

6TH SCIENCE

BIOLOGY

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6TH TERM - I

BIOLOGY

UNIT 1

THE LIVING WORLD OF PLANTS

Introduction

- Biology is a natural science concerned with the study of life and living organisms, including their structure and functions.
- The living world comprises of plants and animals.
- Plants can prepare food itself, grow in size, and reproduce.
- Various parts of the plants are used as food, medicine, wood, and shelter.

Plant forms and functions:

- The plant body is also made up of several organs such as root, stem leaves and flowers.
- Plant consists of two main parts. They are,
 - Root system
 - Shoot system

1. Root system

Root

- The underground part of the main axis of a plant is known as root. It .
- Root has no nodes and internodes.
- It has a root cap at the tip.
- A tuft of root hairs is found just above the root tip.
- Roots are positively geotropic in nature.

Plants root system is classified into two types.

1. Tap root system
2. Fibrous root system

1. Tap root system

- ⇒ It consists of a single root, called taproot, which grows straight down into the ground.
- ⇒ Smaller roots, called lateral roots arise from the taproot.
- ⇒ They are seen in dicotyledonous plants.

Example: Bean, Mango, Neem.

2. Fibrous root system

- ⇒ It consists of a cluster of roots arising from the base of the stem.
- ⇒ They are thin and uniform in size.
- ⇒ It is generally seen in monocotyledonous plants.

Example: Grass, Paddy, Maize.

Functions of the Root

1. Fixes the plant to the soil.
2. Absorbs water and minerals from the soil.
3. Stores food in some plants like Carrot and beet root.

2. Shoot system

Stem

- ⇒ The aerial part of the plant body above the ground is known as the shoot system. Main axis of the shoot system is called the stem.
- ⇒ The shoot system consists of stem, leaves, flowers and fruits.
- ⇒ It has nodes and internodes. Nodes are the parts of stem, where leaf arises. The part of the stem between two successive nodes is called internode.
- ⇒ The bud at the tip of the stem is known as apical or terminal bud, and the buds at the axils of the leaves are called auxiliary buds.

Functions of the stem

- supports the branches, leaves, flowers and fruits.
- transports water and minerals from roots to upper aerial plant parts.
- transports the prepared food from leaves to other parts through stem.
- stores food as in the case of sugarcane.

Structure of a leaf

The leaf is a green, flat expanded structure borne on the stem at the node.

- ⇒ A leaf has a stalk called *petiole*.
- ⇒ The flat portion of the leaf is called *leaf lamina or leaf blade*.
- ⇒ On the lamina, there is a main vein called *midrib*. Other veins are branch out from mid rib.
- ⇒ The portion of the leaf connected in the nodal region of the stem is known as the *leaf base*. Leaves of some plants possess a pair of lateral outgrowth on the base, on either side of auxiliary bud. These are called *stipules*.
- ⇒ The green colour of the leaf is due to the presence of green coloured pigment called *chlorophyll*.
- ⇒ On the lower side of the leaf there are tiny pores or openings known as *stomata*.

Functions of the leaf

The green leaves

- Prepare food by the process of photosynthesis.
- Helps in respiration.
- Carry out transpiration.

Do you know?

- Victoria amazonica, the leaves of this plant grow up to 3 metres across.
- A mature Victoria leaf can support an

evenly distributed Load of 45 Kilograms or apparently young person.

How do we classify the plants?

1. Based on flower: Plants can be classified into two main groups.

Flowering plants and Non-flowering plants.

Sun Flower - Flowering plant

Riccia-Non- flowering plant

2. Based on position of seed: Plants can be divided into two groups.

Angiosperms. and Gymnosperms

Mango-Angiosperm

Cycas-Gymnosperm

Habitat

Each and every organism needs a place to live and reproduce. Such a dwelling place is called habitat.

From the depths of the ocean to the top of the highest mountain, habitats are places where plants and animals live.

Types of Habitat

I. Aquatic habitat:-

- ⇒ When we visit a pond, we see some plants appear to float on water. One of the common plants is the lotus plant. Its leaves float on the water.
- ⇒ There is a small frog sitting on a leaf. It is ready to catch the insects flying/fluttering around the flowers. The stem of the plant is seen to be inside (submerged) the water. Its roots are found within the muddy floor of the pond.
- ⇒ As this plant grows in water, shall we call it an aquatic plant?

