3. Diversity in Living Things and their Classification

Can you recall? In which spheres of the earth do living things exist?

The geographical conditions at different places on the earth are very different. We find that living things exist in all these diverse conditions. When we live in a certain place, we adjust to the conditions there. Various types of living things have survived because of their ability to adjust themselves to the conditions in their surroundings.

Can you tell? Are the plants and animals that you have seen all alike?

Diversity in plants

Various types of plants are found in many places around us. Some plants like grass are short, while others are tall and have a canopy. Some plants grow underwater, while some others float on water. We find that some plants grow even in deserts. Moreover, we find that there is a lot of variety in the same type of plant. For example, there are different varieties of rice or wheat, different types of roses, and mangoes of different flavours. Some plants grow even without stems, leaves or roots. These are very different from ordinary plants. Let us study this diversity among plants.

Plants make their own food in sunlight. Such plants are called **autotrophic** plants. For example, the hibiscus, pomegranate, periwinkle, etc. Some plants like funguses, loranthus, dodder use other plants for food and are said to be **heterotrophic**. Plants like the pitcher plant even consume insects. They are **insectivorous**.

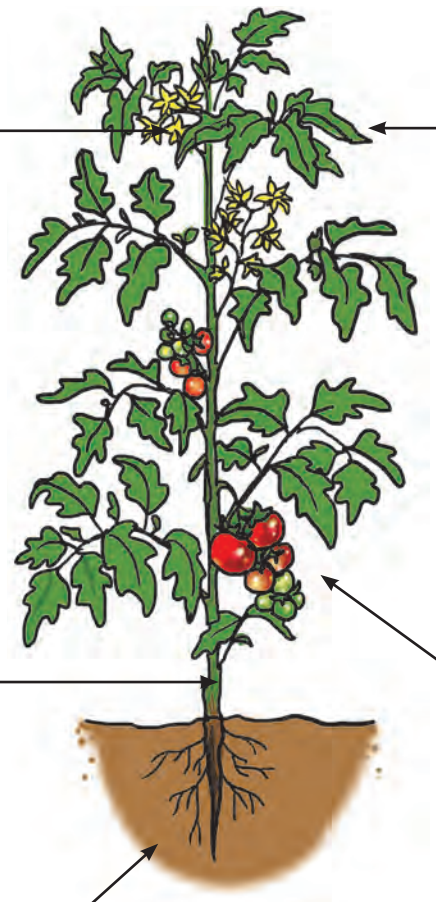
3.1 : Method of nutrition in plants

The structure of a plant

Plant structure can generally be divided into two parts – the stem which grows above the ground and the root which grows below the ground surface.
The root, stem and leaves are the main parts of plants. From time to time, plants bear flowers for reproduction. Flowers are transformed into fruits. Fruits have seeds. Seeds give rise to new plants.

The flower : This is the most attractive part of a plant. It is connected to the stem by a stalk which may be long or short. A flower has a typical colour and shape. The flower is an important means of reproduction.

The stem : The height, shape and size of a plant depends upon the stem. The stem carries out the functions of production, conduction and storage of food. In some plants, it has the function of reproduction. It gives support to other parts of the plant.



3.2 : The structure of a plant

The leaf : The leaf is flat. It plays an important role in the production of food. Leaves are mainly of two types : simple and compound leaves.

Simple leaf
(Ex. Hibiscus)

Compound leaf
(Ex. Rose)

The fruit : Fruits have different shapes. Fruits contain one or more seeds. The pods of beans and peas are actually fruits.

The root : Roots hold the soil firmly and anchor the plant. The main functions of the root are to absorb and transport water and nutrients from the soil. The roots of the carrot and radish also store food. There are two types of roots : taproot and fibrous root.

Taproot
(Hibiscus, Banyan)

Fibrous root
(Onion, Grass)

Need for classification of plants

Up to now, information about lakhs of plants has been collected. While studying the diversity in plants, they are classified for the sake of convenience on the basis of the similarities and differences in their structure, their organs and their other characteristics.

The scientist Carolus Linnaeus made the first scientific classification of plants. Initially, it was his method of classification that was used by all.

