

The Living Organisms And Their Surroundings 9

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Our environment is our surrounding. It includes both living and non-living things. Environment includes all the factors that affect the form and growth of the organisms. These factors are of two kinds—abiotic and biotic.



Our environment



Activity Time

Form a list of the things you see around in the environment, identify the abiotic and biotic components.

Abiotic factors are the physical or non-living factors, like rainfall, temperature, wind, humidity, soil, water, sunlight and air.

Biotic factors include all living things, like plants and animals.

Habitat

A habitat is a place where plants and animals live. It is the address of an organism.

A good habitat must also provide space to find food, water, shelter, and opportunities for breeding. Habitats have both living and non-living things, often in different quantities.

For example, a desert has a harsh environment and therefore in this habitat the non-living

Do You Know ?

Tigers mark their territory by spraying urine and a foul smelling fluid from their anal glands on trees, bushes and rocks. They also leave scratch marks on trees and on the ground.

things dominate. In a tropical rainforest, however, there are so many living organisms that they outnumber the non-living things. Many different kinds of plants and animals are found in a particular habitat.

What comes to your mind when you try to draw the picture of a desert ? A wide expanse of sand, the scorching sun, sand storms and very few plants and animals.

Have you ever thought how these plants and animals survive in such a harsh environment ?

These living organisms possess special characteristics to withstand the harshness of the environment. These special characteristics that enable plants and animals to survive in a particular environment are called **adaptations**. For example, beetles that are found in dry habitats have thick and hard outer shells that prevent them from drying out.



Camouflage is defined as an ability of an organism to blend in with its surroundings. It is a common example of an adaptation in some animals. The combination of bright orange and black spots on a monarch butterfly is an adaptation to warn potential predators that the butterfly is poisonous. Thus preventing it from being eaten.

Thus, adaptations give the organisms a better chance to survive in their surroundings.

Types of Habitats and Adaptations

Let us now explore the different types of habitats and the adaptations that the organisms living there exhibit.

Primarily two kinds of habitats are found on the Earth—terrestrial habitat and aquatic habitat.

Terrestrial Habitat

All the plants and animals that live on land are called **terrestrial** organisms. Grasslands, deserts, forests and mountains are the different types of terrestrial habitats.

Grasslands are the areas which remain very hot during the day and cold during the night. Mainly grasses are found in this habitat.

Besides grasses, some shrubs, trees and some flowering perennials are also found in the grasslands. The plants flower during the rainy season. These plants survive cold winters and fires by underground storage organs and thick stem bases. The vegetation here has deep root systems which enable plants to absorb water from the soil. The root system also helps them in anchorage. The plants have flexible stems so that they can withstand the strong winds that flow in the



Grassland

grasslands.

Some examples of vegetation in grasslands include buffalo grass, cacti, sagebrush, perennial grasses, sunflowers, clovers and wild indigos.

Grasslands are open habitats full of food for the animals but they provide little space for shelter. Many types of animals are found in the grasslands. They are the homes to many Herbivores such



Activity Time

Grasslands are known with different words in around the world. Some of the names are given below. Find out the countries where they are found.

Grassland

Country

Savannas

Pampas

Campos

Plain

Steppes

Prairies

Velds



(a) Gazelle



(b) Bison

as bison, gazelles, zebras, giraffes, rhinoceroses, wild horses, deer and rabbits. Carnivores such as lions and wolves are also found in grasslands.

Some adaptations that the animals of the grasslands possess are as follows :

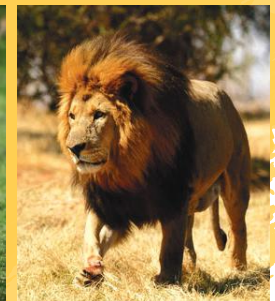
- They have strong legs that enable them to run away from hungry predators.
- They have long ears that enable them to hear their predators from a distance.
- They have keen eyesight to spot danger.

- The body colour of these animals mostly gets camouflaged with their surroundings, making them less susceptible to predators and also helps them in hunting their prey.

- Animals in the grasslands are usually more active in the rainy season.

Do You Know ?

In herbivores, the eyes are placed on the sides of the head to allow them to spot danger in all directions. In carnivores, the eyes are placed in front of the head to locate the prey correctly.



