

# Getting To Know Plants

# 7

UNIT-III : THE WORLD OF THE LIVING

## IN THIS CHAPTER

- *Introduction*
- *Specific parts of plants*
- *Trees, herbs and shrubs*
- *Root system*
- *Shoot system*
- *Pollination*

### Introduction

When you go outside you observe that some plants are small, some very big, while some are just patches of green leaves, while some others have reddish ones. Some have huge red flowers some have tiny blue ones, while some have none. We can see a variety of plants existing all around us—near our homes in the school ground, in the parks and gardens, isn't it ?



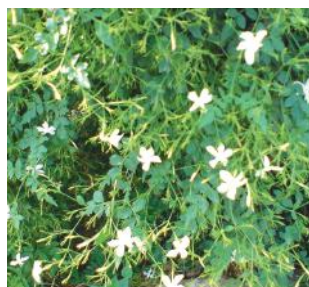
Let us get to know the different parts of any plant. This will help us to understand the differences between plants of different kinds.

Shrubs are medium sized plants with hard and woody stem, often profusely branches. Branches may arise from the early part of the stem. Lemon, corinda, henna, lantana, bougainvillea and pomegranate are some of the examples of shrubs.

Their life span covers many years though less than trees.



Mehandi



Jasmine



Pomegranate



Lemon

Some shrubs

Herbs are small plants with soft and delicate stems. They are generally smaller in size up to one metre and may live for 1–2 seasons. Examples of herbs are balsam, wheat, paddy, mustard and kochia.



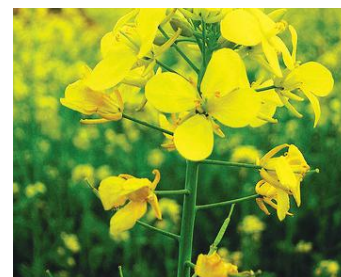
Wheat



Paddy



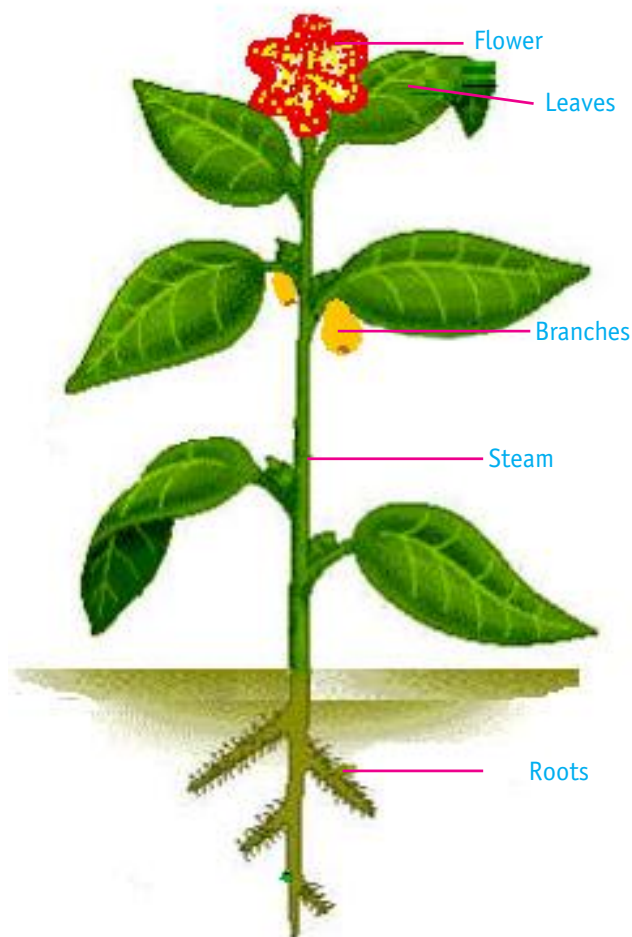
Balsam



Mustard

Some herbs

## SPECIFIC PARTS OF PLANTS



Look carefully at each plant that you see around. When you look at a plant what parts can you see above the ground ?

Can you label the stem, branches, roots, leaves, and flowers of the plant shown alongside in figure.

## TREES, HERBS AND SHRUBS

On the basis their shape, size and life span plants can be classified into trees, herbs and shrubs.