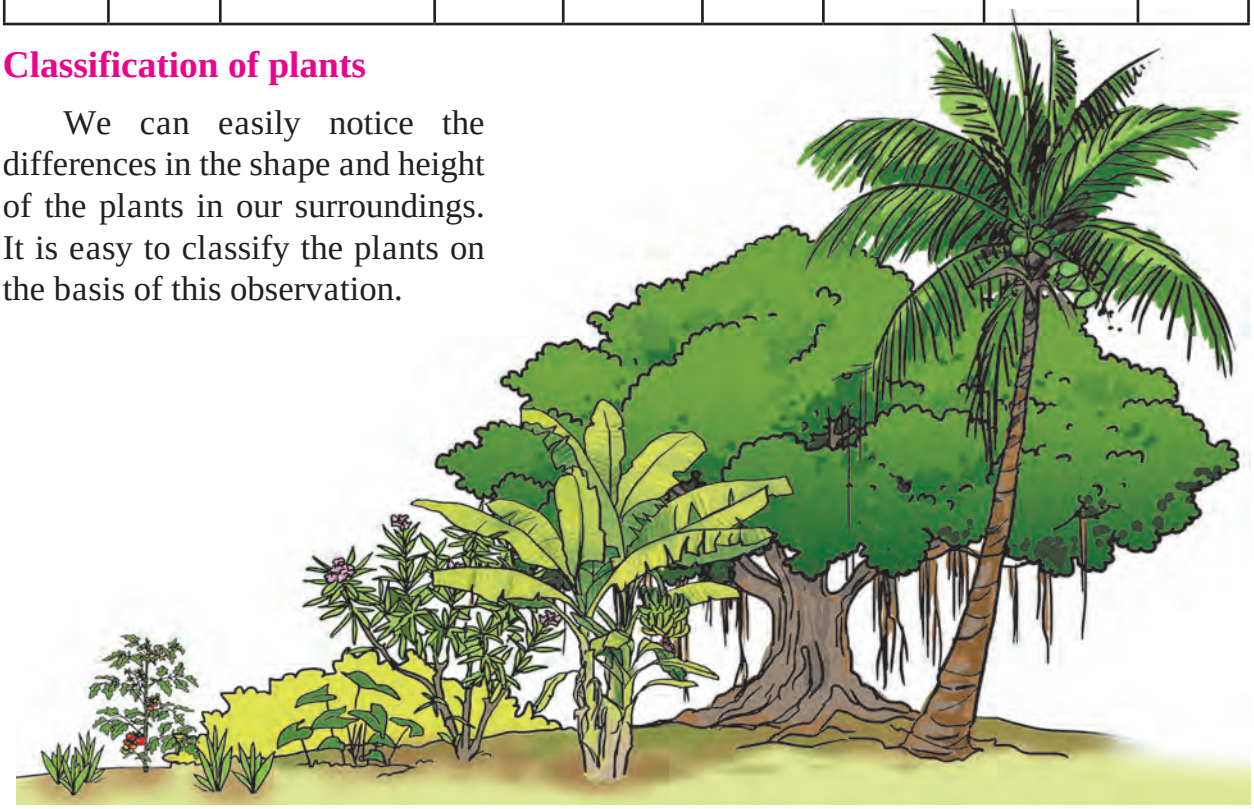
Observe and discuss.

Take a round through a garden or in your surroundings and list the plants that you see. Draw their pictures as well. Draw a table as shown below and complete it on the basis of the information you gather. Discuss it in the class.

Name of the plant	**Where does the plant occur/ grow**	**Nature of the stem** (Circumference, colour, bark, hard/soft, etc.)	**Height** (Short, medium, very tall, etc.)	**Branches** (Nature, number, etc.)	**Leaves** (Colour, shape, edge, etc.)	**Flowers** (Colour, fragrance, shape, etc.)	**Nature of the fruit** (Colour, shape, hardness or softness, etc.)	**Uses** (Which part is used.)
Rose								

Classification of plants

We can easily notice the differences in the shape and height of the plants in our surroundings. It is easy to classify the plants on the basis of this observation.



3.3 : Diversity in plants

Can you tell?

1. What are the similarities between a mango, a banyan and a tamarind tree?

Trees : Some plants grow tall. Their stem, or trunk, is hard and strong. They have branches at some height above the ground. They bear flowers and fruit for many years. Such plants are called trees. Trees are tall, big and **perennial**, i.e., they live for many years.

2. What are the similarities between the hibiscus, oleander and lantana plants?

Shrubs : Some plants grow close to the ground. They give out branches very close to the ground. They are shorter and smaller than trees, but they have a thick and hard stem. The oleander, hibiscus, lantana, *koranti* and rose are shrubs that may grow up to two to three metres.

