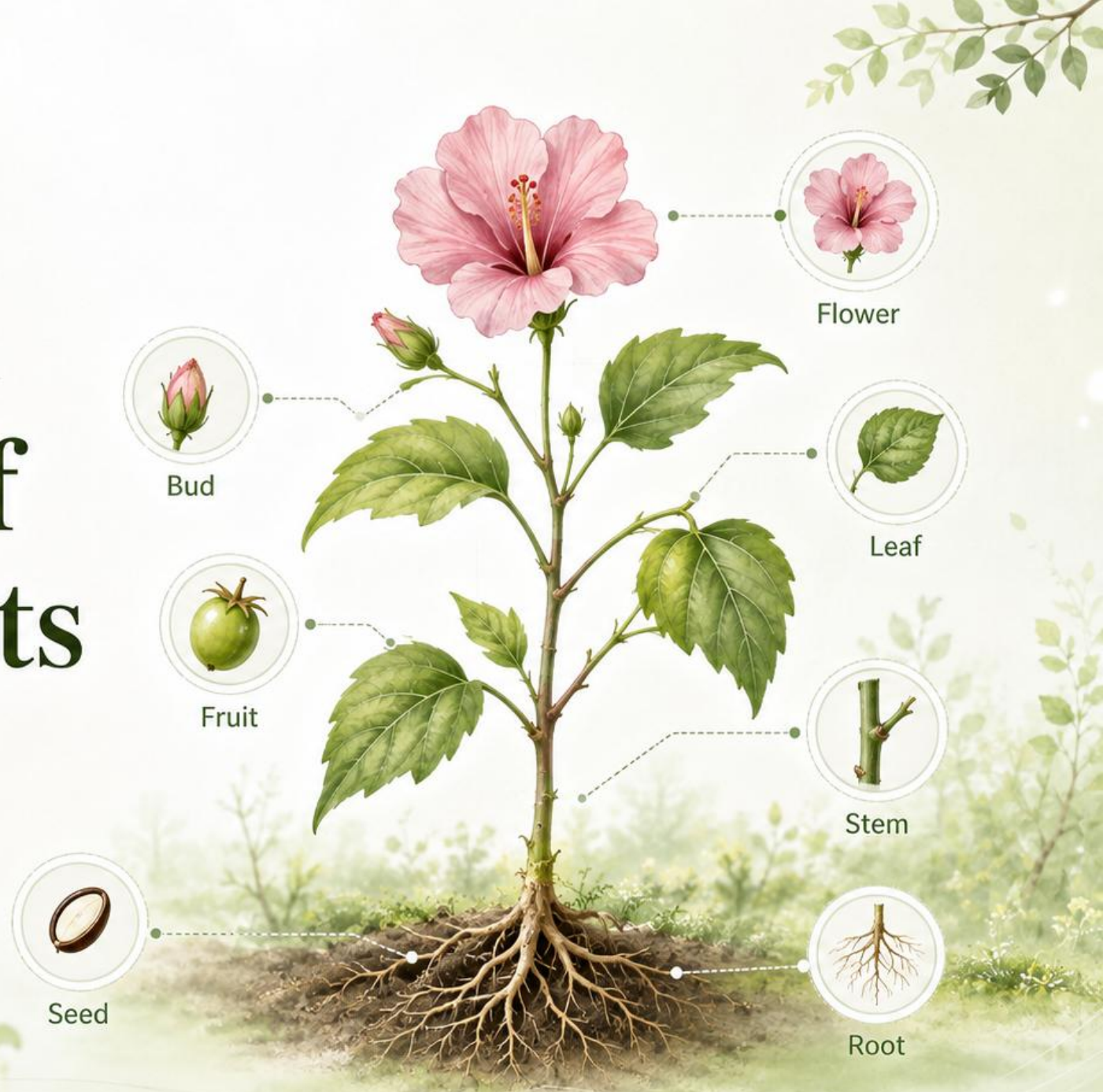


Chapter 5 : Morphology of Flowering Plants

Biology Notes | Class 11



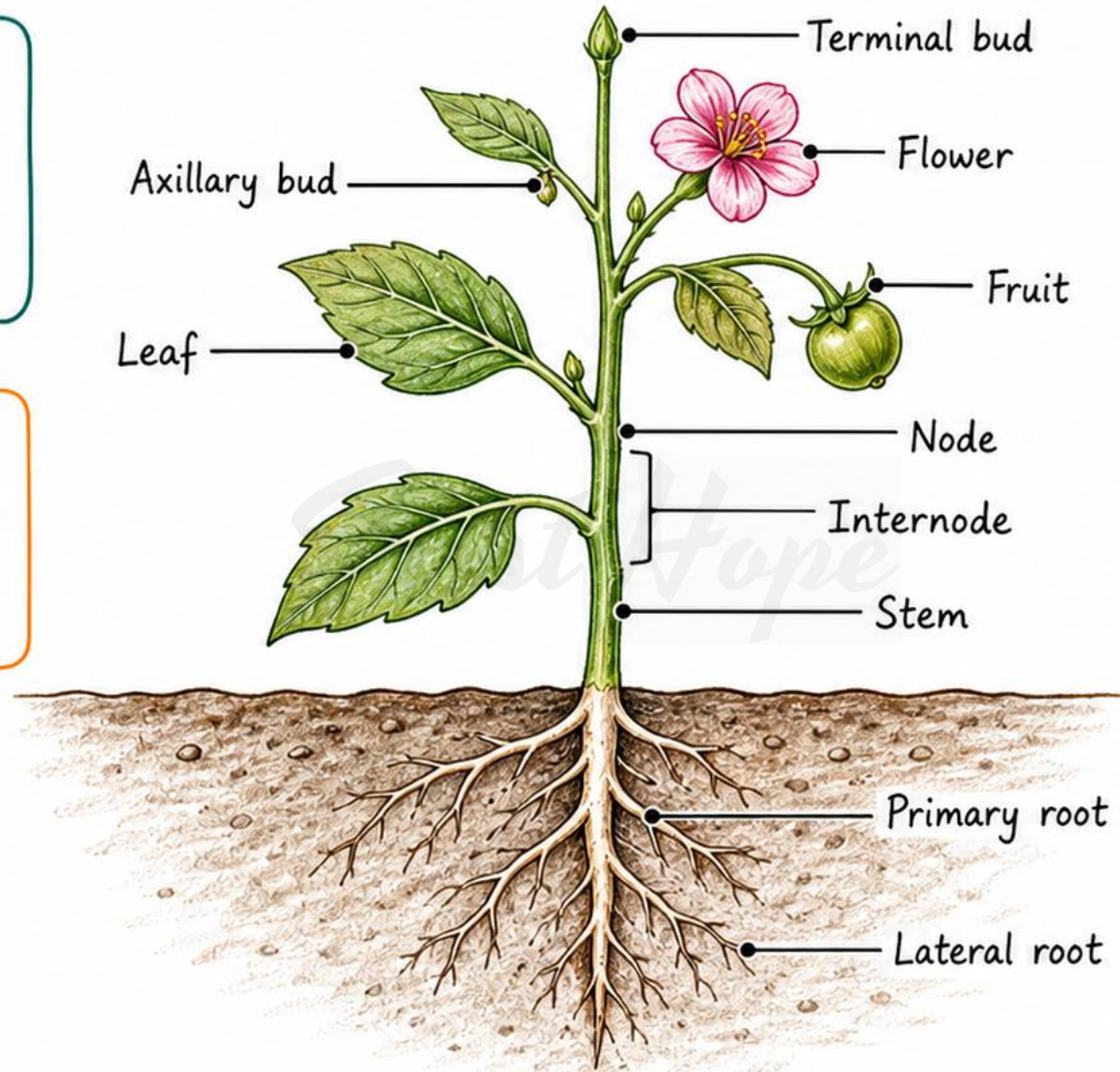
FLOWERING PLANT BODY PLAN & MORPHOLOGY

Morphology — study of the external form and visible structure of organisms.

Root system usually develops from the radicle; shoot system develops from the plumule.

ROOT SYSTEM:

anchors plant; absorbs water and minerals; may store food and synthesise growth regulators.



SHOOT SYSTEM:

stem, leaves, buds, flowers and fruits.