Aquatic habitat includes areas that are permanently covered by water and surrounding areas that are occasionally covered by water.

There are two types namely Fresh water habitat and Marine water habitat.

Do you know?

- Nile is the longest river in the world. It is 6650 Km long.
- The Longest river in India is Ganges River. It is 2525 Km long.

I. a. Fresh water Habitat :-

- ⇒ Rivers, lakes, ponds and pools are the fresh water habitat.
- ⇒ Water hyacinth, water lily and lotus are seen in the fresh water habitat.
- ⇒ In these plants roots are very much reduced in size.
- ⇒ Stem and leaves have air chambers that allow aquatic plants to float in water.

Do you know?

Air spaces in stems and petioles of lotus are useful for floating in water

I.b. Marine water habitat:-

- ⇒ From outer space earth looks like an awesome blue marble, That's because most of earth's surface, more than 70% is covered by oceans
- ⇒ . Oceans also support the growth of plants. Marine plants perform about 40% of all photosynthesis that occurs on the planet.

Example:

Marine Algae, Sea grasses, Marsh grass, Phytoplanktons.

II. Terrestrial habitat:

- ⇒ Terrestrial habitats are the ones that are found on land like forest, grassland and desert. It also includes

man-made habitats like farms, towns and cities.

- ⇒ They can be as big as a continent or as small as an island.
- ⇒ They make up about 28% of the entire world habitat.

Example :

Rubber tree, teak tree and Neem tree.

Do you know?

The first land plants appeared around 470 million years ago. They were mosses and liverworts. The Amazon Rain Forest in South America produces half of the world's oxygen supply.

Terrestrial habitat is classified into three types such as

- a. Desert
- b. Grassland
- c. Forest

a. Desert habitat

1. A habitat without much water is called deserts.
2. Deserts are the driest place on earth, They get fewer than 25cm of rainfall annually.
3. Deserts cover atleast 20% of the earth.
4. The plants which grows in this habitat have thick leaves that store water and minerals.
5. The plants like cactus store water in their stem and the leaves are reduced to spines.
6. They have long roots that go very deep in the soil in the search of water.

Types: (i) Hot dry deserts, (ii) Semi arid deserts, (iii) Coastal deserts, (iv) Cold deserts.

Example: Cactus, Agave, Aloe, Bryophyllum

Fact file

Thar Desert, also called Great Indian Desert, is an arid region of rolling sand hills on the Indian subcontinent.

It is located partly in Rajasthan state, north-western India, and partly in Punjab and Sindh (Sind) provinces, eastern Pakistan.

b. Grassland habitat

1. Grassland is an area where the Vegetation is dominated by grasses.
2. Grasses ranges from short to tall.

Eg. Savanna Grassland

c. Forest habitat

1. Forest is a large area dominated by trees.
2. There are three types of forests and are:- tropical forests, temperate forests and mountain forest.
3. Annual rain fall ranges from 25-200 cm.

World habitat day is observed on 1st Monday of October.

Plant Adaptations and Modifications.

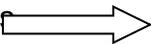
- ⇒ Adaptations are special features in plants which help them to survive in the habitats they live in over a long period.
- ⇒ Plants in a specific environment have developed special features which help them to grow and live in that particular habitat.

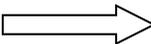
In this chapter, Let us study some adaptations like tendril, twiners and thorns. These adaptations are seen in plants which live in terrestrial and desert habitat.

1. Tendril Climber:-

- ⇒ Tendril is a twining climbing organ of some weak stemmed plants like peas and bitter gourd. Tendril coils round a support and help the plant to climb.

Example:

1. Sweet Pea  Leaflets are modified into tendrils.

2. Bitter Gourd  Axillary buds are modified into tendril which helps the plant to climb.

Do you know?

Bamboo is one of the fast growing plants, during active growth phase.

2. Twiners:-

- ⇒ Some plants have weak stems.
- ⇒ They cannot stand straight on their own.
- ⇒ They must climb on any support to survive.

Example: Clitoria and Jasmine

3. Thorns:-

- ⇒ Leaves of some plants become wholly or partially modified into sharp pointed structures called “thorns or spines” for defensive purpose.

Example:

1. Agave - the leaf apex and margins are modified into thorns
2. Opuntia - the leaves are modified into spines.
3. bougainvillea – the stem has sharp thorns.

