GETTING TO KNOW PLANTS

Plants show a big variety. Some plants are very large, some are small and some are tiny. On the basis of their size and shaps, plants have been divided into the following three categories.

(i) Herbs (ii) Shrubs (iii) Trees

Plants with green and tender stems are called herbs. They are usually short and may not have many branches.

Some plants have the stem branching out near the base. The stem is hard but not very thick. Such plants are called shrubs.

Some plants are very tall and have hard and thick brown stem. The stems have branches in the upper part, much above the ground. Such plants are called trees.

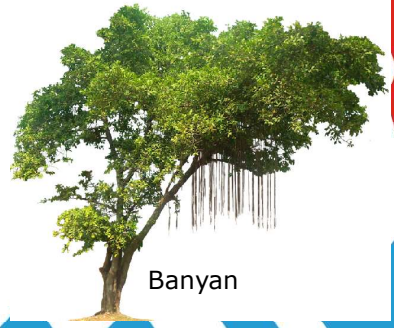
Gram

Mint

Rose

Duranta

Some Herbs **Some Shrubs**



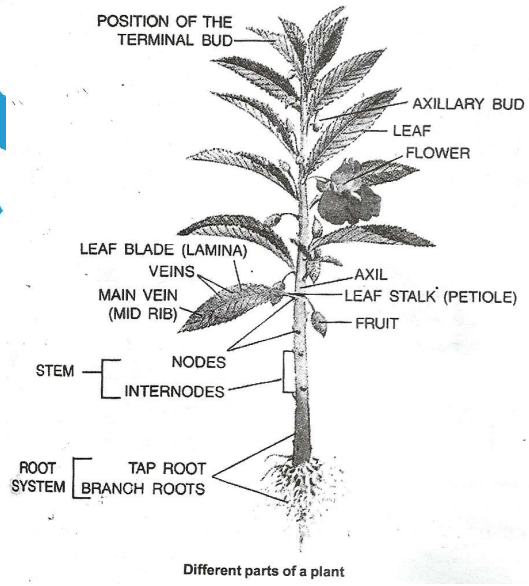
Banyan

Neem

Some Trees

DIFFERENT PARTS OF PLANT

1. Stem **2. Branches** **3. Roots** **4. Leaves** **5. Flower**



Different parts of a plant

CREEPERS

Plants with weak stems that can not stand upright and spread on the ground are called creepers eg. Bottie gourd, bitter gourd, pumpkin.

Pumpkin: A creeper Plant

CLIMBERS

Plants which take support on neighbouring structure and climb up are called climbers eg. Betel, grapes, Money plants.

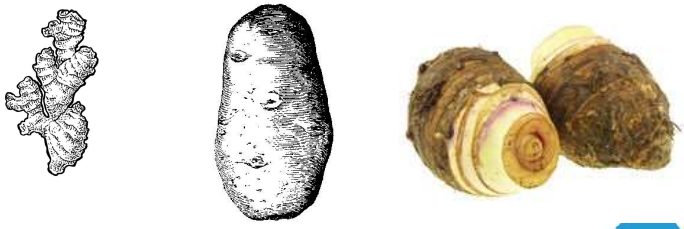
Pea: Some Climbers

STEM

- The stem is the aerial part on which buds, leaves, flowers and fruits are borne.
- It grows from the plumule of the embryo of a seed.
- It form the main axis that connects the root system with the rest of the plant body.
- It grows away from the soil and towards sunlight.
- The stem may be branched or unbranched.
- The young stem is usually green and soft though it is hard and woody in some plants.
- Stem conduct water.
- Minerals dissolved in water also move up in the stem along with the water.
- The water and minerals go to leaves and other plant part attached to the stem through narrow tube inside the stem.
- The stem conducts water from roots to the leaves (and other parts) and food from leaves to other parts of the plant.
- The leaves grow on the stem at difinite points called nodes.
- There may be one or more leaves at a node.
- The part of the stem between two successive nodes is the internode.
- The angle formed between the base of a leaf and the stem is termed as leaf axil.

FUNCTIONS OF STEM

1. **Support :** It supports branches, leaves, flowers, fruits and buds.
2. **Transportation :** It helps in the transportation of water and minerals salts absorbed by the roots of the plant and helps in supply of food from the leaves to various parts of the plant.
3. **Food storage :** The stem also functions as the storehouse of food material as in case of potato, garlic, ginger.