Deserts: Deserts are places where the environment is generally hot and extremely dry, providing many striking examples of how plants and animals are adapted to their surroundings. Here rainfall is less than 10 inches per year.

Plants have many adaptations to cope with the lack of water. These are as follows :

- Some desert plants store water in their stems.
- As maximum loss of water takes place through the leaves, they are reduced to spines. Photosynthesis, which occurs in green leaves, is then carried out by the stems.
- In some plants, leaves are covered by a waxy coating and are small in size to minimise water loss.

Many varieties of cactus are found in desert.

Camels, lizards, and desert toads are some animals found in deserts.

Desert animals also have many adaptations that help them survive in the hot and dry climate.

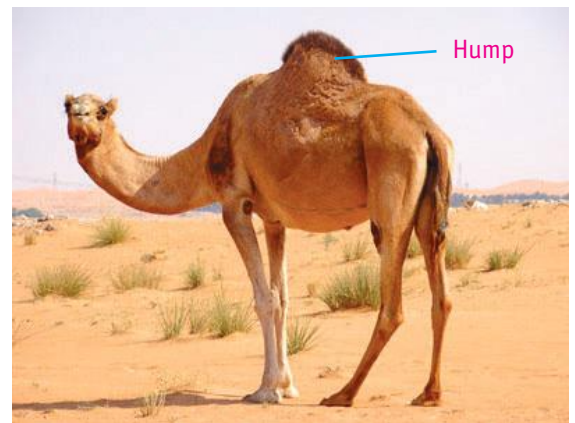


Some desert plants

- The light-coloured fur of the jackrabbit blends with the surroundings and protects it from predators. Its large ears help it to keep cool. The blood vessels in the ears expand to allow the blood to cool before re-entering the body.
- The kangaroo rat conserves water by excreting a solid urine rather than liquid.
- Many small animal hide under rocks or dig underground burrows and stay there during the day to escape the heat of the sun.
- Most desert animals are nocturnal—they avoid the extreme mid-day heat by feeding at night, when the temperature drops down and the air becomes much cooler. Some of them remain dormant (inactive) in the summer.
- Large desert animals try to stay in shady areas during the day. They obtain water from the food they eat and from the few water holes that exist in the desert.
- The camel stores its food as fat in large hump on its back. The stored fats make the camel survive for long period without food and water.



Jackrabbit



Camel : The ship of the desert

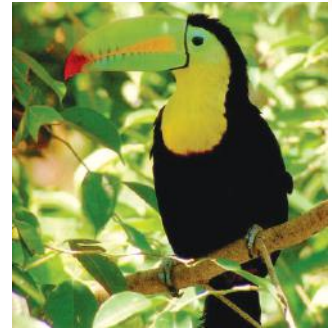
Forests: Forests are hot and wet. With over 80 inches of rainfall per year, plants have adaptations that enable them to shed water efficiently. The leaves of forest plants have drip tips for this purpose. Buttress and stilt roots provide extra support to the trees growing in spongy and wet soils.

Little sunlight is available on the dark forest floor. Plants have large leaves to capture the maximum amount of sunlight. Plants like orchids and ferns grow on trees to get more sunlight.

Animals in the forest include chimpanzees, anacondas, snakes, jaguars, lions, tigers and toucans.



Chimpanzee



Toucan

Some animals found in forests

Mountains : Have you ever been to any hill stations like Shimla, Mussoorie, or Darjeeling for a holiday ?

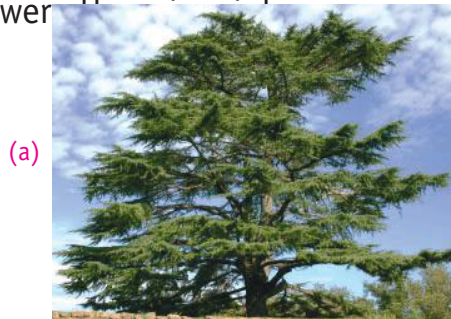
Do You Know ?

Half of the forests that originally covered 48% of the earth's land surface are gone.

Only one-fifth of the earth's original forests remain undisturbed.

