# The Living Organisms -Characteristics and Habitats



"Millions of species of plants, insects, and microorganisms are still undiscovered by humans".

### Introduction

There is a large variety of things around us. Some of these are living things whereas others are non-living things.

Those things which need food, water and air for their survival are called living things. All the animals need food, water and air to survive or live, so all the animals (including human beings) are living things.

Those things which do not need food, water and air for their survival are called non-living things. For example, a table or chair do not need food, water or air to survive, so a table and a chair are non-living things. The study of living things (or organisms) is called biology.

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The living things are called organisms. Thus, all the plants and animals are organisms.

### **Characteristics of living things**

The characteristics of living things are given below:

- (i) Living things need food, air and water.
- (ii) Living things can grow.
- (iii) Living things can move by themselves.
- (iv) Living things can respond to stimuli (or changes around them). They are sensitive.
- (v) Living things respire (release energy from food).

All the living things have some common characteristics (or features) which make them different from non-living things.

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- (vi) Living things excrete (get rid of waste materials from their body).
- Living things can reproduce. They can have young ones. (vii)
- (viii) Living things have a definite life-span (after which they die).



	list out some animals, plants and other objects found in different habitat.						
In the fo	orest	On	mountains	ln t	he desert	In the sea	Any other?
iggested	Answers						
In the	On		In the	In the	Any other?	A ce	ll is the smallest
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Lion	Yak		Camel	Fishes		inde	pendently.
Tiger	Brown B	ear	Snake	Sharks			
Tiger Deer	Brown B Chiru	ear	Snake Spiders	Sharks Octopus			SPOT LIGHT
Tiger Deer Rabbit	Brown B Chiru	ear	Snake Spiders Lizards	Sharks Octopus Crab			SPOT LIGHT
Tiger Deer Rabbit	Brown B Chiru	ear	Snake Spiders Lizards	Sharks Octopus Crab			SPOT LIGHT
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forest	mountains	desert	sea		living structure that
Lion	Yak	Camel	Fishes		independently
Tiger	Brown Bear	Snake	Sharks		independentiy.
Deer	Chiru	Spiders	Octopus		
Rabbit		Lizards	Crab		SPOT LIGHT



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### Biology

Growth means increase in size. All the living things can grow. The young ones of all living things (plants and animals) grow and become bigger in size with the passing of time.



Animals cannot manufacture their own food. So, they are called heterotrophs (hetero-different; trophe-food).

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All the living things grow from a 'single cell'. The growth in living things is from within the living

thing (or living organism). As a living thing grows the number of cells in its body go on increasing. Non-living things do not grow.



### Aim

To demonstrate growth in plants

### Procedure

Sow some wheat seeds in moist soil. Keep watering them daily.

### Observation

In a few days, tiny seedlings emerge from these seeds. Observe them daily. In few weeks, the seedlings become much bigger.



### True or False

**1.** Cell is the basic unit of life.

Green plants manufacture their own food in their green leaves by photosynthesis. So, they are called autotrophs (auto-self; trophe-food).

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- 2. All the living things need food to stay alive.
- 3. Green plants are called autotrophs.

### **Movement**

All the living things move by themselves (without any external help). Animals can move from one place to another or they can move their body parts. For example, a frog moves when it jumps





parts move towards a stimulus such as sunlight, water or gravity. Non-living things cannot move

by themselves. For example, a rock is a non-living thing which cannot move by itself from one place to another.

### **Response to Stimuli**

All the living things respond to changes around them. The changes in surrounding to which living things respond are called stimuli ('stimuli' is the plural of stimulus). The living things show response to external stimuli such as heat, light, touch, sound, smell, taste, water and chemicals. For example, if a man touches a very hot object accidentally, he quickly pulls his hand away from the hot object. In this case, the stimulus is heat and the man responds by moving his hand away from the hot object.

	Stimuli	Phenomenon of response
(1)	Water	Hydrotropism
(2)	Temperature	Thermotropism
(3)	Light	Phototropism
(4)	Gravity	Geotropism
(5)	Touch	Thigmotropism



### Aim

Place a potted plant in a room a little away from a window through which sunlight enters some time during the day. Continue watering the plant for a few days. Does the plant grow upright, like

plants out in the open? Note the direction in which it bends, if it is not growing upright. Do you think, this may be in response to some stimulus?

All living things respond to changes around them.

Plants respond to light. If a potted plant is kept in the open space, the stem of plant grows straight up towards the source of light "sun". The directional movement of leaves, roots, etc., of a plant in response to external stimuli such as light and gravity is called tropism.