Trees are the most advanced plants. They have a tall and strong stem called trunk. The trunk may produce branches, twigs and leaves. Coconut and palm are also trees. Though they do not possess branches. Trees generally survive for many years.

Neem, sheesham, sal, teak, mango are a few examples of trees.

You know that plants have roots, stem, leaves and flowers as well as fruits. Let us

find out what type of function each of these parts performs.

There are two types of organ systems the root system and the shoot system.

### **A. Root System**

The part of the plant body which fixes it to the soil is called the root system. The root system is mainly of two types :

1. Tap root system
2. Fibrous root system



Fibrous root

1. **Tap root system** : A tap root system consists of one major root from which various minor branches arise in all directions. These branches arise in a cluster below the stem and spread out in the soil. Mostly flowering plants have tap root system. Mango, pea, mustard, guava etc. are the examples of tap root system.

2. **Fibrous root system** : Plants with fibrous roots do not have any main root. There is a bunch of roots shooting from the base of the stem and growing underground. Wheat and maize are well known plants with fibrous roots.



Tap root

## Do You Know ?

Roots Nodules : A natural gift.

On the roots of pulses and gram etc. rhizobium, a nitrogen fixing bacterium makes its home in the form of small swellings called nodules. Rhizobium can fix atmospheric nitrogen into its oxides which go into the soil and makes it fertile.

## Functions of Roots

Roots have following functions :

### Roots absorb water and nutrients from the soil.

We water the plants and add manure and fertilizers to the soil. This is because roots of the plants absorb water and nutrients from the soil.

Roots offer extra support :

Some plants whose stems are weak have additional roots. These roots help the plants to stand straight and grow above. Some additional roots hang from the banyan tree like ropes. For example, money plant and betel leaf (pea) have the additional roots.



Sweet potatoes Turnips



Carrots Onions

Food storing roots

### Roots store food

The tap roots of plants such as carrots, turnips and radishes are swollen and fleshy as they store food. The plant uses the food when required. We also eat some of these roots.

## B. The Shoot System

It is that part of the plant which grows above the soil. This includes stems, branches, leaves, flowers and fruits.

## Stem

The stem is the aerial part on which buds, leaves, flowers and fruits are borne. It grows from the plumule of embryo in the seed. It forms the main axis that connects the root system with the rest of the plant body. It grows above the soil and towards sunlight. It is covered by an outer covering which protects the internal parts of the stem.



## Functions of Stem

The stems of some plants are modified to carry out other functions. These special functions are :

### Storage of food

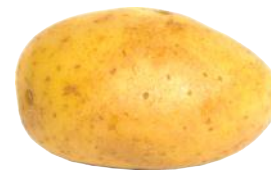
In certain plants, the stems grow underground and store the food made by the leaves. These stems never appear above the ground. Onion, ginger, potato are modified stems. These stems become packed with starch.



Ginger



Onion



Potato

Food storing stems

### Provides support

The stem keeps the plant erect and acts as a pillar supporting the branches, leaves and flowers.

### Helps in transportation of water and food

The stem transports water, minerals and other substances from the roots in the soil to all parts of the plant. Stem forms an important link between roots and other parts of the plant.

### Consists of important plant parts

The stem bears branches, flowers, leaves and fruits of a plant.

It supports leaves in such a way so that they may capture maximum carbon-dioxide and sunlight.

## The leaf

The leaf is a flattened, thin, green, lateral structure borne on the stem. You must have seen a variety of leaves of varied shapes, sizes, thickness and position of different plants.

The leaf is the part of the plant where most of the food is made by the process of photosynthesis. Therefore, leaves of plants are called food factory. They are normally green. They contain chlorophyll so as to appear green.

A leaf has three main regions :

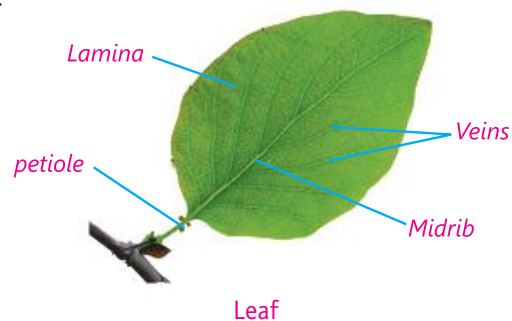
1. Leaf base
2. Stalk or Petiole
3. Lamina

Lamina is thin, flat part of the leaf. Most of the cells in which food making process photosynthesis takes place are in the lamina. The contribution of the stem into the lamina forms the mid rib which branches into a network of veins.