Ginger Potato Colocasia

Some Storage Stems

4. **Climbing :** In weak plants like the gourd, bitter gourd the stem gets modified to form tendrils which help the climbers in climbing.
5. **Photosynthesis :** The green stem can make food for the plant as in the case of cucuts.
6. **Perennation :** Certain underground stems like potato, garlic and ginger help the plant to tide over unfavourable climatic conditions this is called perennation.

MODIFICATION OF THE STEM

(i) **Support :** In plant such as bean, sweet pototo and morning glory the stem spirals around a support as it is weak and slender. Climbers are also known as twiners.

(ii) **Making food :** In plants such as cacti which grow in dry climates, leaves are reduced to spines or scales to prevent loss of water. Such plants have a flattened or cylindrical green stem to manufacture food. It also stores food and water for the plant.

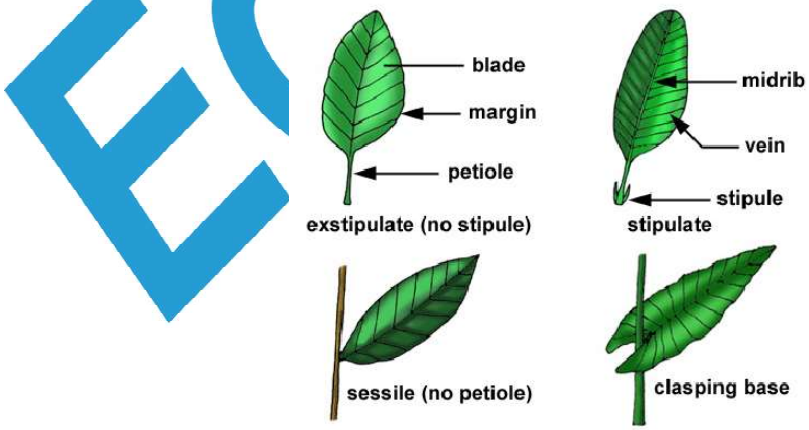
(iii) **Storage of Food :** In some plants the entire stem remains underground and only leaves and flowering shoots are seen above the ground. It is thickened to store excess food which helps plants to survive through long bad seasons. Examples are ginger, potato and onion.

LEAF

Terms related to leaf :

(i) **Petiole :** The parts of a leaf by which it is attached to the stem is called petiole.

(ii) **Lamina :** The broad green part of the leaf is called lamina.

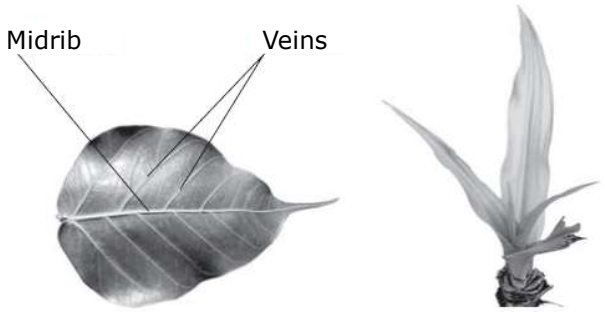


Parts of Leaf

(iii) **Veins :** Lines on the leaf are called veins.

(iv) **Midrib :** A thick vein in the middle of the leaf called the midrib.

(v) **Leaf venation :** The design made by veins in a leaf is called the leaf venation.



Leaf venation (a) reticulate and (b) parallel

LEAF VENATION IS 2 TYPE

(a) Reticulate venation :

If leaf design made by veins in a leaf is net like on both sides of midrib the venation called Reticulate. e.g. Leaves of Mango, Pea etc.

(b) Parallel venation :

If veins are parallel to one another in a leaf then venation called parallel venation. eg. leaves of grass.

FUNCTIONS OF LEAF

1. **Manufacturing of Food :** The leaf is called "the food factory" of a plant. Green plants make their own food by the process photosynthesis. Leaves prepare their food in the presence of sunlight and green coloured substance (chlorophyll) present in them by utillizing carbondioxide and water by releasing oxygen.
2. **Transpiration :** The excess of water absorbed by the root hairs lost through the stomata. Process through which water comes out of leaves in the form of vapour. Plants release a lot of water into the air through this process.
3. **Gaseous exchange :** Exchange of gases occurs during respiration and photosynthesis.
4. **Vegetative propagation :** In some plants, leaves bear buds in the marginal notches from which new plants grow and develop. eg. Bryophyllum, Begonia.