Non-living things do not respond to changes in their

surroundings. For example, a rock is a non-living thing which does not respond to stimuli like heat, light, touch, sound and smell etc.









through respiration. Respiration is the chemical process in which food taken by an organism combines with oxygen to release energy. This energy is used by the organism to carry out its various life processes. All the living things (plants and animals) undergo respiration to obtain energy from food.

### Biology

In humans, the process of taking air into the lungs through nose and then expel it through nose is called breathing. The purpose of breathing in air is to provide oxygen to our body for carrying out respiration.



All living things remove metabolic waste products. In animals, it is called excretion and in plants it is secretion.

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The earthworm breathes through its skin. So, the earthworm absorb oxygen (or air) needed for respiration through its thin and moist skin having good blood supply.

The fish has special organs of breathing called gills. The fish breathes by taking in water through its mouth and sending it over the gills. When water passes over the gills, the gills extract dissolved oxygen from this water. The carbon dioxide produced during respiration is also expelled by the gills into the surrounding water. Whales and dolphins have lungs. They come to the water surface for breathing air. Their nostrils are called blowholes from which the air comes out as if from a blowpipe and produces a shower of water.

The exchange of gases (oxygen and carbon dioxide) in plants during respiration takes place through the tiny pores in their leaves called "stomata".

Plants use oxygen for respiration and release carbon dioxide. The oxygen (of air) enters the plant leaves through stomata and utilized in respiration. The carbon dioxide produced during respiration inside the plant is also expelled from the leaves through stomata. Non-living things do not respire. For example, a rock is a non-living thing which does not undergo respiration.

### Excretion

The living things produce some waste materials in their bodies during the various life processes. Many of these waste materials

are poisonous to the living things so they have to be removed. The removal of waste substances from the body of a living organism is called excretion. All the living things get rid of wastes from inside themselves.





Some harmful or poisonous waste materials are also produced in plants. Some plants remove their waste products as secretions.

Non-living things do not excrete.

Reproduction

All living things follow a cycle of growth & development by which an organism takes birth, grows into an adult, gets old and dies. This is known as the life cycle of organism.

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Human beings and some other animals reproduce by giving birth to babies.

The process by which living organisms produce new members of their species is called reproduction. Some animals reproduce by giving birth to their young ones whereas some animals reproduce their young ones through eggs. For example, human beings reproduce by giving birth to babies. The animals such as dogs, cats, cow, horse, deer, lion and tiger etc., also reproduce by giving birth to their young ones. The animals like birds and fish reproduce through

eggs. Birds lay eggs which on hatching produce young ones. When these eggs are hatched, young ones (baby birds) come out of these eggs.

**Some plants reproduce through cutting :** A small part of a plant which is removed by making a cut with a sharp knife is called a cutting. A cutting may be a piece of stem, root or even a leaf. The cutting should be made in such a way that there are some buds (growing points) on it. In this method, a cutting of

Egg-laying animals are called oviparous and animals which give birth to young ones are called viviparous.

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the existing plant (say, of stem or shoot) having some buds on it is taken and its lower part is buried in the moist soil.

After a few days, the cutting develops roots and grows into a new plant. The plants such as rose, henna (mehndi), grapes, sugarcane and cactus, etc. can be grown by the cutting method. **What is life ?** 

Push your hand deep inside a sack of wheat. Do you find it is warm inside? There is some heat being produced inside the sack of wheat. The seeds respire and in that process give out some heat.

We see that respiration is a process that takes place in seeds even when some of the other life processes may not be very active.

It may not be very easy to answer our question – "what then is life"? However, looking at all the diversity of living beings around us, we can conclude that "life is beautiful"!





A new plant grows from a bud of potato

### What are the differences between living and non-living things?

### Explanation

### **Differences between Living and Non-Living Things**

	Living things		Non-living things
1	Living things need food, air and water.	1	Non-living things do not need food, air and
			water.
2	Living things grow.	2	Non-living things do not grow.
3	Living things can move on their own.	3	Non-living things cannot move on their own.
4	Living things respond to stimuli (changes	4	Non-living things do not respond to stimuli.
	around them). They are sensitive.		They are not sensitive.
5	Living things reproduce.	5	Non-living things do not reproduce.
6	Living things respire. They release energy from	6	Non-living things do not respire.
	food.		
7	Living things excrete. They get rid of waste	7	Non-living things do not excrete.
	materials from their body.		
8	Living things have a definite life-span after	8	Non-living things exist forever.
	which they die.		
	which they die.		



