

9 Plants : Parts and Functions

What kind of plants have you seen at home and outside? You must have observed a variety of plants; some are big and some are small. We can find plants near our home, in the school campus, on the way to school, in the parks and almost everywhere.

- Are all plants similar?
- What are the similarities among them?

Let us get to know more about plants, especially about their parts and functions.

Parts of plants

We know that we have different parts in our body. In the same way plants also have different parts. Do you know them? Here is a plant . Try to name its parts. Which plant is this?

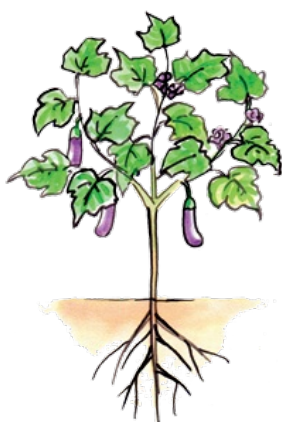


Fig. 1

In this chapter, Let us try to understand about different parts of plants through activities. For this, make groups of 4-5 students. Each group will collect 5 to 6 different types of plants along with their roots. You can collect different small plants from your garden or surroundings but be careful not to damage too many plants.

Activity-1: Identification of plant parts

Observe the collected plants and try to identify their parts. Take the help of Fig. 1 and write your observations in Table 1 given on the next page.

If you don't know the name of any of the plants you can give them a number. You can take the help of your teacher, a gardener or some one else to find the name of the plant. Based on the observations in the Table 1, let us discuss the following questions.

Did you find any plant which does not have roots?

Are the leaves of all the plants similar in size?

Is there any plant without flowers?

What are the common parts that you observe in all plants?

A notch in a tree will remain the same distance from the ground as the tree grows.

Table 1

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S.No	Name of the plant	Root Yes/No	Stem Yes/No	Leaves Yes/No	Flower Yes/No
1	Tridax plant	Yes	Yes	Yes	Yes
2	Plant No. 2				
3					
4					
5					

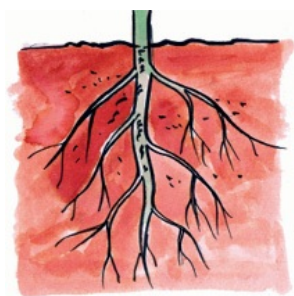


Fig. 2(a)

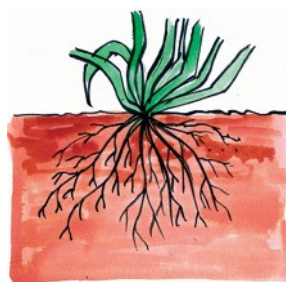


Fig. 2(b)

There are variations in the size and shape of plants but generally all plants have roots, stems and leaves. Have you ever thought about the importance of leaf, stem and roots in plants? What is the role of plant parts? Let us try to understand these things.

Roots: Different types of roots

Observe the roots of the plants you collected. How are they?

Do all plants have similar types of roots?

Is there any difference?

Compare the roots of your sample plants with Fig. 2(a) and Fig. 2(b). Write 2(a) or 2(b), in the column 'roots are similar to', according to your observations.

Table-2

S.No	Name of the Plant	Roots are similar to Fig
1	Tridax plant	2a
2	Plant No. 2	
3		
4		
5		

Banana oil is made from petroleum.

- In Fig. 2(a), how does the middle root look like?
- Compare this middle root with the remaining roots of the plant shown in Fig. 2(a).

- Do you find any such main root in plant shown in Fig. 2(b)? How are the roots of this plant?
- Do you find any other differences between Fig. 2(a) and Fig. 2(b)

In some plants, the main root becomes thick and has thin rootlets. This main root is known as **tap root** (Fig. 2(a)) and the rootlets are called lateral roots.

In some plants we find small hair-like roots arising from the base of the stem. This type of root system is known as **fibrous root**. Here all roots are similar (Fig. 2(b)) and there is no main root.

Function of the roots

- In activity-1, could you pull out the plants easily from the soil? Or was it difficult? Think why?

Observe the roots of the plants; soil is attached to the roots. Roots help to fix the plant tightly to the soil, so we cannot easily uproot the plant.

Do you know why the roots penetrate deep into the soil?

Activity-2: Absorption of Water

Take two glass tumblers filled with water. Collect two plants having soft stems, along with their roots.



Plants in water without ink



Plants in water with red ink

Fig. 3

84% of a raw apple and 96% of a raw cucumber is water.