DID YOU KNOW ?
Why are potato, onion and ginger not considered as roots ? These have nodes and internodes and scaly leaves. Why are leaves reduced to spines in a cactus plant ? In a xerophytic plant, this modification helps to reduce water loss from the plant body. Why is stem fleshy and green in a cactus plant ? Stem takes over the function of leaves as the leaves are reduced to spines.

TYPES OF LEAF

- **Simple and compound leaves :**

(i) A simple of leaf is one that consist of a single lamina, which is not divided into segments. Plants like mango, guava and money plant have simple leaves.

(ii) A compound leaf is one in which the lamina is divided into several small segments or leaflet each attached to the same petiole. the leaflet may be arranged on opposite sides of the petiole like in rose and neem or may arise from a common point at the petiole like in palm leaves.

ARRANGEMENT OF LEAVES

Leaves can be arranged along the stem in different ways.

(i) **Alternate arrangement :** In some plant, a single leaf grows from each point eg Mango, sun-flower and mustard.

(ii) **Opposite arrangement :** In some plants two leaves grow opposite to each other from the same node. eg. Guava and Tulsi.

MODIFICATION OF THE LEAF

(i) **Leaf tendrils :** In plants like pea and sweet pea leaves are modified into long, slender, coiled structures called tendrils.

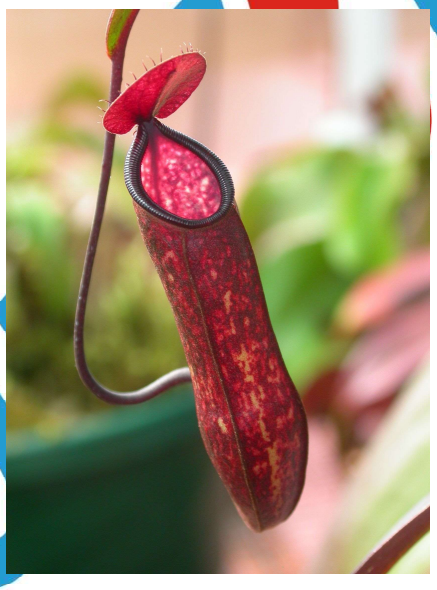
- These are used by the plants for climbing.
- Leaves are used by the plants modified to help the plant climb and support.

(ii) **Leaf spines :** In cacti and plants such as pineapple the leaves are modified into spines that are sharp, pointed structures.

- These structure protect the plant from grazing animals.
- In dry area, the leaves are reduced to spines to prevent loss of water by transpiration.

(iii) **Leaves modified to eat insects :** In some insectivorous plants, the leaves are modified into pitcher or bladder like structures to trap, hold and digest insect and small animals.

- These trapped insect are digested within these structures and serve as a source of nitrogen to the plant.



Pitcher Plant

ROOT

The roots help in holding the plant firmly in the soil they are said to anchor the plant to the soil.

TYPE OF ROOT

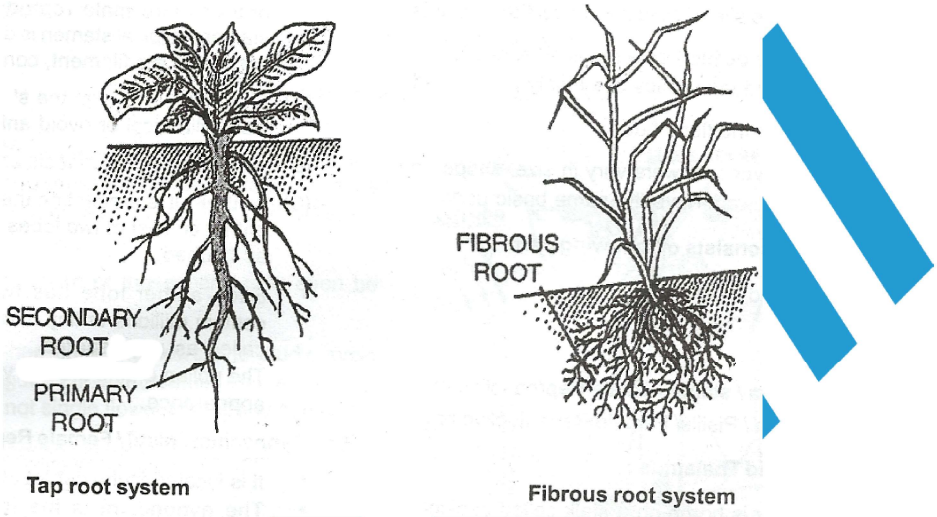
(1) Tap roots **(2) Fibrous Roots**

1. **Tap roots system :** When a dicot seed (seeds with two seed leaves) germinates, the radicle gives rise to a long deep = seated root. It is thick and large this is called the primary root or tap root.