HOTS

Cactus plant is green in colour and performs

photosynthesis. Which part of the plant does photosynthesis?

KEYWORDS

- Tap root: A primary root that grows vertically downward and gives off small lateral roots.
- Fibrous root: Cluster of roots.
- Habitat – The area where a particular organism actually lives.
- Aquatic – Plants whose natural habitat is water.
- Terrestrial – Plants whose natural habitat is land.
- Adaptation – Changes in the structure or behaviour of an organism that helps the plants to survive in a particular habitat.
- Modification – a change in organism caused by environmental factors.
- Tendril climber: A slender organ of a modification of stem
- Twiner: Plants which climb up trees and other objects.
- Thorn: A sharp and stiff part of a modification of stem

UNIT 2

LIVING WORLD OF ANIMALS

Biodiversity

In the living world, a lot of diversity is seen both in animals and plants. Every plant and animal is unique.

1. The term biodiversity refers to the totality of species, populations, communities and ecosystems, both wild and domestic.
2. It may also be defined as the variety and variability among living organisms and the habitats in which they live.

- ⇒ Biodiversity includes a variety of ecosystems such as those that occur in deserts, forests, mountains, lakes, rivers and agricultural fields. In each ecosystem, living creatures, including humans, form a community interacting with one another and with other
- ⇒ The living things form biotic community and non-living things form abiotic community.

Habitat

- Fishes and crabs grow only in water
- Elephants, tigers and camels live on land.
- .Camel can live anywhere it is able to live in deserts more comfortably.
- Polar Bear and Penguins dwell in cold regions.

Living in such harsh conditions requires special features in these animals which help these organisms to live, breed and excel well in that particular place. Living or dwelling place of an organism is known as habitat.

Do you know?

In Jurong Birds Park, Singapore, Penguins are kept in a big glass case with ice bergs and temperature is maintained at 0° C and below.

Unicellular and Multicellular Organisms

Living things are made of small units called cells.

All the functions and processes in the body of living things are brought about with the help of these microscopic cells.

1. Organisms are made up of a single cell and these are called unicellular organisms,
 - a. Amoeba, Paramecium and Euglena are unicellular

2. Organisms that are made of many cells are called multicellular organisms.
- Fish, frog, lizard, bird and man are multicellular.

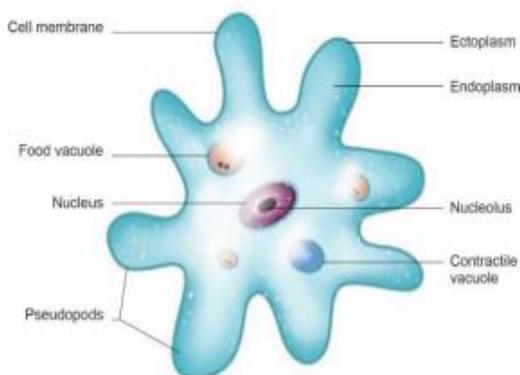
Unicellular organism

- Unicellular organisms are small, usually microscopic, cannot be seen with naked eye.
- They are aquatic, simplest and most primitive of all animals.
- They perform all their physiological activities by the special structures present inside the body called organelles.

Amoeba

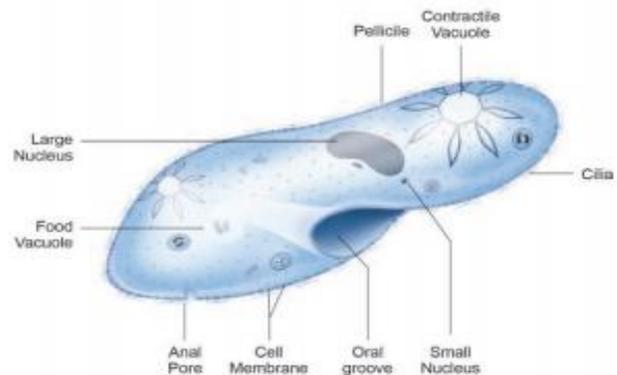
- We know Amoeba is an unicellular organism It does all the activities like digestion, locomotion, respiration and reproduction.
- It swallows food from the water and the food is digested in the food vacuole.
- Contractile vacuoles help in excretion.
- Respiration is by simple diffusion through the body surface.
- They have finger-like structures called Pseudopodia, (false foot) which help in movement or locomotion