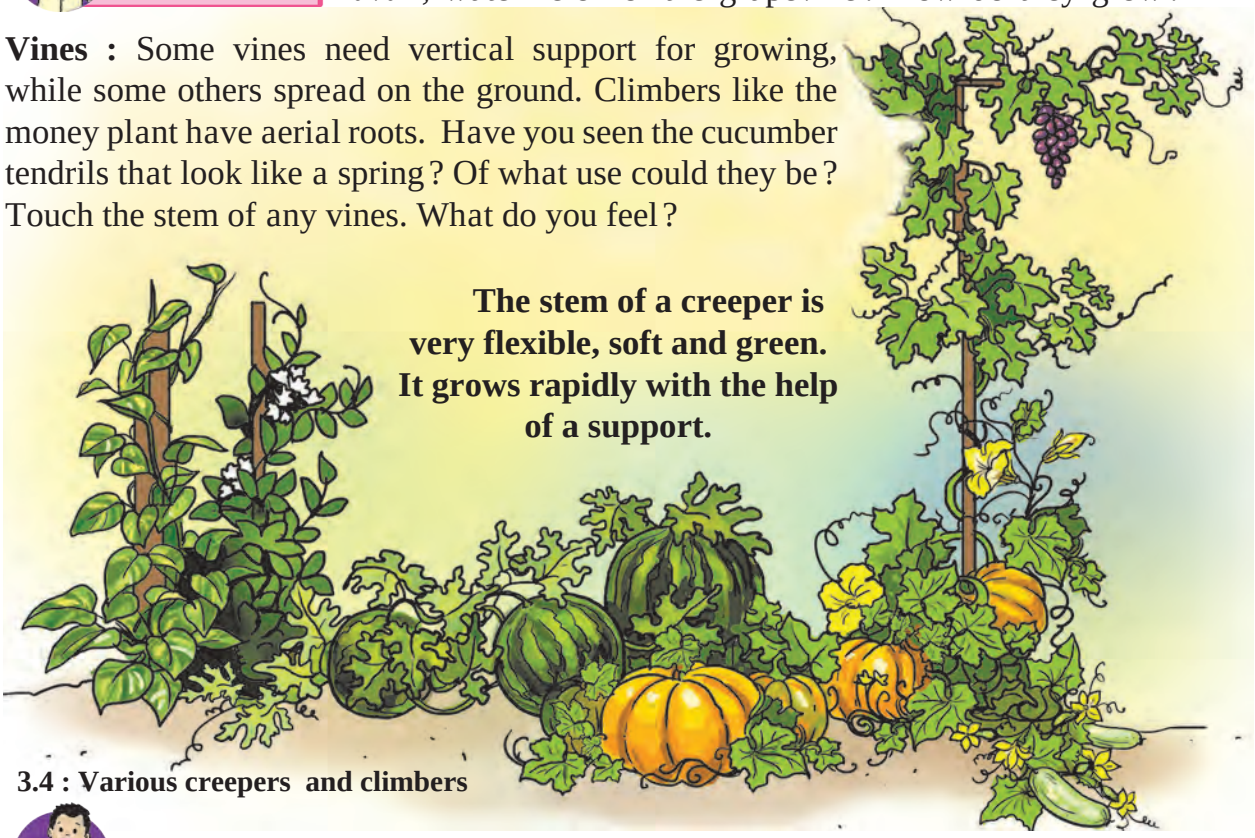
3. What are the similarities between the fenugreek and periwinkle plants?

Herbs : Herbs grow 1 to 1.5 metres tall. The stems of herbs are green and quite flexible as compared to those of trees and bushes. Herbs may live for a few months or up to two years.

According to the size and height of their stems, plants can be classified into three types : trees, shrubs and herbs.

Can you tell? Have you seen vines like the pumpkin, the railroad creeper, *kavali*, watermelon or the grapevine? How do they grow?

Vines : Some vines need vertical support for growing, while some others spread on the ground. Climbers like the money plant have aerial roots. Have you seen the cucumber tendrils that look like a spring? Of what use could they be? Touch the stem of any vines. What do you feel?



The stem of a creeper is very flexible, soft and green. It grows rapidly with the help of a support.