- The primary root gets divided into branches which are known as secondary roots.
- The branches of secondary roots are called tertiary roots.
- The primary root is longer than its branches and grows vertically downward into the soil.
- It is found in most of the dicot plants like castor, pea, mango, gram and beams.

2. Fibrous Roots System :

- In the fibrous root, the primary root is short - lived and is replaced by a cluster of thin fibre like roots. These are called fibrous roots.
- These roots spread from a common point and are about the same size.
- They spread out in the soil and give firm support to the plant.
- They are found in most of the monocot plants.
  (Plants that have seeds with single seed - leaf)
  Like wheat, maize, barley and grasses.



Tap root system

Fibrous root system

DID YOU KNOW ?
Leaf venation and the type of roots in a plant are related : Plants having leaves reticulate venation have top root while plants having leaves with parallel venation have fibrous roots.

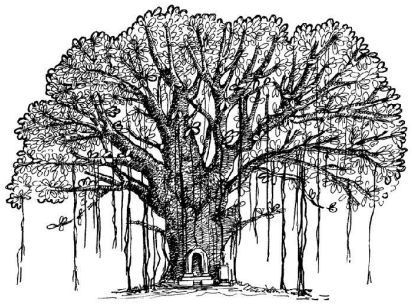
FUNCTIONS OF ROOTS

1. **Fixation :** It fixes the plant firmly in the soil.
2. **Absorption :** The root hairs help in the absorption of water and minerals from the soil.
3. **Prevention of soil erosion :** Roots bind the soil finely and prevent soil erosion.
4. **Storage :** In plant like carrot, turnip, radish and sweet potato and tapioca, the roots are modified for the storage of food.

SUPPORTING ROOTS

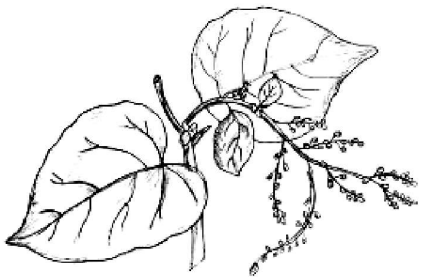
- In plants such as black pepper, money plant and beetel the roots help the plant to climb up a support as the stems are too weak to stand on their own Hence they are kown as climbing roots
- In plant such as banyan new roots grow downwards from the main stem or branches. These are aerial roots that grown towards the soil and act as pillar to support the plant. They are know as prop roots.

DIFFERENCES BETWEEN ROOT AND STEM	
Root	Stem
Nodes and internodes absent.	Nodes and internodes present.
Never green.	Often green.
Leaves and buds absent.	Bears leaves and buds
Generally develops below ground.	Generally develops above ground.



Prop Root
(Banyan)

Stilt Root
(Zea Maize)



Climbing Root
(Money Plant)

Modification of Roots for Support

FLOWER

- The Flower is the site of sexual reproduction in plants.
- A flower many be defined as a modified shoot in which nodes and internodes are highly condensed.
- It develops from the floral bud.

Parts of a Flower : Flowers vary in size, shape and colour but all flowers have the same basic parts.

A Flower consists of following parts :

- Pedicel and Thalamus
- Calyx
- Corolla
- Androecium/ stamen/ Male Reproductive organ
- Gynoecium/ Pistils/ Femals Reproductive organ.

(i) Pedical and Thalamus :

- The Flower is borne on a stalk called pedicel.
- The upper most end of the pedicel is some what swollen. This swollen part of the pedicel is known as the Thalamus.

(ii) Calyx : It is the First outermost whorl of a Flower.

- It consist of leaf like structures called **sepals.**
- Sepals are generally green in colour and manufacture food.
- They also protect the new delicate inner parts of the flower during the bud stage.

(iii) Corolla : It is the second whorl of a flower.

- Each segment of the corolla is known as a **petals.**
- Petals are usually brightly coloured due to the presence of pigments.
- The bright colour, sweet smell and nectar attract the insect which in turn, help in pollination.

(iv) Androecium/ stamen/ Male Reproductive organ :

- It is the third floral whorl which is composed of one or more male reproductive organs called stamen A typical stamen is differentiated into three parts they are filament, connective and anther.