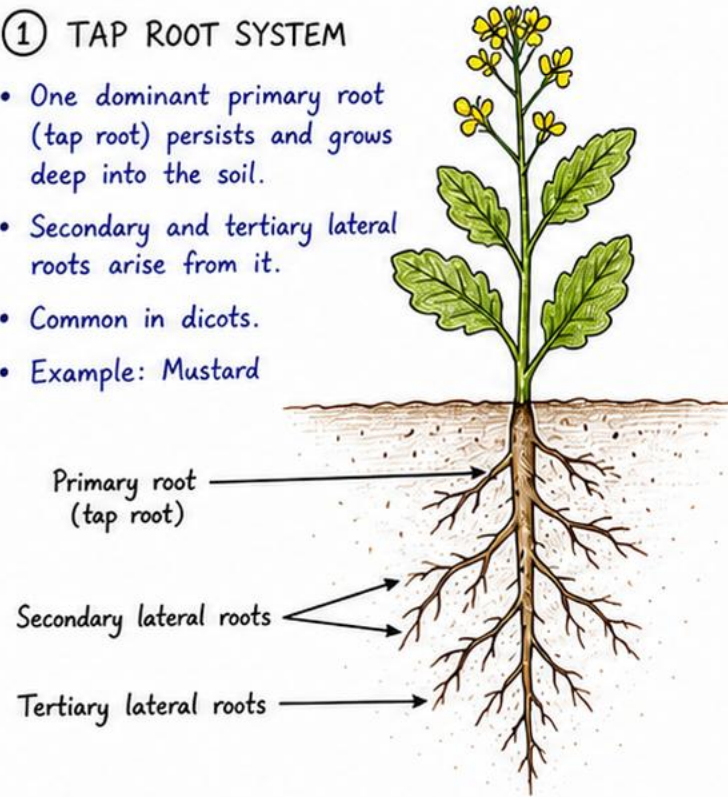
Organs may be modified for storage, support, protection or vegetative propagation.

A plant organ is identified by origin, position and connections—not by shape alone.

ROOT SYSTEMS & FUNCTIONS

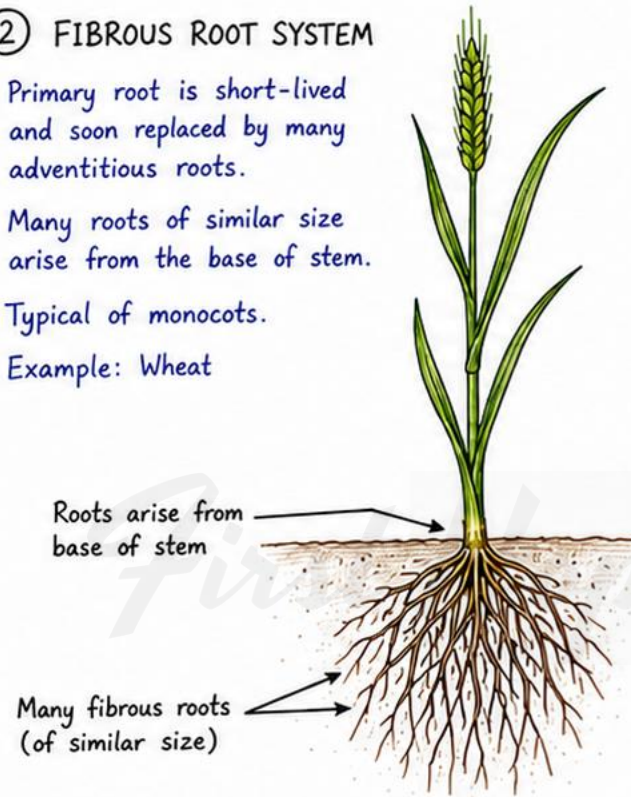
① TAP ROOT SYSTEM

- One dominant primary root (tap root) persists and grows deep into the soil.
- Secondary and tertiary lateral roots arise from it.
- Common in dicots.
- Example: Mustard



② FIBROUS ROOT SYSTEM

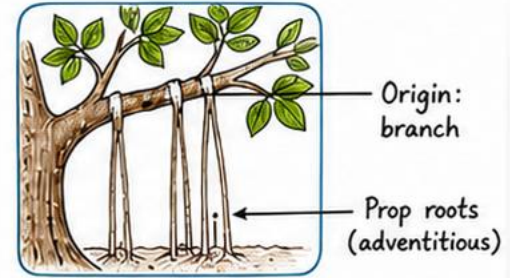
- Primary root is short-lived and soon replaced by many adventitious roots.
- Many roots of similar size arise from the base of stem.
- Typical of monocots.
- Example: Wheat