3.4 : Various creepers and climbers

Can you tell? For how many years do crops like bajra, wheat, corn, radish, marigold live?

The lifecycle of plants like jowar, sunflower is completed in one year. These plants are called annuals. The lifecycle of plants like the carrot, beetroot is of two years. They are called biennials. Shrubs like the hibiscus and oleander and trees like mango and gulmohur live for several years and bear flowers and fruit. They are called perennials.

According to the period of their lifecycle, plants are classified as **annuals**, **biennials**, **perennials**.

Can you tell? To which part of plants are butterflies and insects attracted?

Plants that bear flowers are called **flowering plants**, while the plants that never bear flowers are called **non-flowering plants**. Non-flowering plants may not have organs like roots, stems, leaves.

Use your brain power!

- What type of plants are toadstools and mushrooms?
- What type of plant is the fig?
- Do ferns, algae, money plant bear flowers?

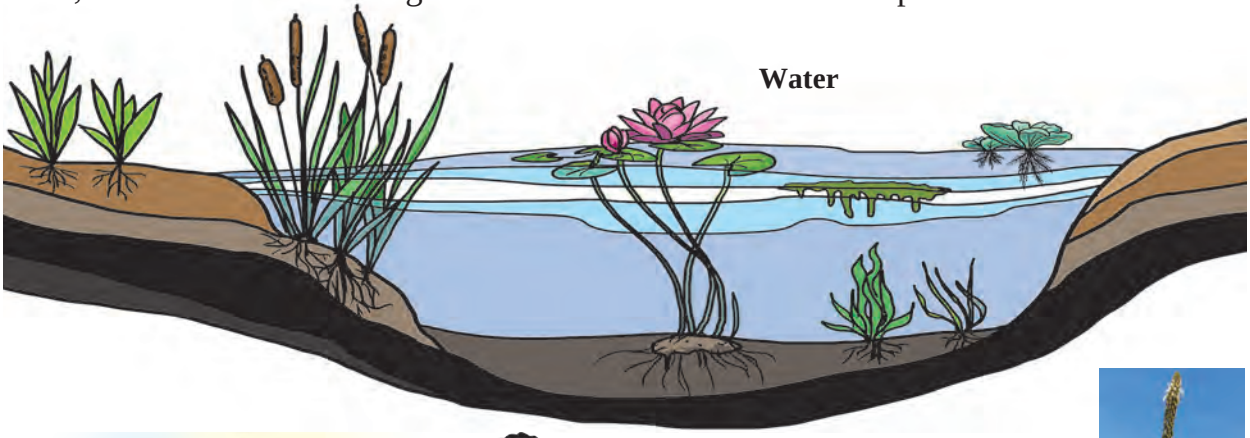
Do you know?

The world's largest flower is found in Indonesia. The diameter of the flower of the plant Rafflesia arnoldi is about one metre. The world's smallest flower is of the plant called Wolffia or duckweed. Its diameter is as small as 0.5 mm.

Can you tell?

1. Where does the pomegranate shrub grow?
2. Where does the lotus grow?
3. Where do bulrushes, the railroad creeper grow?
4. Where does the dodder plant grow?

We see different plants growing in different places around us. Plants can be classified according to their habitat or the place where they grow. Land, water, marshy areas, deserts and even a big tree are the various habitats of plants.



Water

A desert

Land

Use your brain power!

- Why does the water hyacinth float on water?
- Why is the stem of the cactus fleshy?
- What different criteria are used to classify plants?

3.5 : Habitats of plants

Diversity and classification in animals

Different animals have developed different shapes to survive in the environment. There is a great variety in the body structure of animals too. The amoeba that cannot be seen with our eyes, the huge elephant, the small snail, the fish that swims in water, a kite that flies high in the sky, butterflies that flit around flowers, a house lizard that crawls on a wall are all animals. Each has different characteristics.

Animals have body parts like a head, a neck, a torso, a tail and limbs for movement. They have various organ systems which carry on various functions inside their body. In this respect, too, there is a lot of diversity in animals.

Can you tell?

What are the differences in the body structure of animals like a snake, a lizard, a tiger, a fish, an eagle, a hen, a crab, a housefly, an earthworm, a crocodile and a grasshopper?

We see a variety in animals with respect to their food as well. Since animals depend on others for their food, they are found in places where food is available. Different animals have different methods of obtaining and eating food. This, too, leads to differences in their body structure.