(A) Filament : It is form the stalk that bears more or less cylindrical or ovoid anther

(B) Connective : It connects anther to filament.

(C) Anther : It is present on the top of filament. Each anther consist of two lobes that is why it is called as bilobed.

- Each anther lobe has two pollen sac which contain millions of tiny micorscopic pollen grain, called as microspores.
- The pollen grains are like yellow dusty powder in appearance.

(iv) Gynoecium/ Pistils/ Femals Reproductive organ :

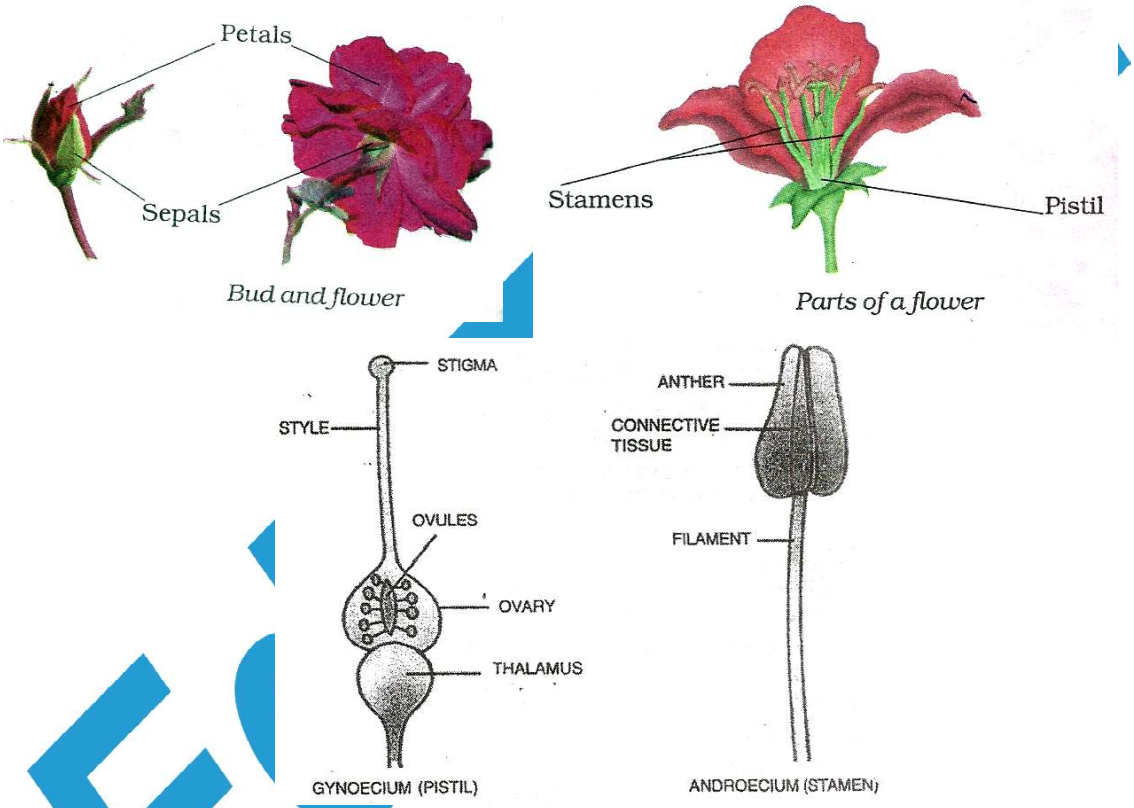
- It is located in the centre of flower.
- The gynoecium is the fourth whorl which is composed of one or more carpels.
- The freely occuring units of the carpels in a flower are called pistils.
- Each pistil usually consist of three distinct parts :
  (A) ovary (B) Style (C) Stigma

(A) **Ovary :** It is a basal swollen part of the pistil. The ovary bears the ovules on a raised tissue called the placenta.

(B) **Style :** From the top of the ovary arise a long elongated structure which connects the stigma with ovary. It is meant for raising the level of the stigma.

(C) **Stigma :** The terminal rough, hairy and sticky.

- The stigma is normally rough, hairy and sticky.
- It is meant for receiving pollen grains during pollination.



Different parts of a flower

- NOTE : Structure of the flower is not always the same. The number of sepals, petals, stamens and pistils may also be different in different flowers.
- Sometimes, some of these parts may even be absent.
- NOTE : When choosing flowers to study, avoid using Marigold, chrysanthemum and sun flower. These are not single flowers but group of flowers.