► Terrestrial Plants

*Plants that grow on land are called **terrestrial plants**.* Plains, mountains, and deserts are examples of terrestrial habitats.

Plants in Plains

Plains are some large, flat areas of land. Some plains receive low rainfall, while others receive heavy rainfall. Due to this difference, the plants growing there show different adaptations.

Plants growing in plains with low rainfall Mango, Ashoka, and Gulmohar are examples of trees growing in areas with low rainfall.

Adaptations

- Trees growing in areas with low rainfall have many branches.
- Most of these trees shed all their leaves during the dry season. Therefore, they are called **deciduous trees**.



Plants growing in plains with heavy rainfall

Rubber and teak are examples of trees growing in areas with heavy rainfall.

Adaptations

- Trees growing in areas with heavy rainfall have many leaves.
- These trees do not shed all their leaves during the dry season. They remain green almost throughout the year. Therefore, they are called **evergreen trees**.

Know Your SDGs



SDG 13: Climate Action

(Take urgent action to combat climate change and its impacts.)

The Dibang valley, located in the northeastern state of Arunachal Pradesh, is home to a beautiful evergreen forest with a rich variety of plants and animals. However, climate change is fast becoming a threat to the survival of forests all over the country. Research using the Internet about ways in which humans can reverse the damage caused by climate change. How can we help maintain the greenery around us?

Teak tree



Fir tree with cones

Plants on Mountains

Mountains are highly raised areas of land. Mountains are generally colder than plains. Pine, fir, and deodar are examples of trees that grow on mountains. These trees are flowerless. Instead of flowers and fruits, they bear cones with seeds.

Adaptations

- Trees that grow on mountains are usually cone shaped so that snow can easily slide off their branches.
- Most trees have small, needle-like leaves with a waxy coating to prevent any damage from snow.



Desert plants

Plants in Deserts

Deserts receive very little rainfall. Thus, they are dry. Plants that need very little water to grow are found in deserts. Cactus and Acacia are examples of plants that grow in deserts.

Adaptations

- ⦿ Desert plants have very few or no leaves. Instead, they have spines and thorns, which prevent loss of water.
- ⦿ The stem of these plants is thick and fleshy as it stores water.
- ⦿ Plants such as cactus have green stems that contain chlorophyll. These stems carry out photosynthesis.

Plants in Coastal Areas

Coastal areas or areas along the seacoast have harsh conditions like rocky and sandy areas with saline¹ soil. Strong and salt-laden winds generally blow here.



Coconut trees

Adaptations

- ⦿ Plants like coconut that grow here, have adaptations to survive in this harsh habitat.
- ⦿ Their fruits and seeds are generally carried away by seawater to far off places.

¹saline: containing salt

Plants in Swamps

Swamps or **marshy areas** have clayey soil, which is sticky and contains a lot of water. Mangrove plants grow in swamps.

Adaptations

- Air cannot reach the roots of the plants growing in marshy areas. Therefore, they have roots that grow above the soil. These roots are called **breathing roots**.
- Breathing roots also help to absorb water and minerals that are required to carry out photosynthesis.



Mangrove trees grow in swamps

Questions

Write the names of any two plants generally found in the following habitats.

- | | | |
|----------------------------|-------|-------|
| 1. Mountains | | |
| 2. Desert | | |
| 3. Plains (low rainfall) | | |
| 4. Plains (heavy rainfall) | | |



► Aquatic Plants

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

Floating Plants

Plants that float on the surface of water are called **floating plants**.

Water hyacinth and duckweed are examples of floating plants.



Duckweeds

Adaptations

- ◎ Floating plants have light and spongy stems so that they can float on water.
- ◎ These plants do not have fixed roots. Their roots hang loosely in water.

Fixed Plants

*Plants that have their roots fixed to the bottom of a pond are called **fixed plants**.* They are found in shallow² water. Lotus and water lily are examples of fixed plants.