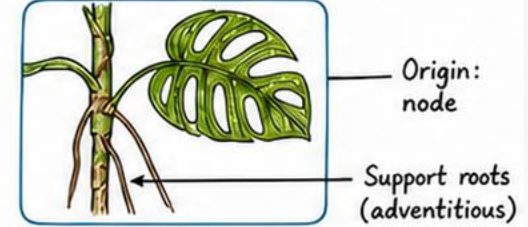
③ ADVENTITIOUS ROOTS

- Roots arise from plant parts other than the radicle.
- Help in support, absorption or special functions.
- Occur in many dicots and monocots.
- Examples:

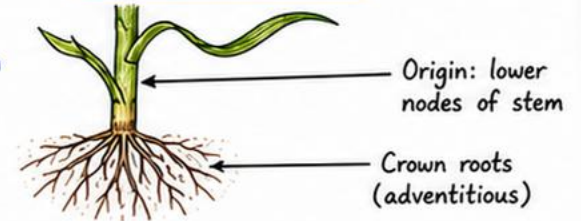
(a) Banyan
Prop roots from branches (supporting roots).



(b) Monstera
Support roots from nodes (climbing roots).



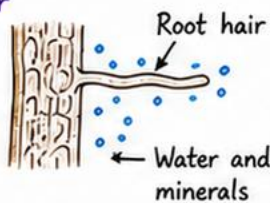
(c) Grass — roots arise from lower nodes/base of stem.



FUNCTIONS OF ROOTS

(A) Absorption of water and minerals

Root hairs absorb water and minerals from soil.



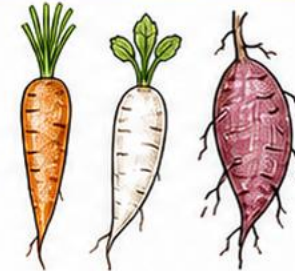
(B) Anchorage

Roots firmly anchor the plant in the soil and provide stability.



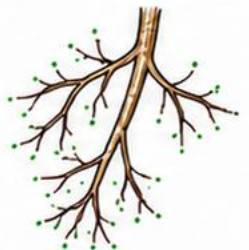
(C) Storage

Some roots store food for future use. (e.g., carrot, radish, sweet potato)



(D) Synthesis of plant growth regulators

Roots synthesize plant growth regulators such as auxins, cytokinins and gibberellins.



DIAGNOSTIC SUMMARY: Tap = one dominant primary axis | Fibrous = tuft of similar roots | Adventitious = origin outside radicle.

REGIONS OF THE ROOT TIP

towards
root base
↑



④ ZONE OF MATURATION / DIFFERENTIATION WITH ROOT HAIRS

- Cells differentiate and perform specific functions.
- Epidermal root hairs absorb water and minerals.

③ ZONE OF ELONGATION

- Cells lengthen rapidly.
- Increase in cell length leads to increase in root length.

② MERISTEMATIC ZONE

- Meristematic cells are small, thin-walled, with dense cytoplasm.
- Cells are actively dividing.

① ROOT CAP

- Root cap protects the tender apex.

COLOUR LEGEND (ZONES)



