The Living Organisms - Characteristics and Habitats

Habitat And Its Types

Do you know what a habitat is? The surroundings of an organism in which it lives is called its habitat. It is the home of an organism. Organisms depend on it for food, water, air, shelter, etc. A habitat can be occupied by different types of plants and animals.

Let us explore the various types of a habitat.

Types of Habitats

What are the types of habitats present on earth? A habitat can be classified into two broad categories, namely **terrestrial** and **aquatic** habitat. Let us explore these habitats in detail.

• **Terrestrial habitat**

They are natural land masses that allow the survival of different plants and animals.

They include forests, grasslands, mountains, deserts, etc. Let us take desert as an example of terrestrial habitat and find out its characteristic features.

Deserts are areas with very low availability of water. The days are very hot in a desert, whereas the nights are very cold. The plants and animals living in a desert are dependent on abiotic factors for their survival.

• **Aquatic habitat**

They are water bodies that allow the survival of plants and animals in them. Ponds, lakes, oceans, rivers, etc. are examples of aquatic habitats. These water bodies can have fresh water or saline water. Organisms living in aquatic habitats use the oxygen dissolved in water to breathe.

Now, we know how terrestrial and aquatic habitats are different from each other. **How do organisms survive in these habitats?**

The characteristics of an organism (a plant or an animal) that help it survive in its habitat are called **adaptations**.

Let us explore adaptations of organisms in each of these terrestrial habitats in detail.

Adaptations in Terrestrial Habitat

Deserts

These areas are very hot and receive very little rainfall in a year. These conditions make deserts very harsh for the survival of living beings. Therefore, plants and animals living in deserts have some special features.

Adaptations of animals in deserts

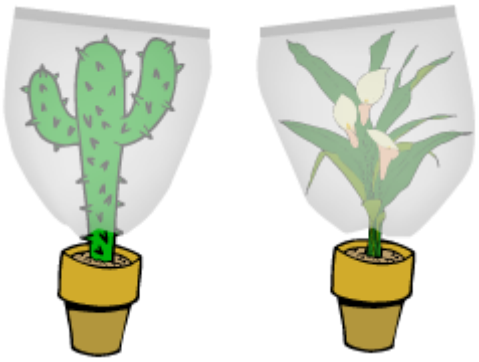
- Camels have long legs, which help them walk on sand. They do not sweat and their dung is dry. This allows them to conserve water in their body. They store large amount of fat in the large hump on their back. This stored fat act as a source of energy and water, as per the need. They have long eyelashes that protect its eyes from the harsh sun rays and blowing sand. Also, their nostrils remain closed most of the times, so that sand cannot enter inside.

- Other desert animals such as rats and snakes live in burrows to stay away from the intense heat. These animals come on the surface during the night when it gets colder.

Adaptations of plants in deserts

- Desert plants such as cactus, *Opuntia*, etc. have leaves in the form of spines. This adaptation helps them in reducing the loss of water by transpiration. In these plants, stems perform the function of photosynthesis. Stems are covered with a waxy layer, which reduces the loss of water. It also has long, deep roots which go deeper into the soil to absorb water.

Let us perform the following activity to compare a desert plant with a lily plant.



Take a potted cactus and a lily plant. Tie the plants with polythene bags and keep them in sunlight.

After 4–5 hours, you will observe that more water droplets develop on the surface of the polythene bag covering the lily plant.

This happens because cactus, being a desert plant, is well adapted to minimize the loss of water by transpiration.

Mountains

Mountains are usually very cold and windy. Mountains at very high altitudes also witness regular snowfall during winters.

Adaptations of animals in mountain areas

Animals which live in mountains, such as snow leopard, yaks, etc., have thick skins or furs that protect them from cold. Furs can also be present on the feet and toes of these animals. Animals like mountain goats have strong hooves that help in running up the rocky slopes of mountains. Since content of atmospheric oxygen is less, most of the animals have higher number of red blood cells. During the period of very low

temperatures, many animals undergo hibernation (long winter sleep) to conserve their energy and survive the winter without food.
Animals like polar bear live in extreme cold regions, they have thick fur and a layer of fat under their skin to adjust to drastic cold climatic conditions.