Adaptations

- ◎ Fixed plants have flat and broad leaves. This helps the leaves to float easily on the surface of water.
- ◎ Their leaves have a waxy coating. The wax prevents them from decaying in water.
- ◎ Their stems are thin, long, and hollow. This helps them to reach the surface of water.
- ◎ Their leaves have stomata only on the upper surface of the leaf. Stomata help them to absorb and release gases.



Lotus



Pondweeds

Adaptations

- ◎ Underwater plants have thin and narrow leaves.
- ◎ These plants do not have a waxy coating or stomata on their leaves.

²shallow: having little depth

- They absorb and release air into water directly through their surface.

► Some Other Adaptations

Some plants show adaptations for nutrition.

Insectivorous Plants

Plants that feed on insects are called insectivorous plants. Venus flytrap and pitcher plant are examples of insectivorous plants. Their leaves are modified to trap insects.

Venus flytrap plant has leaves that are in the form of boxes with hinges. The leaves have hair along their edges. When an insect sits on the leaf and touches the hair, the leaf folds and the insect gets trapped.

The pitcher plant has leaves that are in the form of a pitcher with a lid to cover the mouth of the pitcher. When an insect sits on the pitcher, the insect gets trapped.



Insect trapped in Venus flytrap



Pitcher plant

Fact File

Typically plants grow in nutrient-rich soil, but insectivorous plants grow in soil that is poor in nutrients. So they catch insects and get their nutrition from them. The pitcher plant, since it eats insects, is also called a carnivorous plant.



Coralroot plant

Non-green Plants

Plants that do not have chlorophyll are called non-green plants. The Indian pipe and coralroot are examples of non-green plants. These plants cannot make their own food. They absorb food mostly from dead plants and animals.



Questions

Fill in the blank with a suitable word.

1. Plants that grow in water are called.....
2. Lotus and water lily are plants.
3. Flat and broad leaves are found in aquatic plants.
4. Underwater plants have and leaves.
5. Venus flytrap is an plant.



Case Study

Dorzi, a young boy, loves to travel. He makes a collage of all the photographs he takes on his trips during the year. He also likes to explore plants in different habitats, such as deserts, coastal areas, and mountains. Following two pictures of plants in their habitats are his favourite:

1. A large-sized cactus with spine shaped leaves and thick fleshy stem to store water in a desert.
2. A group of coconut trees on a beach, also known as harsh habitat because it has rocky and sandy areas with saline soil.

Based on the above information, answer the following questions:

- a. What are the special features of cactus plant that makes it suitable to grow in a desert?
- b. Why are the coastal areas where the coconut trees grow is known as harsh habitat?

Wrap Up

- ⦿ Terrestrial plants grow on land.
- ⦿ Plants that grow in plains in areas with low rainfall and shed their leaves in the dry season are called deciduous trees.
- ⦿ Plants that grow in plains in areas with high rainfall and do not shed leaves in the dry season are called evergreen trees.
- ⦿ Trees that grow on mountains such as fir tree are cone-shaped, flowerless (have cones with seeds), and have small needle-like leaves with a waxy coating.
- ⦿ Plants in deserts, such as cactus, have spines and thorns instead of leaves, and thick, fleshy stems.
- ⦿ Plants growing on the seacoast, such as coconut trees have their fruits and seeds scattered by seawater.

- ⦿ Plants in swamps, such as mangroves, have breathing roots that grow above soil.
- ⦿ Aquatic plants grow in water. They are of three types: floating plants, fixed plants, and underwater plants.
- ⦿ Insectivorous plants, such as pitcher plant, have their leaves modified to catch insects.
- ⦿ Non-green plants, such as coralroot plant, absorb food mostly from dead plants and animals.

Exercises

SECTION I



A Choose the correct option.