Add colour (red ink) in one of the tumblers. Place the plants in each of the tumbler (Fig. 3). Let them be for 2–3 hours and then record your observations.

- Why do you think we added red ink in one tumbler?
- Did you see any red spots in the stem or other parts of any of the plants?
- Why did red spots appear on the stem or flower?

We can conclude that roots help in taking up of water from the soil. They do this by absorption. Minerals present in the soil are also absorbed along with the water.

Do you know?

Some plants store food in roots and stems. Some plants like radish, carrot, beetroot store food materials in their roots. These roots bulge out and called tuberous roots. Can you give some more examples. Carrot, sweet potato are eaten even when raw!



Fig. 4

Parts of a leaf

Leaves are another important part of plants. Most plants that we see in our surroundings have different types of leaves.



Fig.5

Midrib
Lamina
Veins
Petiole
Leaf base

Observe the given picture of a leaf and its parts (Fig. 5).

- Where is the leaf attached to the stem?
- What is the flat portion of the leaf called?
- What do you call the small line like structure in the flat portion of the leaf?

- Which part connects leaf lamina with stem?

A leaf contains leaf base, a stalk like structure called petiole and lamina.

Pistils have three parts – the stigma, the style, and the ovary.

Activity-3: Are all leaves same?

Observe the leaves of the plants that you collected in activity 1. How are they? Are all the leaves of the same size and shape? See Fig. 5 showing a leaf and its parts.

Compare the leaves of the plants, collected in activity 1, with Fig. 5. Write your observations in table 3. You can also draw what you see in the 'shape' and 'edge' columns if describing is difficult.

Table 3

S.No	Name of the plant	Leaf base Yes/No	Petiole Yes/No	Lamina Yes/No	Shape of the leaf	Edges of the leaf
1	Tridax plant					
2						
3						
4						
5						

- What are the common parts that you observe in all leaves?
- Do all the leaves have the same shape?

Venation

Observe the leaf lamina carefully. What do you see? You may see some thin line- like structures spread over the leaf.

Activity-4: Venation

The leaf lamina usually consists of a midrib, veins and veinlets arranged in the form of a network. To understand this venation let us do an activity.

Put a leaf under a white sheet of paper or a sheet in your notebook. Hold the tip of a pencil flat and rub it on the paper. Did you get any impression? Is this pattern similar to that on the leaf?

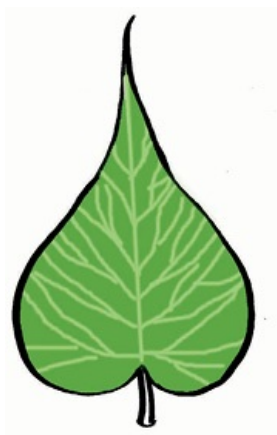
These lines on the leaf are called veins. The long vein present in the middle of the lamina is called midrib. The branches arising from the midrib are called veins and the even finer divisions are veinlets. The arrangement of veins in the lamina is called venation. Venation acts as a skeleton of the leaf and give it a shape and support. Think what would happen if there are no veins in the leaf !

Petals are usually colorful, and they attract insects and birds that help with pollination.

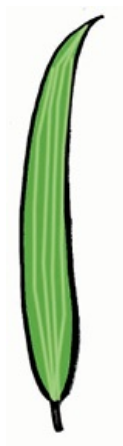
Activity-5: Types of Venation

Observe the venation of the leaves that you collected in activity 1. Now compare them with the venations of the leaves shown in Fig. 6.

Record your observations in table 4.



Reticulate Parallel
(web-like) venation



Parallel
venation

Fig. 6

Table 4

S.No	Plant	Venation(Reticulate/Parallel)
1		
2		
3		
4		
5		

Now compare the results obtained in table 2 with table 4.

- What type of roots are there in plants having parallel venation in their leaves?
- What type of roots are there in plants having web-like venation in their leaves?
- Is there any relation between venation and root system?

You will see that the plants with tap root system have leaves with web-like or reticulate venation and plants with fibrous roots have parallel venation.

Functions of a leaf

Leaves play an important role in the life of plants. Plants also breathe like us. Do you know which part of the plant acts as their nose?

Activity-6: Stomata Observation

Take a fleshy leaf. Peel the outer layer of the leaf and place it on a slide. Put a drop of water on it and observe it under a microscope. Try to find some bean shaped parts.