Check your 2 Concepts 2

**1.** Do all the living organisms show all the characteristics of life all the time?



1. No, it is not necessary. For example, seeds are living and are stored for months. But neither they grow nor reproduce, nor move nor feed. When these seeds are sown in the soil, they germinate and grow into whole plants. Also, when they are stored, they respire without air (anaerobically).

All that surrounds living things & affects their growth & development is called their environment (environ - to surround).

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### **Differences between plants and animals**

	Plants		Animals
1	Green plants make their own food by the process	1	Animals get their food from plants or other
	of photosynthesis. (Autotrophic nutrition)		animals. (Heterotrophic nutrition)
2	Plants do not move from place to place since they	2	Animals move from place to place since
	lack organs for locomotion.		they have organs for locomotion.
3	Plants grow throughout their life. (Unlimited	3	Growth in animals is limited up to a certain
	growth)		period.
4	Plants show growth at the tips of shoots and	4	Animals show uniform growth in their
	roots. (Localised growth)		body. (Diffused growth)
5	Plants lack sense organs and they show slow	5	Animal have sense organs and show quick
	response to external stimuli.		response to external stimuli.
6	Plant cells have cell wall and chloroplasts.	6	Animal cells do not have cell wall and
			chloroplasts.

### Habitat

All the living organisms (plants and animals) prefer to live in those places which are best suited to their needs. The place (or surroundings) where a plant or animal lives is called its habitat. A habitat provides food, water, air, light, shelter (protection) and a place for breeding to the plants and animals living in it. All the habitats can divided into two main groups : Terrestrial habitats and Aquatic habitats.

Water dissolves vital gases like oxygen and Carbon dioxide and allows sun light to penetrate water bodies. This enables living beings to survive in water. SPOT LICHT

### **Terrestrial habitats**

A land based habitat is called a terrestrial habitat. Some of the examples of terrestrial habitats are: Desert, Mountains (or Hills), Forest, Grassland, Garden, Field, Soil and Homes.

### Aquatic habitats

A water based habitat is called an aquatic habitat. Thus, the plants and animals which live in water are said to live in an aquatic habitat. Some of the examples of aquatic habitats are Pond, Lake, River, Swamps (an area with water logged ground) and Oceans (or Sea).

### Components of a habitat

A habitat does not consist of only living organisms. In a habitat, soil, water, air, light, temperature and many other components of physical environment are also present. Thus, a habitat includes both biotic and abiotic components of the environment.



### **Biotic components**

The term "biotic" means "living". So, the living things in a habitat are its biotic components. The living things in a habitat are plants, animals and micro organisms.

### Abiotic components

The term "abiotic" means "non-living". So, the non-living things in a habitat are its abiotic components. The various non-living things in a habitat are soil, rocks, air, water, sunlight and temperature etc.



### Aim

To show the effect of some abiotic factors on the germination of seeds to form young plants.

### Procedure

Take a small heap of moong seed.

Many plants and animals develop special body parts that help them to survive in their habitat. Such changes are termed modification.



- (i) Keep some dry moong seeds in a sunny room (where sunlight is available).
- (ii) Keep some moong seeds completely submerged in water for a few days.
- (iii) Soak some moong seeds in water for a day, then drain out water.
- (a) Keep some soaked and wet moong seeds in sunlight for a few days.
- (b) Keep some soaked and wet moong seeds in a completely dark place for a few days.
- Keep some soaked and wet moong seeds in a very cold place like a refrigerator (or with (c) ice around them) for a few days.

### Observation

- (i) After a few days we will observe that the dry moong seeds do not germinate at all showing that water (or moisture) necessary for the germination of seeds to grow into plants.
- (ii) The moong seeds kept completely submerged also do not germinate showing that air is also necessary for the growth of plants.
- (iii) The wet moong seeds kept in sunlight germinate and grow (a) maximum.
  - (b) Those kept in dark do not grow much showing that sunlight is necessary for the growth of plants.
  - (c) The wet moong seeds kept in a very cold place (like a refrigerator) grow very, very slowly showing that temperature (heat or warmth) is necessary for the growth of plants.

### Conclusion

Abiotic factors such as water, air, sunlight and temperature (or heat) are very important for the growth of plants. In fact, these abiotic factors are very important for the existence of all living organisms, plants as well as animals. Adaptations A living thing can survive in a particular habitat, if its body is suited (or adapted) to the

conditions or environment of that habitat. Plants and animals develop special characteristics or features in their body in order to survive in their habitat (or surroundings). The presence of specific body features (or certain habits) which enable a plant or an animal to live in a particular habitat is called adaptation. There are some changes that can happen in an organism over a short period of time to help them

adjust to some changes in their surroundings. For instance, if we live in the plains and suddenly go to high mountain regions, we may experience difficulty in breathing and doing physical exercise for some days. We need to breathe faster when we are on high mountains as there is lower levels of oxygen in air. After some days, our body adjusts to the changed conditions on the high mountain. Such small changes that take place in the body of a single organism over short periods, to overcome small problems due to changes in the surroundings, are called

acclimatisation. These changes are different from the adaptations that take place over thousands of years.