The Amazon Rainforest is not only the largest forest in the world, it is often called the "Lungs of the World".

You must have noticed that as you ride up mountains, the weather becomes colder and the wind blows through your hair. You may have even seen or pl



(a)



(b)

Some trees found in mountains : (a) Cedar (b) Spruce

A sweet smell is present in the air up in the mountains. This is the smell of the pine trees. Sal, teak, bamboo, fir, oak, maple, deodar, spruce and cedar are some plants that grow abundantly in the mountains. Moss and fungi are also seen growing here.

Some of the adaptations in plants found in mountains are as follows :

- These plants have shorter stems so that they can avoid the harsh wind and not get knocked over. They have a wide root system in order to gather more nutrients.
- Most of the trees are cone shaped and bear cones. These trees are called **conifers**. The Christmas tree that you know is a conifer. They have needle-like leaves that slide off the snow and rainwater easily.
- Some mountain trees possess few leaves and very bright flowers so that they can attract more insects for pollination. The leaves usually are very tough and have waxy surface to prevent drying out.

The mountains provide natural habitat to a large number of animal species like the tiger, yak, deer, musk deer, wild goat, sheep, wolf and the snow leopard.



(a)



(b)



(c)

Some animals found in mountains : (a) snow leopard (b) yak (c) musk deer

The animals adapt to the cold climate by **hibernating** (winter sleep), migrating to warmer areas, or insulating their bodies with layers of fat. They have shorter legs, tails and ears in order to reduce heat loss. Their body is usually covered with long hair like the yak or with thick fur like the snow leopard. Animals living in the mountains also have larger lungs, more blood cells, and more haemoglobin (helps in carrying oxygen to the cells) because of the increased pressure and lack of oxygen at higher altitudes or heights.

You live in Delhi and if you visit a hill station, you may experience difficulty in breathing for a short while. This is because there is less oxygen in the atmosphere in hilly areas so we tend to breathe faster. After sometime our body undergoes small changes and adjusts to the changed surroundings. We get used to the place and start to breathe normally. The small changes that take place in the body of an organism over a short period of time to overcome problems arising due to changes in the surroundings is called **acclimatisation**. These changes are different from adaptations which take place over thousands of years.

Aquatic Habitats

Oceans : The oceans cover three-fourths of the earth's surface. They contain salty or marine water. The ocean have a large variety of organisms living in them.

The bodies of the animals like fish living in the marine environment are streamlined, that is, the front and back of the body is narrow while the middle region is broader. This body shape helps in reducing the resistance provided by water and helps them cut through water and swim fast. They also have fins on the body which help them move and change the direction. In addition, the body is covered with scales and mucus, thereby making it waterproof.

Most animals living in the oceans breathe through their gills. Fish also have air bladders to help them float in the water. Fish without air bladders like sharks need to swim constantly to avoid sinking.



Fish



(a) Squid (b) Octopus

Some animals in the ocean do not have streamlined bodies. They avoid swimming and live close to the bottom of the ocean. They wait for the prey and catch it when it moves towards them. Squids and octopus are examples of bottom dwellers.

Some animals like dolphins and whales do not breathe through gills. They come to the surface of the water from time to time to breathe in air. They breathe through the nostrils or blowholes located on their heads. They can remain inside the water for a long time without breathing.

Do You Know ?

Dolphins do not speak like us, but they definitely communicate. They tell each other about the location of food and about predators. The dolphin's echo system or SONAR enables them to navigate and hunt, bouncing high-pitched sounds off objects and listening for the echoes.

Freshwater habitat : Have you ever visited a pond ? If you have, you must have seen lots of plants and animals in it. Write down the names of animals that live :

- In water

-
- above the water

-
- In the surrounding area water
-

Frogs live near water because they need to return to the water to lay their eggs. They begin their lives as tiny eggs laid in clusters on water. The eggs hatch into tadpoles that swim in freshwater and breathe through their gills. As the tadpole grows, it develops legs and loses its tail to become a frog. When the tadpole changes into a frog, it starts to breathe through the lungs and starts living on land. It can also breathe through its moist skin.

Frogs have long, powerful jumping legs. This helps them move and also catch their prey. Their hind legs are webbed.