3.6 : Diversity in animals

Try this.

Observe the animals in your surroundings. Make a list of their names. Complete the following table on the basis of the information obtained and discuss it in the class.

Name of the animal	What is their food? How do they eat it?	Where do they live?	The special feature that you found

You will not see all animals in your own surroundings. Why is it so? Which are the other animals that you know of, but have not seen? Collect information about them using the above table. Take the help of websites like www.earthlife.net, www.discovery.com, www.seaworld.org, www.kidsgowild.com, www.worldwildlife.org, www.nationalgeographic.com.

Try this.

Take a drop of water from a puddle and place it on a glass slide. Observe it under a microscope. What do you see?

When a drop of water from a puddle is seen under a microscope, innumerable microbes can be seen moving about in it. You will see the continuously moving amoeba. The paramoecium is also a **unicellular** animal like the amoeba.

A horse, a bear, a tortoise are **multicellular** animals.

Can you tell?

1. What is the chain of bones in the centre of our back called?

Animals with a vertebral column and those without it form two groups known as the **vertebrates** and **invertebrates**, respectively.

Snakes, birds, fish and kangaroos as also humans are vertebrate animals. Animals such as snails, cockroaches, earthworms do not have a vertebral column and therefore they are invertebrate animals.

2. Name some animals which lay eggs and others which give birth to their young ones.

We have learnt that producing another living thing like oneself is called reproduction. A hen lays eggs and hatches them. After a few days, the young chicks hatch out of the eggs. A cow gives birth to a calf. Before that, the calf grows within the cow's body. According to the mode of reproduction, animals are classified into two types, namely, **oviparous animals** which lay eggs and **viviparous animals** which give birth to their young ones.

3. Where are the animals, namely, a horse, a bear, a tortoise, an alligator, a fish, a deer and a frog to be found?

According to their habitat, animals are usually classified into **terrestrial** and **aquatic** animals. However, animals like a frog, salamander, toad live in both places, namely, land and water. Therefore, they are called **amphibious animals**.

A kite, an eagle, a crow, a butterfly, a honeybee all fly in the air, though they live in difference places. These animals are said to have an **aerial mode of life**.

Use your brain power!

What are the different criteria used to classify animals?

Always remember...

In the living world, a lot of diversity is seen both in animals and plants. Every plant and animal is unique. We should all make efforts to conserve this diversity in the living world.

What we have learnt–

- Plants are classified on the basis of their height and the shape of stems, period of life cycle and habitat.
- Animals are classified on the basis of the cell structure, vertebral column, method of reproduction and habitat.

Exercise

1. Match the pairs.

A Group	B Group
(a) Amphibian	(1) A Monkey
(b) Vertebrate	(2) A Snake
(c) With scales	(3) A Frog

2. Who is the odd one out?

(a) Fungus, mushroom, chrysanthemum, spirogyra
(b) Mango, banyan, palm, chick pea
(c) Grape, orange, lemon, hibiscus
(d) Sunflower, banyan, jowar, bajra
(e) Guava, radish, carrot, beetroot
(f) Deer, fish, man, worms

3. What is the difference ?

(a) Flowering plants – non-flowering plants
(b) A tree – a shrub
(c) Vertebrates – invertebrates

4. True or false?

(a) The snail is an aquatic animal.
(b) Amphibians can live in air and in water.
(c) The function of the brain is well developed in vertebrate animals.
(s) The amoeba is a multicellular animal.

5. Write two names of each.

(a) A flowering plant
(b) A non-flowering plant
(c) A tree
(d) A shrub
(e) A creeper
(f) An annual plant
(g) A biennial plant
(h) A perennial plant

6. Write answers to the following.

(a) What are the parts of a plant?
(b) What are the functions of the root?
(c) Why is it necessary to classify living things?
(d) What are the criteria used to classify living things?
(e) Tell some characteristics of creepers.
(f) Explain the characteristics of herbs with two examples.
(g) On the basis of which criteria will you classify plants and animals?
(h) What protects the bodies of animals?

7. Draw figures.

Draw the figure of a plant to show the parts, namely, the root, stem and leaves in it.

Activity :

- Visit a plant nursery and classify the plants there.
- Visit a zoo and obtain information about the diversity in animals.
- Write an essay on diversity in plants.
- Collect seeds of various plants during summer and throw them in open spaces (fallow land, moorland, hill, etc.) during the rainy season.

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