Lab (3)
plant components

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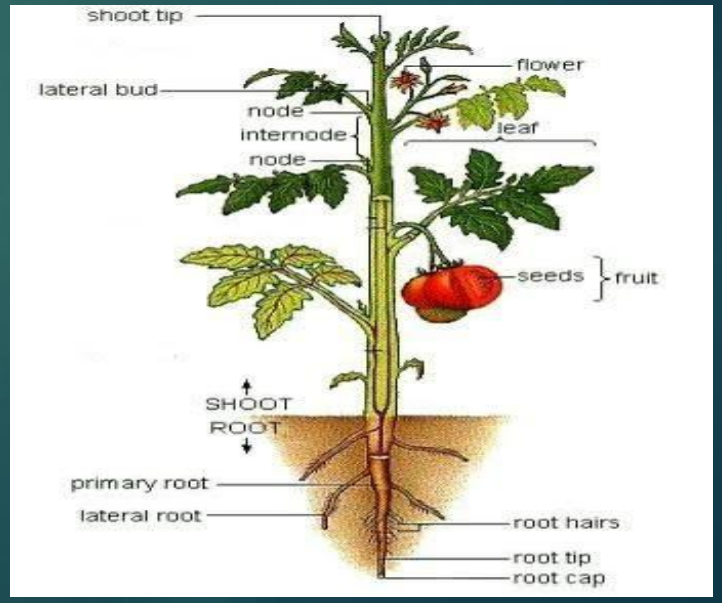
Introduction

- Plant components are the main parts of a plant.
- Each part has a special function that helps the plant grow, survive, and reproduce.
- Studying these parts helps us understand how plants get water, make food, and produce seeds.



Why Plant Components Are Important

- Plants are living organisms that produce their own food through photosynthesis.
- • They provide oxygen, food, and shelter for other living beings.
- • Plants play a key role in maintaining the balance of nature and the ecosystem.
- • They come in various shapes, sizes, and types, adapting to different environments.

Root

- The root is the part of the plant that usually grows underground.
- • It absorbs water and minerals, anchors the plant, and stores food.

- Types:
- 1. Taproot: One main root growing deep with smaller lateral roots.
- • Example: carrot, beet
- 2. Fibrous root: Many thin roots spreading from the stem base.
- • Example: wheat, rice
- 3. Adventitious root: Roots growing from stems or leaves instead of the main root.
- • Example: potato, lily

Root Structure & Functions

- Structure:
- • Root cap: Protects the tip of the root.
- • Apical meristem: Zone of cell division for growth.
- • Zone of elongation: Cells grow longer, pushing the root deeper.
- • Zone of maturation: Cells differentiate into xylem, phloem, and other tissues.
- • Root hairs: Tiny extensions that increase surface area for absorption.

- Functions:
- • Absorption: Water and minerals from soil
- • Anchorage: Keeps the plant firmly in the ground
- • Storage: Stores food like starch for the plant
- • Conduction: Transports water and nutrients to the stem and leaves

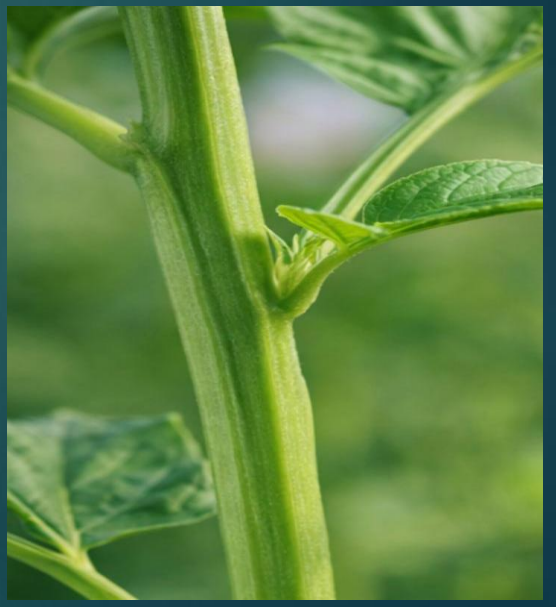
Stem

- The stem is one of the main vegetative organs of the plant. It develops from the plumule of the seed embryo after germination. The stem supports the plant body and carries leaves, buds, flowers, and fruits. It also helps in transporting water and minerals from the roots to the leaves and distributes food made in the leaves to other parts of the plant.
- The stem is divided into nodes and internodes. Nodes are the points where leaves and buds are attached, while internodes are the regions between two nodes and usually do not bear leaves. According to appearance, plants may have a clear visible stem called caulescent, or a reduced stem where leaves form a rosette near the ground called acaulescent. Stems may grow above the soil surface as aerial stems or below the soil as subterranean stems.