Zone of Maturation /
Differentiation with
Root Hairs



Zone of Elongation



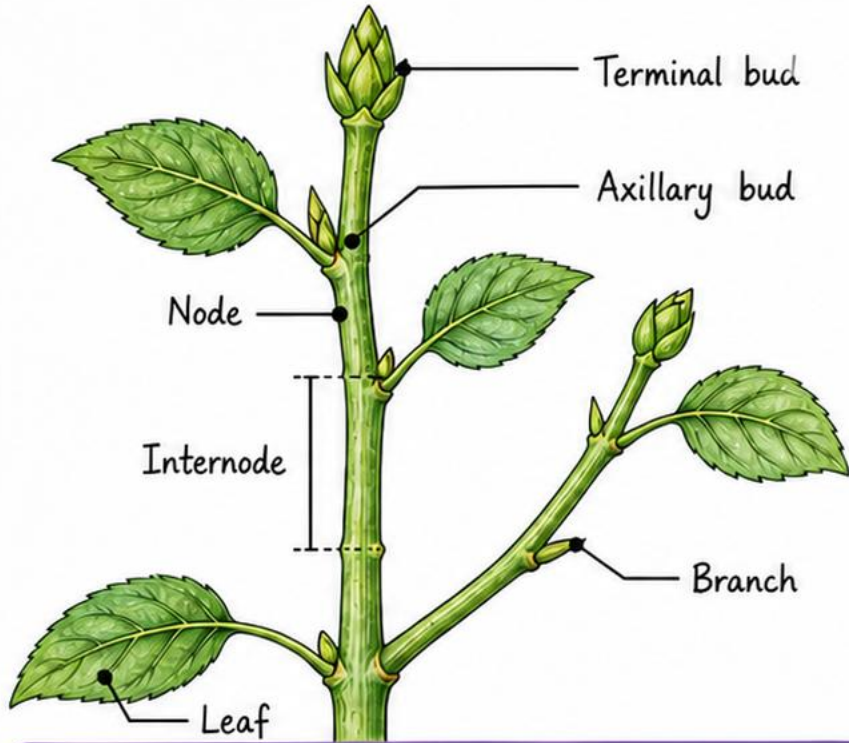
Meristematic Zone



Root Cap

growing
apex
↓

STEM STRUCTURE & FUNCTIONS



Stem — ascending shoot axis developing from the plumule.

ORIGIN

Stems develop from the plumule of the embryo.

FEATURES

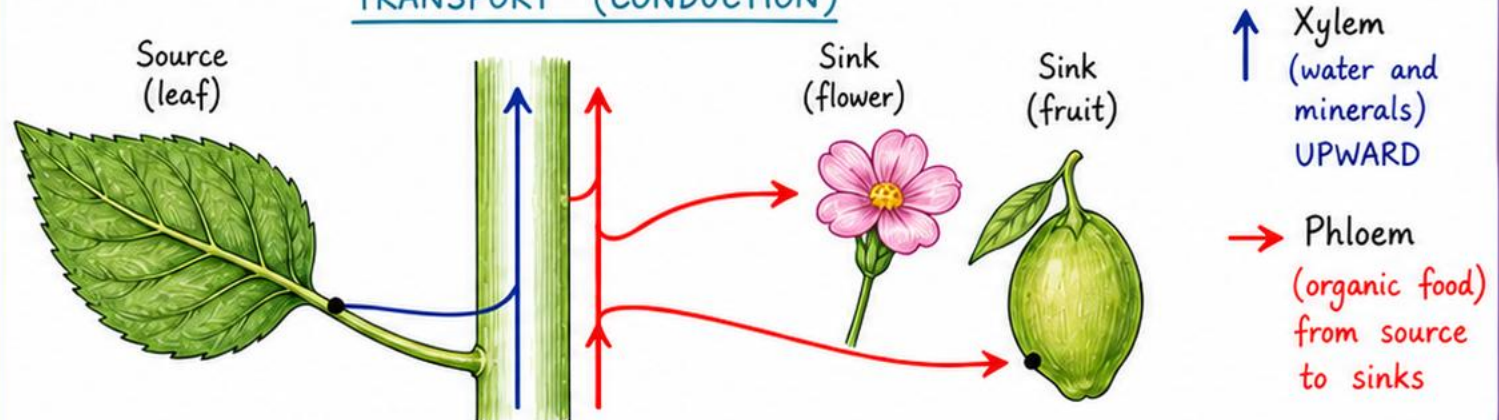
- Nodes bear leaves and branches.
- Internodes lie between successive nodes.
- Young stems are usually green; older stems may become woody and dark brown.

- Ascending shoot axis.
- Bears nodes and internodes.
- Nodes bear leaves, axillary buds and branches.
- Has a terminal bud.
- Has vascular tissue for conduction.
- May be herbaceous (green) or woody (brown).

FUNCTIONS OF STEM

- ① Supports and displays leaves, flowers and fruits.
- ② Conducts water, minerals and organic food.
- ③ May store food.
- ④ May provide support or protection.
- ⑤ May enable vegetative propagation.

TRANSPORT (CONDUCTION)





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