Adaptations of plants in mountain areas

Trees such as *Pinus,* spruce, etc. are conical in shape with needle-like leaves. This adaptation allows snow and rainwater to slide off easily.

Grasslands

These areas are usually warm in summers and cool in winters. Grass is the dominant form of vegetation in grasslands.

Adaptations of animals in grasslands

Animals such as lions are light-brown in colour. This enables them to hide in dry grasses while hunting. Animals, which hunt other animals (called prey), are known as **predators**.

Other animals such as deer (prey) have long ears, which enable them to hear the movement of their predators. Their eyes are located on the sides of their head to look in all directions. These animals can run very fast to escape their predators.

Some interesting facts:

- Did you know that kangaroos and rats have the ability to convert dry seeds they eat into water inside their body?

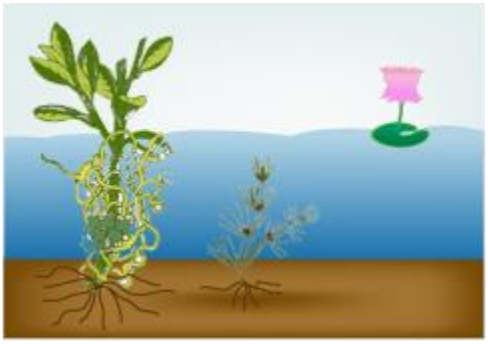
- Camels have the ability to close their nostrils to avoid the entry of blowing sand into their body and have a double row of eyelashes which protect their eyes from the sand and dust.

Ponds and Lakes

A large number of plants and animals live in and around ponds and lakes. We have learnt how fishes survive in water. **How do plants manage to live in water? What are the adaptations observed in aquatic plants?**

- Aquatic plants have their roots fixed in soil, deep below the surface of water. Unlike land plants, their roots are small.

- The stems of aquatic plants are long, hollow, and light. Their stem grows up to the surface of water, with leaves and flowers floating around it.

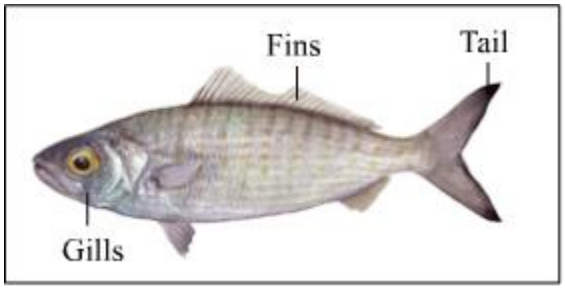


- Some aquatic plants are completely submerged in water. They have narrow ribbon-like leaves, which can easily bend with flowing water.

- In some submerged plants, leaves are divided, which allow water to flow past them easily without causing any damage to them.

  The most common animal to be found in aquatic habitat is fish. Fishes are found both in marine water and in fresh water. Let us see what adaptations do they have that enable them to survive inside the water.

- The most important adaptation that fish have is the the presence of gills. Gills are the specialised respiratory organs found in the aquatic animals. They are effective for respiration only in the water. Fishes have a streamlined body, a feature that helps in the movement of fishes inside the water. Their outer body is covered with water proof scales that help in protecting the fish from the ill effects of the water. They swim with the help of fins and tails.



Do you know that some fishes breathe through lungs and not through gills?
Mammals like dolphins, whales etc. breath air through lungs as they do not have gills. They have a blowhole located on the top of their heads which is why they come to the surface of the ocean.

Frogs are animals that live both on land and in water. Therefore, they have features well adapted for survival in both habitats.

- They have strong hind legs, which help them to leap and catch their prey.
- They also have webbed feet, which help them swim in water.