Stem Modifications and Shapes

- In some plants, stems are modified to perform special functions. Cladophyll stems are flattened and carry out photosynthesis when leaves are reduced. Thorny stems protect the plant from animals, while tendrils help weak stems to climb and reach sunlight. These modifications help plants survive in different environments.

- Stems also differ in shape among plant species. The most common stem shape is cylindrical, but some plants have triangular or quadrangular stems. These stem shapes and modifications are useful features for identifying plants in botanical studies..



Leaves (Definition, Importance and Position)

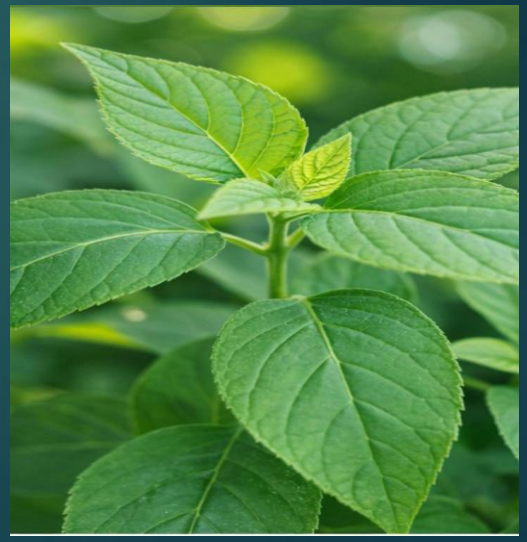
- Leaves are lateral, flattened organs borne on the stem and are considered the main organs of photosynthesis in plants. Through photosynthesis, leaves manufacture food needed for growth and survival. Leaves also play an important role in transpiration and gas exchange, helping in temperature regulation and water movement within the plant.

- Leaves show great diversity in shape, size, and structure more than any other plant organ. According to their position, leaves attached to the stem are called cauline leaves, while those arising from the base of the stem or near the root are known as basal or radical leaves.

Leaf Structure, Types and Modifications

- A typical leaf consists of three main parts: the blade or lamina, which is the broad photosynthetic surface; the petiole, which connects the blade to the stem; and stipules, which may be present at the base of the petiole in some plants. Leaves may be simple or compound. Compound leaves are divided into leaflets that may be arranged in palmate or pinnate forms.

- Leaves may also be modified to perform special functions. Spines reduce water loss and protect the plant, tendrils help in climbing, storage leaves store food, and insectivorous leaves trap insects to obtain additional nutrients.



Flower

- Flowers are the reproductive structures of flowering plants.
- • They produce seeds for the next generation.
- • Flowers attract pollinators like bees, butterflies, and birds.
- • They come in different shapes, colors, and sizes..

Structure & Function of Flowers

- Petals: Colorful parts that attract pollinators.
- • Sepals: Protect the flower bud before it opens.
- • Stamens (Male): Produce pollen (anther + filament).
- • Carpels/Pistil (Female): Produce ovules and receive pollen (stigma, style, ovary).

- Functions:
- • Reproduction – produce seeds and fruit.
- • Attract pollinators for fertilization.
- • Some flowers store nectar for pollinators.

Fruit

- Fruits develop from the fertilized ovary of a flower.
- • They protect seeds and help in their dispersal.
- • Fruits come in various shapes, sizes, and types, depending on the plant.
- • They provide food for humans and animals.

Types & Functions of Fruits

- Types:
- • Fleshy fruits: Soft and juicy, like apple, tomato, mango.
- • Dry fruits: Hard or papery, like pea, peanut, sunflower seeds.

- Functions:
- • Protect seeds until they are mature.
- • Help in seed dispersal by wind, water, or animals.
- • Provide nutrition to humans and animals.

Seed

- seed is the mature fertilized ovule of a plant.
- • It contains an embryo that can grow into a new plant.
- • Seeds come in different shapes, sizes, and colors.
- • They are the main way plants reproduce and spread.

Structure & Functions of Seeds

- Structure:
- • Seed coat: Protective outer layer.
- • Cotyledon: Food storage for the embryo.
- • Embryo: The young plant that will grow.

- Functions:
- • Protects the embryo until it can grow.
- • Provides stored food for the young plant during germination.
- • Helps in reproduction and dispersal of the specie