Amoeba



Paramecium

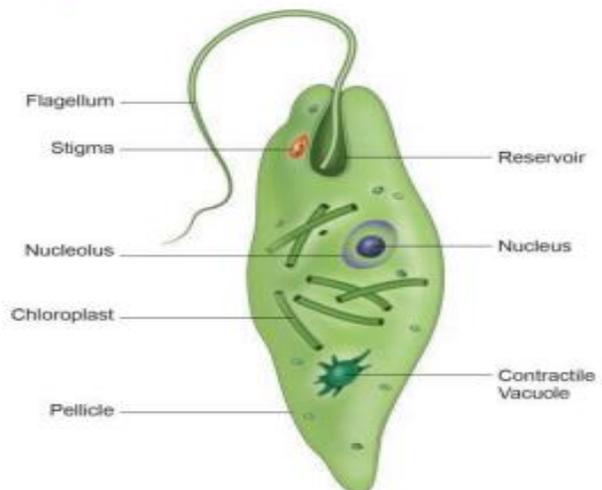
Paramecium is also a unicellular organism which lives in water and move with the help of cilia.



Euglena

Euglena is an unicellular animal which moves with a flagellum.

Euglena



Multicellular organisms:

- Majority of organisms we see around us, including animals are multicellular.
- In such organisms, different functions are carried out by different groups of cells or organs in their body.

E.g. Jelly fish, Earth worm, snails, fish, frog, snakes, pigeon, tiger, monkey and man.

Unicellular Organisms	Multicellular Organisms
<ul style="list-style-type: none"> • They are made up of single cell. • The single cell of the organism can perform all the functions of life. • These organisms are generally very small (microscopic) in size. • They lack tissues, organs and organ systems. • Growth occurs by an increase in the size of the cell. eg. Amoeba, Paramecium and Euglena. 	<ul style="list-style-type: none"> • They are organisms are made up of many cells. • Division of labour exists among cells. Different cells are specialized to perform different functions. • They are mostly large in size. • They are composed of tissues, organs and organ systems. • Growth occurs by an increase in the number of cells by cell division. eg. Earthworms, Fish, Frogs, Lizard and human beings.

Adaptation in Animals Animals vary in size, shape and behaviour

- A Living thing can survive in a particular habitat if its body is adapted to the conditions of that habitat.
- Plants and animals develop special characteristics or features in their body in order to survive in their habitat (the surroundings).
- The presence of specific body features for certain habits which enable a plant or an animal to live in a particular habitat is called adaptation.

Fish

1. The head, trunk and tail of a fish merge to form a streamlined shape. The streamlined body shape helps the fish to move through the water easily.
2. The fish has special organs called "Gills" which is a respiratory organ helps to absorb oxygen dissolved in water for breathing. It is adapted to breathe in water.
3. Most of the fishes have slippery scales all over the body which protect the body.

4. The fish has fins for swimming.
5. The fish has strong tail which acts as rudder to change direction and keep its body balance in water.

Lizard

1. Lizards are scaly-skinned reptiles that are usually distinguished from snakes by the possession of legs, movable eyelids, and external ear openings.
2. They mostly inhabit warm regions. Most lizards are quadrupedal (walk with four legs) and have a powerful limb.
3. Some lizards have the capacity to rotate the head around the head joint.
4. They breathe through lungs. Some lizards are able to run bipedally with two legs. In this the tail is held out backward and upward and acts as a counterweight.
5. Most lizards eat a variety of insects like mosquitoes and Cockroaches with sharp, tricuspid, teeth adapted for grabbing and holding
6. Some lizards (Dinosaurs) have web in the toes, and few lizards are able to glide or parachute the air and make soft landings.

Birds

1. They have streamlined body covered with feathers.
2. This body shape provides minimum resistance to air.
3. They have beak instead of mouth.
4. They breathe through lungs. They have a pair of wings that are modified forelimbs.
5. They have hollow and light bones.
6. Usually we see birds fly, however they can also hop, move, run, etc., on the ground and they perch well on the branches of tree with the help of a pair of clawed feet.