1. Where will you find a pine tree?
 a. Mountain b. Desert c. Swamp d. Seacoast
2. Which of the following is a feature of mangrove plant?
 a. Needle-like leaves b. Roots above the soil
 c. Remain green almost throughout the year d. Thin, long, and hollow stems
3. Which of the following is a feature of cactus?
 a. Flowerless b. Spines and thorns
 c. Roots grow above the soil d. Stems without chlorophyll
4. Which of the following is true about floating plants?
 a. They grow under the surface of water b. They feed on insects
 c. They do not have chlorophyll d. They float on water

B Assertion and Reasoning questions.

1. **Assertion (A):** Air cannot reach the roots of the plants growing in marshy areas.
Reason (R): These roots grow above the soil.
 a. Both A and R are True b. Both A and R are False
 c. A is True and R is False d. A is False and R is True

2. **Assertion (A):** Trees that grow on mountains have small, needle-like leaves.

Reason (R): They are usually cone-shaped.

a. Both A and R are True

b. Both A and R are False

c. A is True and R is False

d. A is False and R is True

C

Write T for True and F for False. Correct the False statements.

1. Mango and Ashoka trees grow in areas with low rainfall.

2. Acacia tree grows in deserts.

3. Leaves of fixed aquatic plants have stomata only on the upper surface.

4. Venus flytrap is an insectivorous plant.

D

Match the following.

Column A

1. Terrestrial plant

2. Breathing roots

3. Plant that grows under the surface of water

4. Waxy coating on leaves

5. Insectivorous plant

Column B

a. Mangrove plants

b. Pitcher plant

c. Water lily

d. Neem

e. Tape grass

SECTION II

E

Short answer questions.

1. Define habitat.

2. Define adaptation.

3. What are non-green plants? Give two examples.

4. Write two adaptations of plants that grow in deserts.

5. Name one terrestrial plant.

6. What are breathing roots?



F

Long answer questions.

1. Write about the adaptations shown by Deodar and Acacia trees.

2. Describe the adaptations shown by coconut tree and mangrove plants.

3. Write a short note on aquatic plants and give examples.

4. How are the leaves of insectivorous plants modified? Give examples to explain.

Picture Study

- 1** Pictures of certain plants are shown below, along with their jumbled up names. Identify the plants and unjumble the labels.



nepi reet

a.



ngmao reet

b.



utlos tlamp

c.



apte sasgr

d.

- 2** A picture of a plant is shown below. Identify it and answer the following questions.

a. Name the plant.

.....

b. Where does it grow?

.....

c. Write an important feature of its habitat.

.....

d. Does it possess leaves? If not, why?

.....

e. Which special structure is present on this plant?

.....



My Learning Corner



Think about

- Pine trees growing on mountains do not have flowers. Then how do they reproduce?

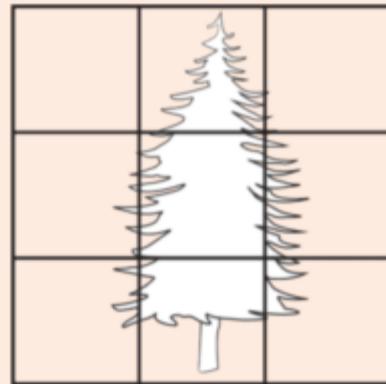
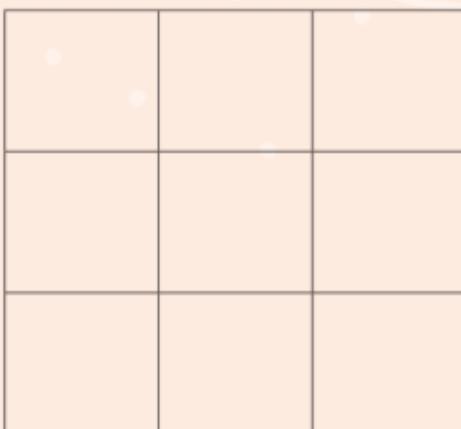
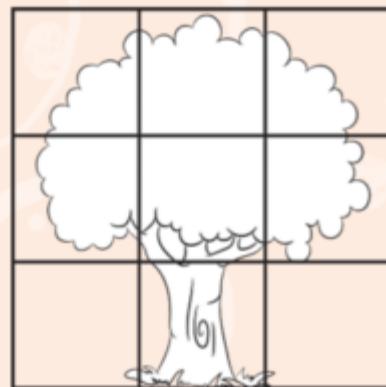
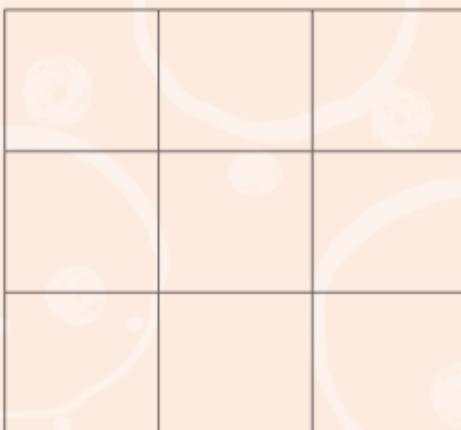