### Some terrestrial habitats and their adapatations

Some of the important terrestrial habitats are

1. Deserts

3. Forests (or Grasslands)

1. Deserts

### Adaptation in desert animals

The animals like desert rats and desert snakes survive in the hot desert having lack of water due to the following adaptations :-

2. Mountain regions and

(i) They live in burrows. During the daytime, the desert rats and snakes dig deep burrows in the sand and stay in them when it is very hot. The burrows stay cool during the day and hence protect these animals from the sun's heat as well as loss of water from their body. The desert rats and desert snakes come out of the burrows only during cool night in search of food.



Desert rats and desert snakes live in burrows during hot day time



Camel



# How the camel is adapted to survive in the desert environment?

## Explanation



Camel lives in hot desert where water is scarce. The body structure of a camel helps it to survive in desert conditions. Camel is adapted to live in a desert because of its following special features

- 1. The camel has long legs which help to keep its body away from the hot sand in the desert.
- 2. A camel can drink large amount of water (when it is available) and store it in the body.
- 3. A camel's body is adapted to save water in the dry desert as follows : A camel passes small amount of urine ; its dung is dry and it does not sweat.
- A camel's hump has 'fat' 'stored in it. In case of emergency, a camel can break down stored 4. fat to obtain water.
- 5.

### Adaptations in desert plants

fat to obtain water. A camel has large and flat feet which help it to walk easily on soft sand (by preventing it from sinking into soft sand). **rations in desert plants** of the adaptations which help the desert plants to survive in hot and dry environment of a desert are as follows : The leaves in desert plants are either absent, very small or present in the form of spines Some of the adaptations which help the desert plants to survive in hot and dry environment of a

- (i) (thorns). This helps in reducing the loss of water from the leaves through transpiration.
- (ii) Since the leaves of desert plants are either absent, very small or form spines the stems of desert plants are modified to perform the function of leaves. Thus, in desert plants photosynthesis is usually carried out by their green stem.
- The stems of desert plants are modified for storing water. The stems of desert plants are (iii) also covered with a thick waxy layer (called cuticle) which prevents the loss of water from it.
- Most of the desert plants have long roots which go deep into the soil for absorbing water. (iv)



Spines (modified leaves to reduce loss of water)

Green stem (stores water and carries out photosynthesis)

Cactus

### Adaptations in mountain regions

The mountain habitats are usually very cold and windy.

### Adaptation in mountainous plants

There is lot of rain in mountain regions. It is very cold during winter and snowfall may also occur. The rain and snow may damage the mountain trees and plants.

The trees can survive in extremely cold and windy mountain habitats due to the following adaptations :

- (i) The trees in mountain are usually cone-shaped having sloping branches. This shape of the mountain trees make the rain-water and snow to slide off easily without damaging the branches and leaves.
- (ii) Many mountain trees have small, needle-like leaves due to which these leaves lose very little water in windy conditions. The needle like leaves have a thick waxy layer to reduce the loss of water through transpiration and to protect them from damage by rain and snow.



### Adaptation in mountainous animals

Mountain trees

The animals living in mountain habitats are also adapted to the extremely cold environment present there.

### Adaptation in yak :

Yaks have long hair on their body to protect them from cold by keeping them warm.



Yak

### Adaptation in mountain goat:

- The mountain goat has long hair to protect it from cold and keep it warm.
- (ii) The mountain goat has strong hooves for running up the rocky slopes of mountain for grazing (The hard and rough feet of an animals are called hooves).



Mountain goat

### Adaptation in snow leopard :

Snow leopard lives in mountains where snow is present. The snow leopard is adapted to live in extremely cold places having snow as follows:



Snow leopard

The snow leopard has thick fur on its body. This fur protects the snow leopard from cold and keeps it warm. The snow leopard has also fur on its feet and toes. This protects its feet from cold when it walks on the snow.

### Adaptations in forests and grass land

The adaptations in lion and deer to the forest habitat are described below:

### **Adaptation in Lion**

- (i) The lion has long, strong and sharp claws in its front legs to catch its prey. The lion can withdraw the claws inside the toes so that they do not become worn out and blunt when it walks.
- (ii) The lion has eyes in front of its head which enable it to have a correct idea of the location of its prey. This helps it in catching the prey.
- (iii) The lion is light brown in colour. The light brown colour helps the lion to hide in dry grassland (without being noticed) when it hunts for prey.