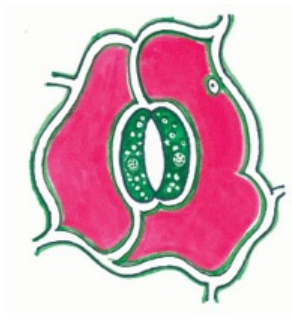


Fig. 7

Pistils have three parts – the stigma, the style, and the ovary.

Compare what you see under the microscope with Fig. 7.

The bean shaped part that you see in the leaf acts like our nose. These are called stomata. It is useful in the exchange of gases between the plant and atmosphere.

Do you know?... In Warangal district, there is a traditional cottage industry where pictures of various traditional and mythological figures are drawn with bright colours on dried leaves. This artwork is famous throughout the world.

Activity-7: Transpiration

Do you know that excess water is removed in the form of vapours from the leaf surface. To understand this let us do the following activity. Choose a bright, summer day to do the activity.

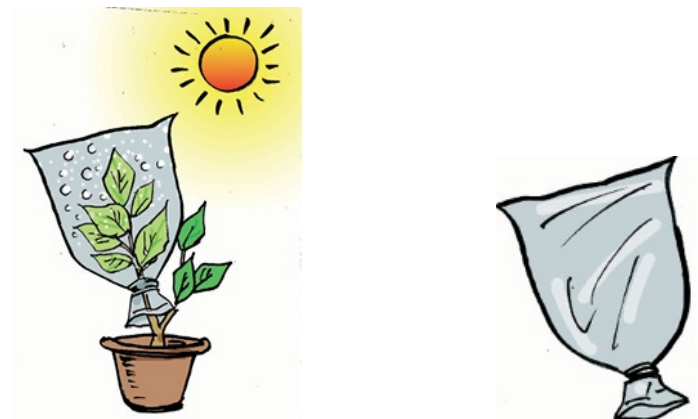


Fig. 8

Select a well watered plant that has been growing in the sun. Enclose a leafy branch of the plant in a polythene bag (Fig. 8) and tie up its mouth. Take another polythene bag of same size and tie up its mouth without keeping any plant. Keep both the polythene bags in the sun. After a few hours observe the inner surface of the bags. What do you see?

Are there any droplets of water in any of the bags? Which bag has droplets? How do you think they are formed there?

Plants release excess water in their body through stomata and some other parts as well. The water is released in the form of vapour and this process is called **transpiration**. These vapours condense and are seen as droplets in the polythene bag. Think, what will happen if transpiration does not take place in plants.

Another leaf function is the preparation of food for the plant by the process of **photosynthesis**. We will discuss more about this in the next classes.

Stem provides support to the plant

Observe the stem portion of some plants that you collected for Activity 1 Record your observations in table 5.

Petals are usually colorful, and they attract insects and birds that help with pollination.

Table 5

S.No	Name of the plant	Stem grows Vertically/Horizontally	Branches are Present/Absent

- Do all plants have stems.
- Are the stems of all plants similar?
- How is the stem of the plant that grows horizontally?

Leaves and flowers grow from the stem. If you observe carefully, you will see a scar on the stem where the leaf arises. The stem branches into sub-branches and bears leaves, flowers and fruits.

Activity-8: Carrying food material

Take two small cuttings from a soft stemmed plant. Set them up like you did in activity 2 (Fig. 9). Wait for 2-3 hours and record your observations.

- What differences did you find between the stem of both the plants?
- Do red spots appear on the leaves or flowers of any of the plants?

Cut a small section of the stem of the plant, kept in red ink and water, with a sharp blade. Take the help of your teacher for this. Put it on a slide. Observe it under a microscope. Do you observe any coloured portion? Now, cut the stem into two halves vertically, from top to bottom Observe it. Do you see any coloured portion?

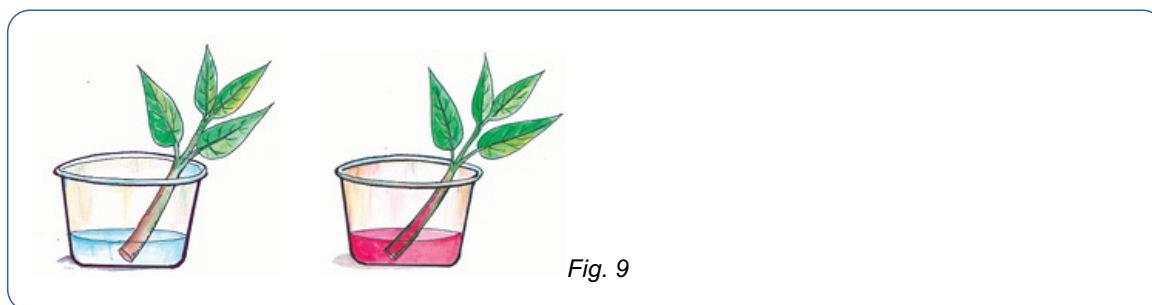


Fig. 9

The coloured ring like structure that you see act as a tube that carries water and food material

throughout the plant. The water absorbed by the root is carried through the stem to all parts of the plant.