These veins contain much strengthening.

Material and keep the leaf stiff and flat. These veins transport water and minerals to the leaf and carry manufactured food away to other parts of the plant.

Leaves have tiny openings on their surface which are called stomata. The stomata takes in carbon dioxide which is needed to produce food through the process of photosynthesis.



## Do You Know ?

In Some plants like picture plant, leaf is modified into a pitcher with a lid, used to trap insects, hence they are called insectivores plant.

These stomata regulate water loss through the leaves of a plant. This regulating process is called transpiration.

## Functions of Leaves

In some plants, leaves too are modified to do some specific function, like the roots and the stem.

1. Climbers have weak stems. These plants, such as a pea plant, have modified leaves in the form of coil like structures called leaf tendrils. They help the plant in climbing.
2. Leaves lose water from their surface and this process is known as transpiration.
3. Some leaves are modified to store food. They become swollen and fleshy such as onion, garlic etc.
4. Leaves of some plants even have buds that produce new plants such as begonia and bryophyllum.



Modified leaves of onion to store food



Leaf-buds



Leaf tendrils

## THE FLOWER

You might have seen many plants with flowers. Some plants are identified by recognizing their flowers just because different flowers have different smell. However some flowers do not have any smell. Flowers are of many sizes, shapes and colours.



Daffodil



Tulip



Rose



Pansy

A flower usually develops on a branch from a bud. A stalk called the pedicel, supports the flower on the branch. The upper swollen end of the pedicel is called the thalamus.

## Parts of a Flower

A flower has four main parts :

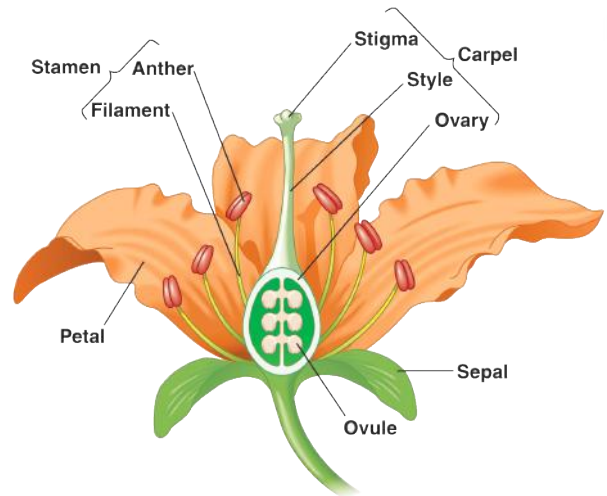
1. The calyx
2. The corolla
3. The androecium
4. The gynoecium

Calyx is the outermost whorl of a flower. It is usually green in colour. The individual members of the calyx are called sepals.

They protect the young flower bud.

Corolla is the second whorl of the flower. The individual members of the corolla are called petals. The petals protect the essential whorls. Androecium is the third whorl from outside. It is the male part of the flower. It consists of structures called stamens. The number of stamens in different flowers may vary from a few to a large number. Each stamen has two main parts : a filament and an anther. The anther produces pollen grains which take part in reproduction.

Gynoecium forms the innermost whorl of the flower. It is the female part of the flower. It is composed of one or more carpels or pistils. Each carpel is composed of stigma, style and ovary.



Structure of flower

## Functions of Flower

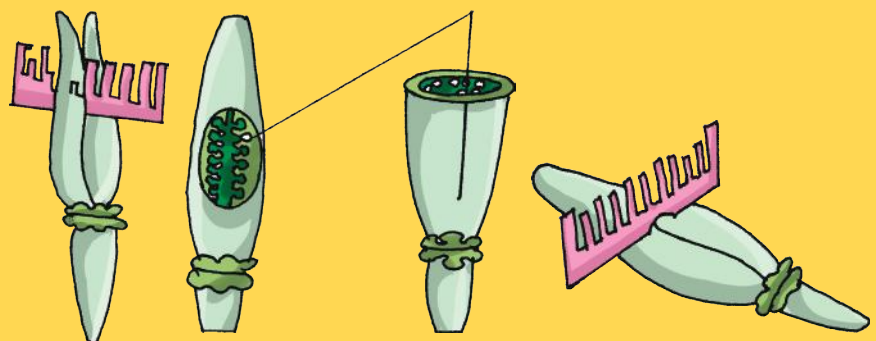
- Flowers help in reproduction.
- Flowers like rose and jasmine are important ingredients of perfume.
- Flowers with their variety of colours are used to decorate houses roadsides parks and other places.