Some interesting facts:

- Did you know that dolphins sleep by giving rest to only one-half of their brain? For this reason, they always have one eye open.
- Frogs absorb water through their skin. It is for this reason that they do not drink water.

Adaptations in Aerial Habitat

The adaptations for flight are called aerial adaptations. These are found in birds, bats and variety of insects. Let us see what specific adaptations do birds have that enable them to fly.

- Birds have a streamlined body. The body surface is smooth so as to minimise the resistance against air. Their forelimbs are modified into wings which are covered into long flight feathers. The wings are supported by strong and enlarged breast muscles, or wing muscles. Birds have hollow bones with air cavities, so as to reduce their body weight and facilitate the flight. The excretory product is solid urine that cuts down the requirement of water.

You must be aware by now that new plants arise from the seeds. A plant produces a large amount of seeds during its lifetime. Imagine all these seeds are dropped down into the soil around the parent plant. What will happen? Will all these seeds be able to grow into a new plant? The answer is, **no**. If all the seeds are dropped into a limited area, they will compete with each other for space, nutrients, and water. As a result, most of the seeds will get deprived of these necessary requirements and will fail to germinate. To avoid such a condition, plants find ways to 'disperse' their seeds. **Dispersal** refers to the distribution of seeds far away from the parent plant. Many agencies can help in the seed dispersal, that include air, water, and various animals (even humans!). Seeds that are transported through air show some special adaptations so as to be easily carried away to large distances by winds. Such seeds are lighter in weight and have silky hair or wings-like extensions, that assist in their

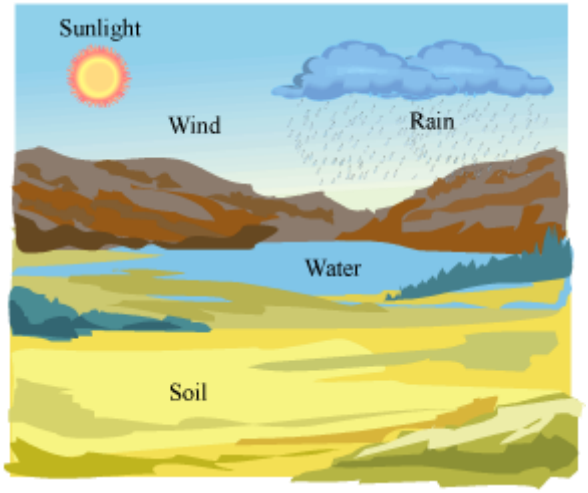
movement through winds. Example of such seeds are cotton, poppy and drumstick seeds.

Environmental Factors

A habitat is made up of both biotic and abiotic factors. **What are biotic and abiotic factors?** Let us find out.

Abiotic factors

Abiotic factors include light, temperature, water, air, soil, inorganic nutrients, etc. They are the non-living components of any habitat.



Biotic factors

Biotic factors are the living components of any habitat. They include plants, animals, etc.

In order to understand how various abiotic factors interact with biotic factors, let us study their effects on plant life.

Do you know why deserts have low biotic population than plains?

Deserts have low biotic population because they are too hot and dry. These conditions make survival of life very difficult.

Thus, abiotic factors of a region can determine the density of biotic population of that region.

We often say that plants, animals, and microorganisms are living things. **How can we say whether a thing is living or non-living? Which characteristics of living things classify them as living?** Let us explore.