Fruit is really the part of a flower in which seeds grow. Cherries, apples, and even milkweed pods are fruit.

Do you know? ...Some plants like potato, turmeric, garlic, ginger and sugarcane store food material in the stem due to which the stem bulges in size. Generally we think that these are all tubers or roots. Actually they are modified stems.

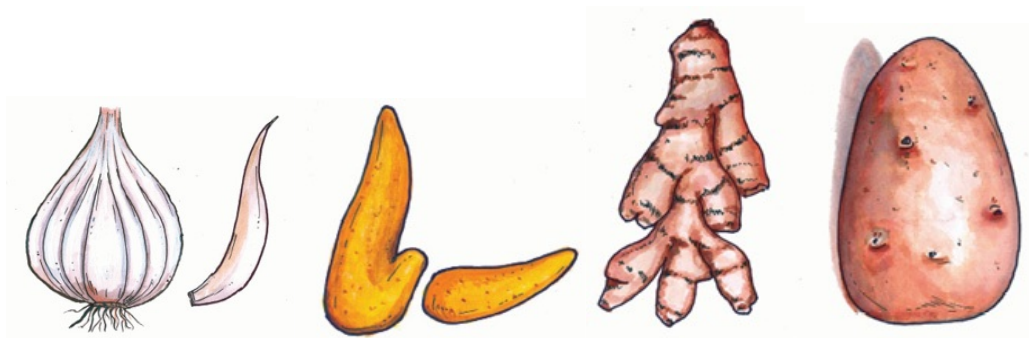


Fig 10

How can you say that a potato is stem although it grows under the ground? Think it over.

Most plants around us have roots, leaves, stems and flowers. All parts of the plants carry out some functions, essential for the whole plant. There are diverse forms of plants in nature and plants adapt themselves to the different conditions in nature in different ways. For example, while stems usually support the plant body, in some plants they adapt and start storing food.

Flower is another important part in the plant. Flower has different colourful structures called petals. They attract insects for pollination and produce fruits. We grow plants for colourful flowers which gives beauty to nature. We will learn more about flower in the next classes.

Keywords:

Tap root, fibrous roots, leaf, petiole, lamina, stomata, reticulate venation, parallel venation, transpiration

What we have learnt

- The important parts of a plant are roots, stem and leaves.
- Tap root system and fibrous root system are two types of root systems seen in plants.
- Roots absorb water and minerals from the soil and also help in anchoring the plant body to the soil.
- The stem bears branches, leaves, flowers and fruits.
- The stem carries the water absorbed by the roots to different parts of the plant.
- Leaves are involved in preparing food. They also help in exchange of gases and transpiration.
- Leaf base, petiole and lamina are all parts of a leaf.
- Reticulate and parallel venation are found in leaves.

Buds are small swellings on a plant from which a shoot, leaf, or flower usually develops.

Improve your learning

1. What are the important parts of a plant?
2. How will you tell which part of a plant is the stem and which is the root?
3. Collect any plant from your surroundings. Draw its root structure. What can you say about its root system?
4. John has no place in his house but he wants to plant vegetables like tomato in his house. Suggest him different ways to do so.
5. What will happen if a plant doesn't have any leaves?
6. How does the stem help the plant?
7. What type of venation is found in the leaves of plants with fibrous roots?
8. If the leaves have reticulate venation what would be the type of root?
9. Explain the various parts of a plant with the help of a diagram.
10. Explain the parts of a leaf with the help of a diagram.
11. How can you show that plants absorb water through their roots?
12. Rajani said "Respiration takes place in leaves", is she correct? How can you support this statment.
13. Collect the leaves of various plants. prepare a herbarium. Write a brief report on their shapes, size and venation.
14. Prepare a greeting card with dry leaves.
15. In Activity 1 your teacher suggested not to harm other plants when you collect plants for observations. Why did she suggest so?
- 16 Observe a plant which has healthy green leaves and beautiful flowers. Write your feelings about the plant in your notebook.

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Grapes and clematis have stems that climb with tendrils, which hold onto a surface, as the stems get longer.