

Lesson Plan – 11

Topic: Dicot and Monocot Plants

Sub – Topic: Features of Root, Leaf & Flower

Class: 7

Duration: 30 Mins

Aim:

- To study the external features of root, stem, leaf and flower of monocot and dicot plants.

Objectives:

Students will be able to:

1. Identify parts of the flower
2. Tell the difference between monocots and dicots
3. Group plants according to leaf type and characteristics and present findings in a table form by using a computer.

Previous knowledge: Students know the basic parts of a flower.

Required Materials:

- Glass slides
- Forceps
- Hand lens
- Scissors
- Dissecting microscope
- A complete monocot plant such as onion or paddy or wheat or maize
- A complete dicot plant such as mustard or sunflower or pea.

Principle:

The flowering plants, or angiosperms, are differentiated into root, stem, leaves and flowers. They bear seeds enclosed in a fruit. They are divided into monocotyledons and dicotyledons on the basis of the kind of seeds they bear. Monocotyledons bear seeds which have a single cotyledon. The seeds of dicotyledons have two cotyledons.

Procedure:

1. Take a monocot plant. Separate root, stem, a leaf and a flower of this plant with the help of scissors and place these parts on different slides separately with forceps.
2. Then take a dicot plant and repeat the process.
3. Now observe and compare the external features of root, stem, a leaf and a flower of the monocot and dicot plants using hand lens and subsequently by dissecting microscope.

Observation:

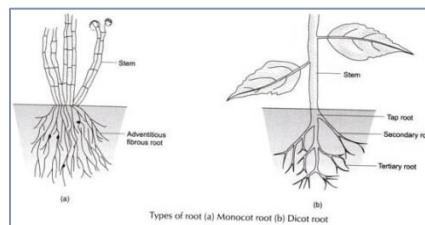
A. Root:

Monocot root:

1. In monocots, primary root does not persist for a longer period. It is soon replaced by a cluster of long, threadlike roots which originate from the base of the stem. These roots are called fibrous roots.
2. Due to absence of secondary growth in thickness these roots remain slender.

Dicot root:

1. In most of the dicots, root develops directly from the radicle.
2. It grows longer, thickens and is known as primary root.
3. It persists and becomes stronger to form tap root.
4. It generally produces lateral branches called secondary roots.
5. Branches of the secondary roots are called tertiary roots.
6. Tap root along with its branch system is called tap root system.



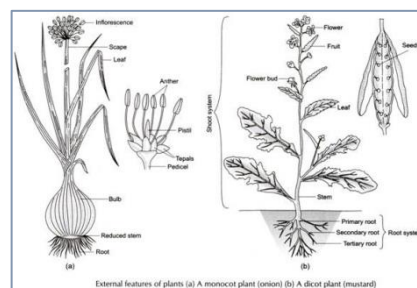
B. Stem:

Monocot stem:

1. It is aerial, erect, herbaceous or woody, usually unbranched.
2. It is usually differentiated into solid nodes and hollow internodes. In maize, internodes are also solid.
3. In some members stem is modified into underground organs like rhizome (e.g., ginger), corm (e.g., Colocasia) or bulb (e.g., onion).

Dicot stem:

1. It is normally long, erect, herbaceous or woody, cylindrical and branched.
2. It has distinct nodes and internodes. Both the nodes and internodes are solid.
3. Sometimes it is creeping and modified into tendril.
4. It is often four - angled (quadrangular) or five - angled (pentangular).
5. In potato, the underground stem is modified into tubers.



C. Leaf:

Monocot leaf:

1. Leaves are arranged isobilateral, i.e., both surfaces are similar.
2. The venation (arrangement of veins and veins on the lamina) is parallel. In monocots veins run parallel to each other from base to the tip of the lamina. Veins connecting the adjacent longitudinal veins are inconspicuous.
3. Leaves are usually long and narrow, running parallel to the stem.
4. Leaves are mostly simple.
5. Leaf sheath (expansion of leaf base into a broad sheath) is usually present.

Dicot leaf:

1. Leaves are arranged dorsoventrally, i.e., upper and lower surfaces are distinctly different.
2. In dicot leaves, venation is reticulate, i.e., irregularly distributed to form a network.
3. In most dicots, the leaf base bears two lateral appendages called stipules.
4. Leaves are either simple or pinnately compound.
5. Leaf sheath is usually absent.

D. Flower:

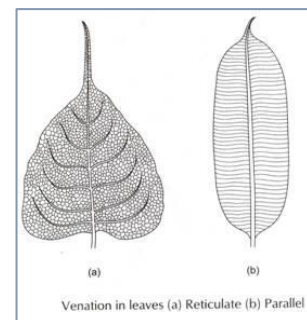
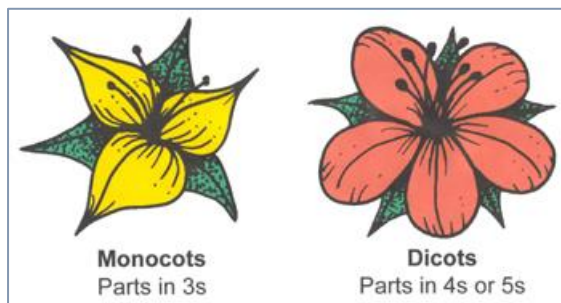
Monocot flower:

1. In monocots, flowers appear in clusters.
2. The flower is typically trimerous (each whorl is in multiple of three).
3. Stamens are usually versatile, i.e., filament is attached to the back of anther at a point only.

Dicot flower:

1. Dicot flowers usually have distinct floral parts, i.e., calyx, corolla, androecium and gynoecium.
2. Calyx is composed of sepals, and corolla is composed of petals.
3. Flower is mostly pentamerous (each whorl in multiple of five), sometimes tetramerous (each whorl in multiple of four).
4. In dicots, flowers usually appear separately.

Stamens are usually basifixed, i.e., filament is attached to the base of the anther.



Conclusion:

- The monocot seed has one cotyledon while the dicot seed has two cotyledons.
- Leaf veins are parallel in monocot plants while veins form network in dicot leaves.
- In flowers of monocot plant, sepals and petals are present in multiple of three. In dicot plant flowers sepals and petals are present in multiple of four or five.

Assessment:**Activity 1**

- Students understanding will be assessed by asking the following questions.
 - How do the seeds of monocot and dicot plant differ?
 - What is meant by venation? Describe the venation patterns found in monocot and dicot leaves.
 - The number of sepals and petals present in a flower can hint the group to which the plant belongs. How is that?

Activity 2

- Ask the students to bring different leaves. Ask them to:
 - Place the leaf bottom side up on a smooth surface.
 - Put a sheet of strong white paper over the leaf.
 - Rub the leaf with soft crayon till you have a good print, showing the veins and the margin of the leaf.
- Instruct them to make the leaf rubbings of different kinds of leaves.
- Ask the students to identify the type of venation.
- Ask them to classify each leaf as monocot or dicot.

Follow up

- Ask students to collect leaves and flowers of different plants and paste them in the folds of old news Papers. Let them dry and then transfer them to their copies. Students should fill the table as follows.