### Activity Time

Let us study the structure of ovary. Take two ovaries from different flowers. Cut them in two different ways as shown in the figure.

To prevent them from drying put a drop of water on each of the two pieces of the ovary, you have cut.



Observe the inner parts of the ovary using a lens. Do you see some small bread like structures inside the ovary ? They are called ovules.

## POLLINATION

The process of transfer of pollen grains from anther of a flower to the stigma of the same or another flower is known as pollination. This is the first step of sexual reproduction in a flowering plant.

### Kinds of Pollination

There are two kinds of pollination : self-pollination and cross-pollination.

- 1. Self-pollination :** When pollen grains of a flower are transferred to the stigma of the same flower or another flower borne by the same plant, it is termed as self-pollination.

Mirabilis, potato, rice, wood sorrel, etc. are self-pollinated flowers.

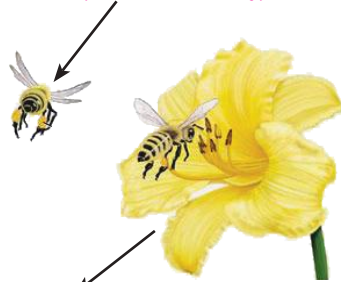


Self pollination

1. Pollen from stamens stick to a bee as it visits a flower to collect food.



2. The bee travels to another plant of the same type.



3. Pollen on the bee sticks to a pistil of a flower on the other plant.

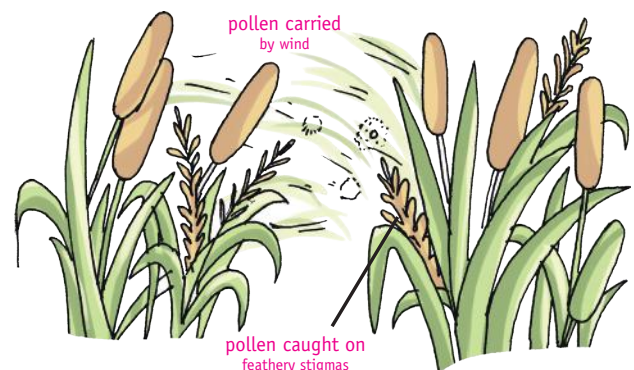
- 2. Cross-pollination :** When the pollen grains are transferred from anther of one flower to the stigma of another flowers of same type borne on another plant, it is termed as cross-pollination, e.g. papaya.

### Agents of Pollination

Pollination takes place by various agents like wind, water, birds, animals and insects.

### Pollination by Wind

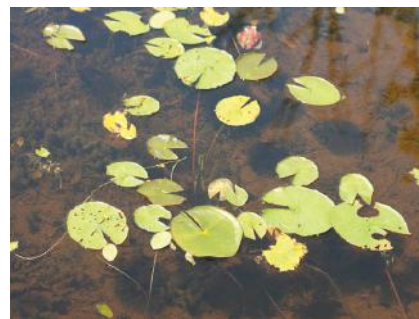
Some plants like maize and wheat have dry pollen grains in large quantity. As the flowers of these plants become mature, pollen grains are blown away by the wind. Some of them fall on the stigma of a flower of the same type, thus, causing pollination. Such type of pollination is called wind-pollination.



Wind pollination

## Pollination by Water

Some hydrophytes like Hydrilla and Vallisneria float completely submerged in water. The flowers of these plants float on the surface of water. When they come in contact with a female flower, the pollen grains fall on the stigma, thus effecting pollination.