### **Adaptation in Deer**

The deer is a herbivorous animal which eats only the plant material as food. The deer is adapted to the forest habitat in the following ways :

- (i) The deer has eyes on the sides of its head which enables it to see in all directions at the same time. The all round vision of deer helps it to see its predator animals like lion (which kill it), in all the area around it.
- (ii) The deer has big ears. The big ears help the deer to hear the movements of predators very easily.
- (iii) The speed of deer helps it to run away from the predators (like lion) which try to catch it.
- (iv) The deer has brown colour. The brown colour of deer helps it to hide in dry grasslands without being noticed by lion etc.
- (v) The deer has strong teeth for chewing hard plant stems of the forest.

### Adapations in aquatic habitats

### Some aquatic habitats

The important aquatic habitats are

1. Oceans

Many sea-animals have streamlined bodies to help them move in sea water easily.

2. Ponds, lakes and rivers





Lion





Ponds, lakes and rivers are "fresh-water" aquatic habitats. The plants which grow in water are called aquatic plants.



### How many types of aquatic plants are there? Explain.

### Explanation

There are three types of aquatic plants (or water plants). These are described below :

- (a) Some aquatic plants float on the surface of water. e.g. water-lettuce and water hyacinth.
- (b) Some aquatic plants are partly submerged in water. The roots are fixed in the soil below water at the bottom of pond, lake or river. The stems of such plants grow up to the surface of water while the leaves and flowers float on the surface of water. e.g. water lily and lotus.
- (c) Some aquatic plants are completely submerged in water. The roots of submerged plants are also fixed in the soil below water at the bottom of pond, lake or river. All the parts of such plants (including stem, branches and leaves) grow under water. e.g. Hydrilla and Vallisneria.

### Adaptations in aquatic plants (or water plants)

The aquatic plants show a number of adaptations. Some of the adaptations are as follows :

- (a) The aquatic plants have very short and small roots whose main function is to hold the plant in place. All the parts of an aquatic plant are surrounded by water, so an aquatic plant can absorb water and dissolved minerals directly from the surface of their stems, branches and leaves.
- (b) The stems of aquatic plants are soft, hollow and light, having large spaces filled with air. The aquatic plants do not need strong stems because the surrounding water of a pond, lake or river keeps them up.
- (c) The submerged aquatic plants have narrow and thin ribbon-like leaves which can bend in the flowing water of rivers and streams and hence do not obstruct the flow of water.





### How the frog is adapted to live in water and on land? Explanation

The animal like frog have ponds as their habitat. Frogs can live inside water as well as on land near the pond.

(a) Frogs have webbed back feet which help them to swim in water. This adaptation helps the frogs to live life in water. In the sea, plants and animals are surrounded by saline water. Most of them use the air dissolved in water.

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Frog

- (b) Frogs have strong back legs for leaping (jumping) and catching their prey. This adaptation helps the frogs to live life on land.
- Some sea-animals like squids and octopus do not have streamlined body shape. But when squids and octopus move in sea-water, they make their body shape streamlined. Such animals stay deeper in the ocean near the sea-bed and catch any prey that moves towards them.

## **Biology Diagrams made Easy**



Partially submerged plants **aquatic plants** Submerged plant Floating plants



- Food
- Growth
- Movement
- Response to stimuli
- Respiration
- Excretion
- Reproduction
- Life-Span

Living Organisms

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Mountain regions Forest and grasslands Desert

Aquatic region

Light, air temperature water, soil etc.

Cactus

Camel, Desert rat, **Desert Snakes** 

### Lion and Deer

### Floating plants, Submerged plants Completely submerged plants Yak, mountain goat, snow leopard

### Terrestrial

### Aquatic

- Deserts
- Mountains or hills
- Forests and Grasslands
- Pond
- Lake
- River
- Swamps
- Ocean or seas

### Microbes

Mountain tree

## Fish



### SOME BASIC TERMS

- **1. Adaptation :** The ability of living organisms to adjust themselves to their surroundings
- 2. Aquatic habitat : Habitat with water.
- **3. Biotic component :** Living things in an surrounding .
- **4. Excretion** : removal of metabolic waste.
- 5. **Growth** : Increase in mass and size of a body.
- **6. Habitat :** Natural environment where an organism lives.
- **7. Living :** Being alive.
- **8. Reproduction :** Giving birth to young ones.
- **9. Respiration :** Burning of food.
- **10. Stimulus :** Any change in environment.