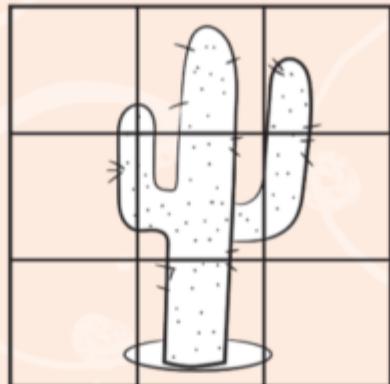
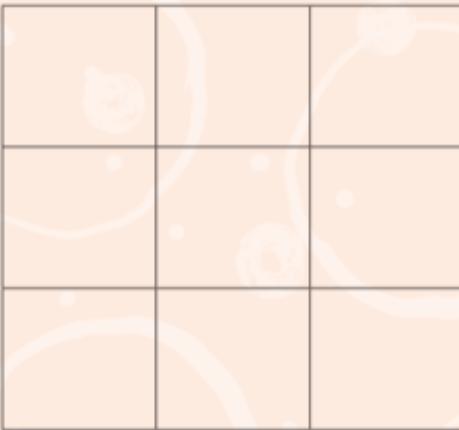
2. Why does water hyacinth have a light and spongy stem?



B Try out

- On a physical map of India, locate and shade the various types of habitats (you have studied in this chapter) in different colours. Also, write the name of any one plant that generally grows there. Paste the map in your Science Scrapbook.
Take the help of elders and the Internet.
- Collect pictures of plants growing in different habitats. Sort these pictures into LAND and WATER plants, and then paste them in your Science Scrapbook.
- Write a slogan or prepare a poster for each of the given topics based on environmental concern. You can take help from the Internet.
 - a. Stop deforestation
 - b. Save wildlife
 - c. Pollution
- Look at the pictures of a mango tree, cactus plant, and a pine tree given below (on the right side). Try to draw similar figures inside the larger squares grid given on the left. You will learn to draw these plants.





Self-Assessment

Now that you have completed the chapter, score each of the following tasks from 1 to 5 to indicate how well you can do them.

Score 5 = I can definitely do this.

Score 1 = I cannot do this yet.

I can...	My score
• define habitat and adaptation.	
• list various terrestrial plants and their adaptations.	
• list various aquatic plants and their adaptations.	
• understand the adaptations shown by some other plants.	
• draw plants of different habitats.	

Worksheet



Look at the table given below. It is based on adaptation in plants in order to adjust in different habitats. Paste pictures and write any two adaptive characters of each of them.

	LAND PLANTS		WATER PLANTS	
	Plants in plains	Plants in desert	Floating plants	Fixed plants
Paste a picture of a plant that grows in each habitat.				
Characters (any two)