Plants living in water are called **aquatic plants**. In plants, roots are used to absorb water and minerals from the soil to be transported to other parts of the plant. Since aquatic plants are surrounded by water, the roots are reduced in size and mainly serve to anchor the plant. Air-filled cavities are present in the leaves and stems of aquatic plants that help them to float.

Aquatic plants can be divided into three types : fully submerged plants, partially submerged plants and floating plants.



Tape grass

In fully submerged plants, all parts of the plant are present under water. The leaves are narrow and long helping the plants to resist water currents and not to get damaged. An example of this kind of plant is tape grass.

In partially submerged plants like the water lily, the stems are rooted in the sediment but the leaves and flowers are seen floating on the top of water. The leaves are flat and large in size. They are covered by a waxy coating to make them waterproof and have stomata (air pores) for exchange of gases on their upper surface.



Water lily

Do You Know ?

Strawberry
poison dart frogs,
which live in
Central America
and Puerto Rico,



lay their eggs on
land, and male frogs keep them moist with
urine. Once the eggs hatch, the mother
carries each tadpole on her back to its own
tiny pool of water that has collected any-
where, such as knots and leaves in trees,
small puddles, etc. Till the tadpoles grow up,
their mother feeds them her own eggs.

Floating plants float on the surface with their roots hanging submerged in the water. Their leaves are broad and round and form bunches on the surface of water. Floating leaves are generally tough because they have to withstand the weather and water movement. An example of such a plant is water lettuce.



Water lettuce

Know the Keywords :

Habitat : A habitat is a place where plants and animals live.

Terrestrial Organism : All the plants and animals that live on land.

Desert : A place where the environment is generally hot and extremely dry.

Aquatic Plants : Plants living in water.

Point to Remember

- Our environment is our surrounding.
- Abiotic factors are the physical or non-living factors such as rainfall and temperature.
- Biotic factors are the living things like plants and animals.
- A habitat is a place where plants and animals live. It is the address of an organism.
- Special characteristics that enable plants and animals to be successful in a particular environment are called adaptations.
- There are mainly two types of habitats—terrestrial and aquatic.
- There are many living things which inhabit various types of terrestrial and aquatic habitats and show a variety of adaptations.

EXERCISE TIME

A. Answer the following questions :

1. What are the adaptation features of plants that are generally found in grasslands? Name a few plants that grow in this habitat.
2. Why is it difficult to survive in a desert ? What adaptations are present in the plants growing in a desert ?
3. List the adaptations in a camel that make it possible to survive in a desert.
4. Pines grow in the mountains. What features make their survival at such heights possible.
5. Describe aquatic plants.

B. Fill in the blanks :

1. Many herbivores are found in _____.
2. Nocturnal animals are found in the _____.
3. _____ and _____ roots are found in plants growing in forests.
4. Conifers grow in _____.
5. The body of a fish is _____ to help it cut through the water and swim fast.
6. Air filled cavities are found in _____ plant.

C. Write 'T' for true and 'F' for false statements :

1. The plants growing in grasslands have very stiff stems to withstand strong winds.
2. Zebras have strong legs to run away from the predators.
3. Cacti carry out photosynthesis using their stems.
4. Moss and ferns grow in deserts.
5. Animals that have short legs, tails, and ears to reduce heat loss, are found in ocean.

D. Tick (✓) the correct option :

1. The monarch butterfly exhibits :
(i) migration (ii) acclimatisation (iii) camouflage
2. Cold winters and fires are common in :
(i) grasslands (ii) deserts (iii) mountains
3. Leaves are reduced to spines in plants found in :
(i) grasslands (ii) deserts (iii) mountains
4. For plants to shed water efficiently in forests, the leaves have :
(i) spines (ii) waxy coating (iii) drip tips
5. Bunches of leaves are found on the surface of water in :
(i) water lettuce (ii) water lily (iii) tape grass



Creative Work

- **Make a list of animals found in the Himalayan foothills. Write their special adaptive features that help them to adjust to cold.**
- **Plan a visit to a nearby zoo and observe animals of different habitats kept there. Find out from zoo caretakers about the places from which these animals have been brought. Find out if the zoo has provided these animals with conditions similar to their natural habitats.**