7. The tail of the bird helps it to control the direction of the movements.
8. They have strong chest muscles which help them withstand the pressure of the air while flapping their wings during flight.
9. At a time, birds can see one object with one eye and another object with the other eye. (Binocular vision)

Adaptation in Camel:

1. Camel lives in hot desert where water is scarce. The body structure of a camel helps it to survive in desert because of its following special features which are listed below:
 - a. A Camel passes small amount of urine; its dung is dry and it does not sweat. Since a camel loses very little water from its body, it can live for many days without drinking water.
2. The camel has long legs which help it to keep its body away from the hot sand in the desert.
3. A camel can drink large amount of water (when it is available) and store it in the body.
4. A camel's hump has fat stored in it. In case of emergency a camel can break down stored fat for nourishment.
5. A camel has large and flat padded feet which help it to walk easily on soft sand. Thus it is called "The ship of the desert".
6. Camel has long eye lashes and hairs to protect its eyes and ears from the blowing dust.
7. It can keep its nostrils closed to avoid dust.

Do you know?

- When an animal moves its location as the season changes it is said to be Migration.
- In Tamil Nadu Bird Sanctuaries are located at Vedanthangal, Kodiyakkarai and Koondhankulam. There are many

birds from foreign countries like Siberia and Russia migrate to our Vedanthaangal.

- Likewise during summer and drought conditions birds from our country migrate to foreign countries. These birds are called Migratory Birds.

Info bits

- Spending winters in a dormant condition is called Hibernation. eg. Turtle
- On the other hand, spending the hot and dry period in an inactive state is known as Aestivation. eg. Snail

Do you know?

- Kangaroo rat does not drink water at all.
- Whatever food it eats and oxygen it gets from air combine together to form water inside the body.

Adaptive Features of Animals from different Habitats

Sl.No.	Name of the Animal	Habitat	Adaptive features
1.	Polar Bear	Polar region	Thick skin for protection, white fur
2.	Penguin	Polar region	Paddle to swim, walk with two legs
3.	Mountain Goat	Mountains	Strong hooves for running, long hair to protect from cold
4.	Lion	Forest	Strong and fast runner has sharp claws to catch prey.

Do you know?

The mountain goat namely Nilgri Tahr can find small spaces on rock to climb with ease and keep its balance as it feeds.

UNIT 3

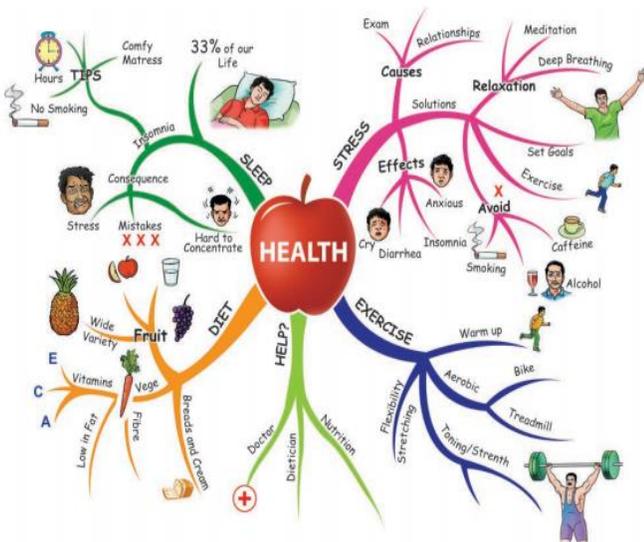
HEALTH AND HYGIENE

Introduction

The word "health" refers to a state of complete emotional and physical well-being.

As defined by World Health Organization (WHO), it is a "State of complete physical, mental, and social well being, and not merely the absence of disease or infirmity."

- Health is a dynamic condition resulting from a body's constant adjustment and adaptation in response to stresses and changes in the environment for maintaining an inner equilibrium called homeostasis.
- Hygiene is a science of the establishment and maintenance of health conditions or practices (as of cleanliness) conducive to health has poor personal hygiene. Brushing your teeth regularly is an important part of good oral hygiene.
- Hygiene is the practice of keeping yourself and your surroundings clean, especially in order to prevent illness or the spread of diseases.



Components of Food

The Chemical constituents of food which give us energy, help to build our body and protect us from diseases are called Nutrients.

1. Carbohydrate
2. Proteins
3. Fats
4. Vitamins
5. Minerals
6. Water

Carbohydrates

Carbohydrates are energy giving component of the food.

Form of Carbohydrates	Sources
Sugar	Fruits, Honey, Cane Sugar, Sugar Beet
Starch	Rice, Wheat, Maize, Potato, etc.
Dietary fibre	Whole grain, nuts, etc.

NUTRIENTS



FOR MORE DETAILS



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