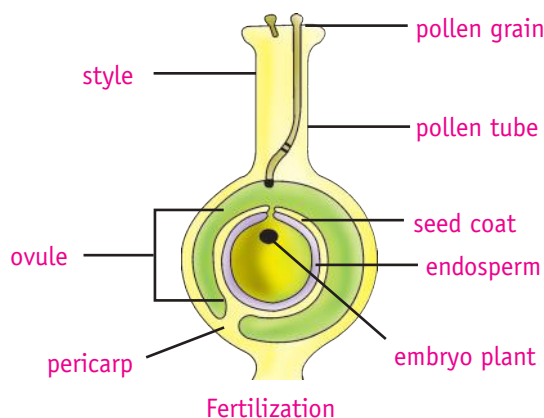
## Pollination by Insects

Insect like bee and butterfly, suck nectar from flowers. When these insects alight on a flower, the pollen grains stick to their bodies. When these insects go to another flower, the pollen grains are transferred to the stigma of the other flower, thus effecting pollination. Orchids, harsingar, salvia, rafflesia, etc., are insect pollinated flowers.

After reaching the stigma, the pollen grains develop the pollen tube. Inside the pollen tube are produced two male gametes. The two gametes fuse together to form zygote. This fusion is known as fertilization.

## Fertilization

The process of fusion of a male cell and a female cell in the ovule is called fertilization. After fertilization, most parts of a flower wither and significant changes occur inside the ovary. Ultimately, ovule of the flower changes into seeds and the ovary changes into fruits. The seeds can be seen inside the fruit.



## Know the Keywords :

Root : Part of a plant which is found under the soil.

Shoot : Part of a plant above the soil.

Calyx : Outermost whorl of a flower.

Corolla : Second whorl of a flower, usually brightly coloured.

Stamen : Male reproductive organ of a flower.

## Point to Remember

- A tap root system consists of one major root from which various minor branches arise in all directions.
- The stem is the aerial part on which buds, leaves, flowers and fruits are borne.
- The leaf is a flattened, thin green, lateral structure borne on the stem.
- The process of transfer of pollen grains from another of a flower to the stigma of the same or another flower is known as pollination.



## EXERCISE TIME

### A. Answer the following questions :

1. How is the root system useful for plants ?
2. What is the difference between the tap root system and fibrous root system ?
3. Write four functions of stems.
4. Write important functions of leaf.
5. Describe the basic structure of a flower with neat and clean diagram.

### B. Fill in the blanks :

1. The part of a plant under the ground is called \_\_\_\_\_ (root/shoot).
2. The part of a plant above the ground is called \_\_\_\_\_ (shoot/root).
3. \_\_\_\_\_ are the kitchen of green plants (stems/leaves).
4. Neem, sheesham are the examples of \_\_\_\_\_ (shrubs/herbs/trees).
5. \_\_\_\_\_ is a herb (balsam/lantana).

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

1. Leaves hold the plant upright.
2. Stem absorbs water and minerals from the soil.
3. Roots conduct water to the leaves.
4. The sugarcane has tap roots.
5. The parts of flower are stamens, sepals, petals, ovules.

### D. We eat different parts of different plants. For each plant, write the part of the plant that you eat :

- |              |       |                |       |
|--------------|-------|----------------|-------|
| 1. carrot    | _____ | 7. mint        | _____ |
| 2. sugarcane | _____ | 8. radish      | _____ |
| 3. tomato    | _____ | 9. mango       | _____ |
| 4. ginger    | _____ | 10. apple      | _____ |
| 5. pea       | _____ | 11. groundnut  | _____ |
| 6. cucumber  | _____ | 12. watermelon | _____ |

**E. Strike the odd one out, also give reasons :**

1. herbs, trees, shrubs, roots
2. ovules, midrib, petiole, lamina
3. stem, root, flowers, leaves

**F. Tick (✓) the correct option :**

1. The main function of the root is :

- (i) to store food
- (ii) to absorb water and minerals from soil
- (iii) none of the above

2. Which of the following possesses fibrous roots ?

- (i) balsam  (ii) wheat  (iii) tulsi

3. Which plant has a tap root system ?

- (i) paddy  (ii) mustard  (iii) maize

4. Which of the following function is performed by the stem ?

- (i) it does not transport food made by leaves
- (ii) it keeps plant straight and gives support to the plant

5. Carpel is :

- (i) the female part of a flower
- (ii) the male part of a flower
- (iii) the innermost whorl of the flower

6. Ovules :

- (i) change into seeds
- (ii) are present in a ovary
- (iii) change into fruits



Creative Work

- **Take a potted plant to demonstrate that water is given off during transpiration. Take the help of your teacher.**