The various characteristics of living things are:

- **All living things are made up of cells.** Cell is the basic unit of life. Living organisms that are made up of only one cell are called **unicellular** such as *Amoeba*, *Chlamydomonas*, bacteria, etc. Those made up of many cells are called multicellular. A complex **multicellular** organism is made up of trillions of cells such as humans, dogs, pine tree, lizard, birds etc.
- **All living things require food** for growth and development. It also gives them energy for sustaining life processes. For example, plants manufacture their own food by the process of photosynthesis. Such organisms are called **autotrophs**. Animals, on the other hand, depend on plants and other animals for their food. They are called **heterotrophs**.
- **All living things grow**. Growth can be easily observed in all plants and animals. Living things either produce new cells or their pre-existing cells increase in size and hence they grow. In animals, growth stops as they reach their adult stage while the plants keep on growing throughout their life.
- **All living things respire**. Respiration is a process that includes breathing. The movement of air in and out of the body and vice-versa is known as breathing. For example, animals such as earthworms breathe through their skin; fish use gills for breathing; and plants exchange gases through tiny pores called stomata, which are present mainly on the surface of leaves. Respiration is a two stage process. It has two stages:
- External respiration − This is the process of breathing i.e., taking in oxygen and giving out carbon dioxide.
- Internal respiration − In this stage, oxygen taken in is utilised to produce energy.

- **All living organisms respond to stimuli**.

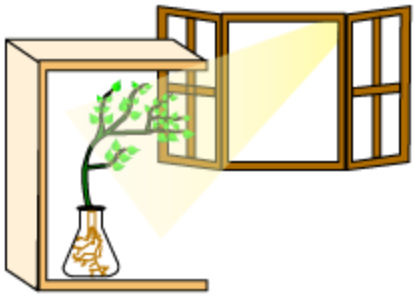
Do you know what stimulus is?

Stimuli are certain changes in the surroundings that cause an organism to respond to them. For example, animals such as cockroaches hide as soon as the light is switched on.

Plants such as *Mimosa pudica* (touch-me-not) close their leaves when touched.

Let us now perform the following activity to understand how plants respond to stimuli.

Take a potted plant and keep it in a room at a slight distance from the window. Sunlight must enter through the window during the day time. Water this plant regularly for a few days.



You will observe that the stem of the plant bends towards the sunlight.

This proves that living organisms react to stimuli.

- **All living organisms excrete.**

  What is excretion?

  A part of the food we eat is utilised by the body while the rest is removed from the body.

  The process of getting rid of waste materials from the body is known as excretion. This process occurs in both plants and animals. In animals, waste products such as urea are excreted in urine; and carbon dioxide, which is also a waste product, is excreted by lungs. In plants, the wastes are converted into harmless substances such as gum, resins, etc.

- **All living organisms reproduce**. Some animals produce eggs while others give birth to young ones. Plants, on the other hand, reproduce by producing spores or seeds.

Do you know?
Mammals such as humans, cats, dogs etc., which give birth to young ones, are called viviparous animals.
Animals such as hens, crocodiles, insects, etc., which produce eggs, are called oviparous animals.

- **All living organisms can move.** It should be noted that all living organisms can move. While animals can move from one place to another with the help of special locomotory organs such as limbs, plants show movement in the form of movement of root towards earth, bending of flowers in sunflower plant towards light, etc. The energy for movement comes from within the organism.

- **All living organisms have a definite life span.** All organisms have a definite life span. Organisms are born; they grow, and finally die. Some organisms have a short life span such as bacteria that live for only 20 to 25 minutes while some organisms have a longer life span such as tortoise that live up to 150 years.

  We can now distinguish between living and non-living things.

Living things	Non-living things
They are made up of cells.	They are not made up of cells.
They show movement, but the energy for movement comes from within the organism.	They show movement by taking external force or energy.
They require food.	They do not require food.
Growth in them is irreversible.	Growth is reversible.
Respiration occurs in which food is oxidised to release energy.	They do not require respiration.
Reproduction occurs in living things.	Non-living things do not reproduce.

Differences between plants and animals

Plants	Animals
They can make their own food by the process of photosynthesis. They are autotrophs.	They cannot make their own food. They are heterotrophs.
They show movement, but cannot show locomotion i.e., they cannot change their position from one place to another.	They show movement as well as locomotion.
They show response to stimuli, but lack sense organs.	They also show response to stimuli and have well-developed sense organs.
They grow throughout their life.	They stop growing once they reach their adult form.