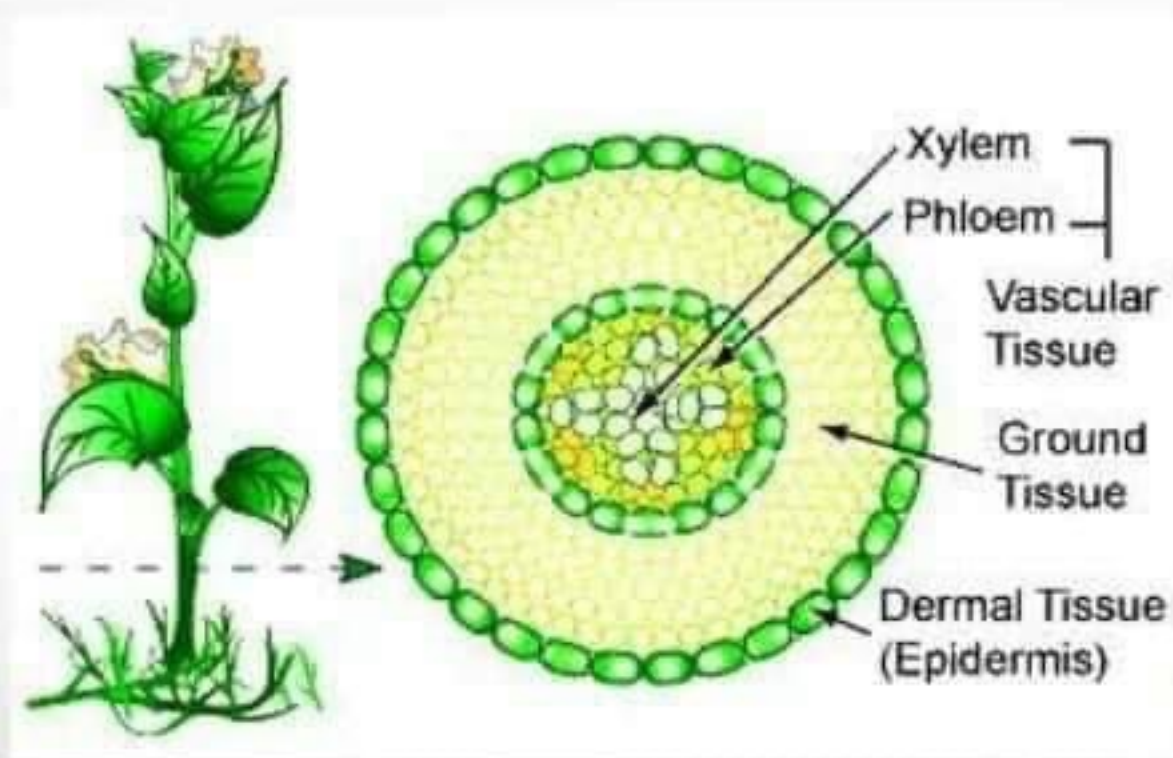


Plant Tissues



Tissues

A group of closely associated cells that perform related functions and are similar in structure.

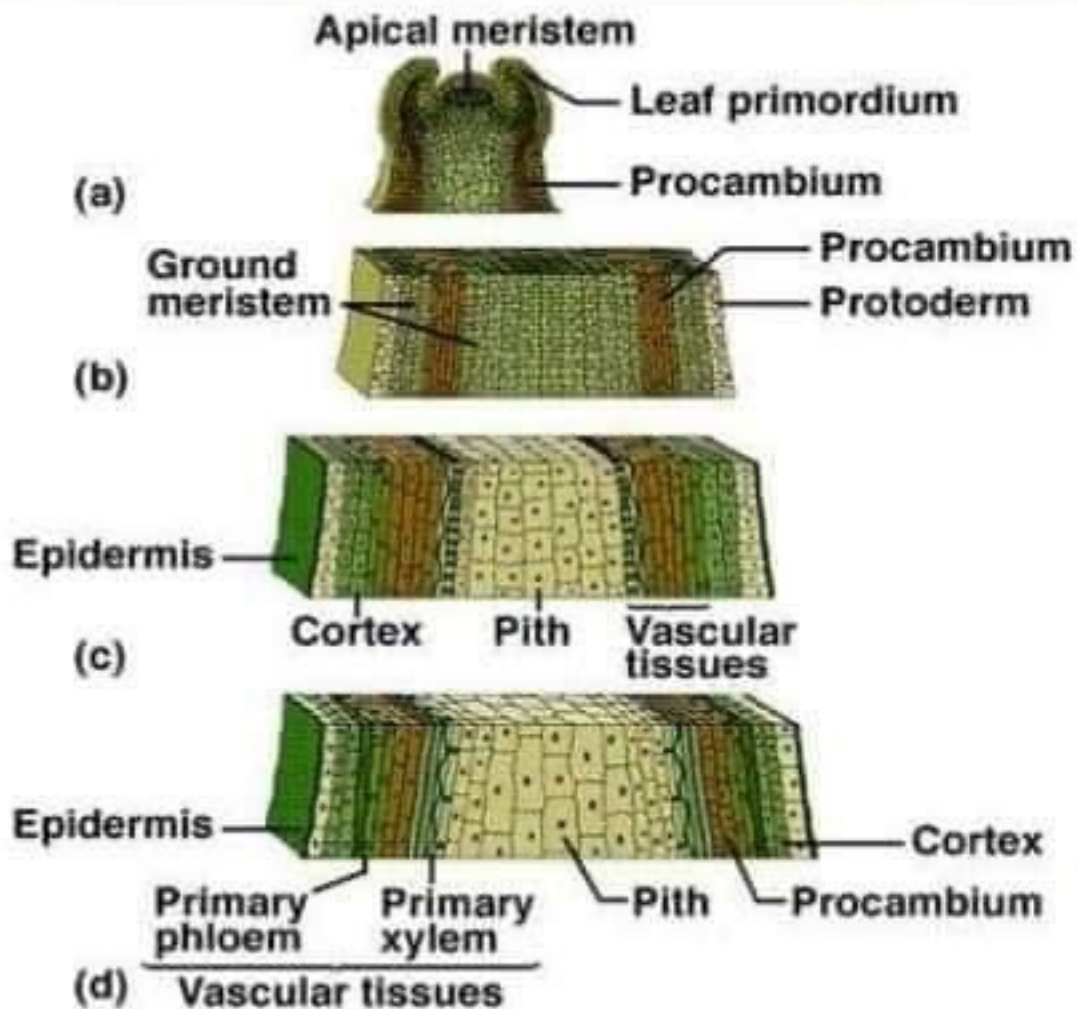


Meristematic tissues

- ❖ The growth of plants occurs in certain specific regions.
 - ❖ This is because the dividing tissue,
 - ❖ Known as **meristematic tissue**
- ❖ Composed of actively dividing cells, responsible for the production of cells.
- ❖ Capacity for division is restricted to certain parts of the plant body called **meristems**
 - ❖ Which are active throughout the life of the plant body.



Meristematic tissues



Permanent tissues

- ❖ Tissues that attained their mature form and perform specific functions.
- ❖ They stop dividing

Types:

- Simple permanent tissues
- Complex permanent tissues



Dermal / surface tissue

Simple permanent tissues

- consist only of one kind of cells

A. Dermal / surface tissue

- external tissues
- forms protective covering of the plant body

a. Epidermis

b. Periderm



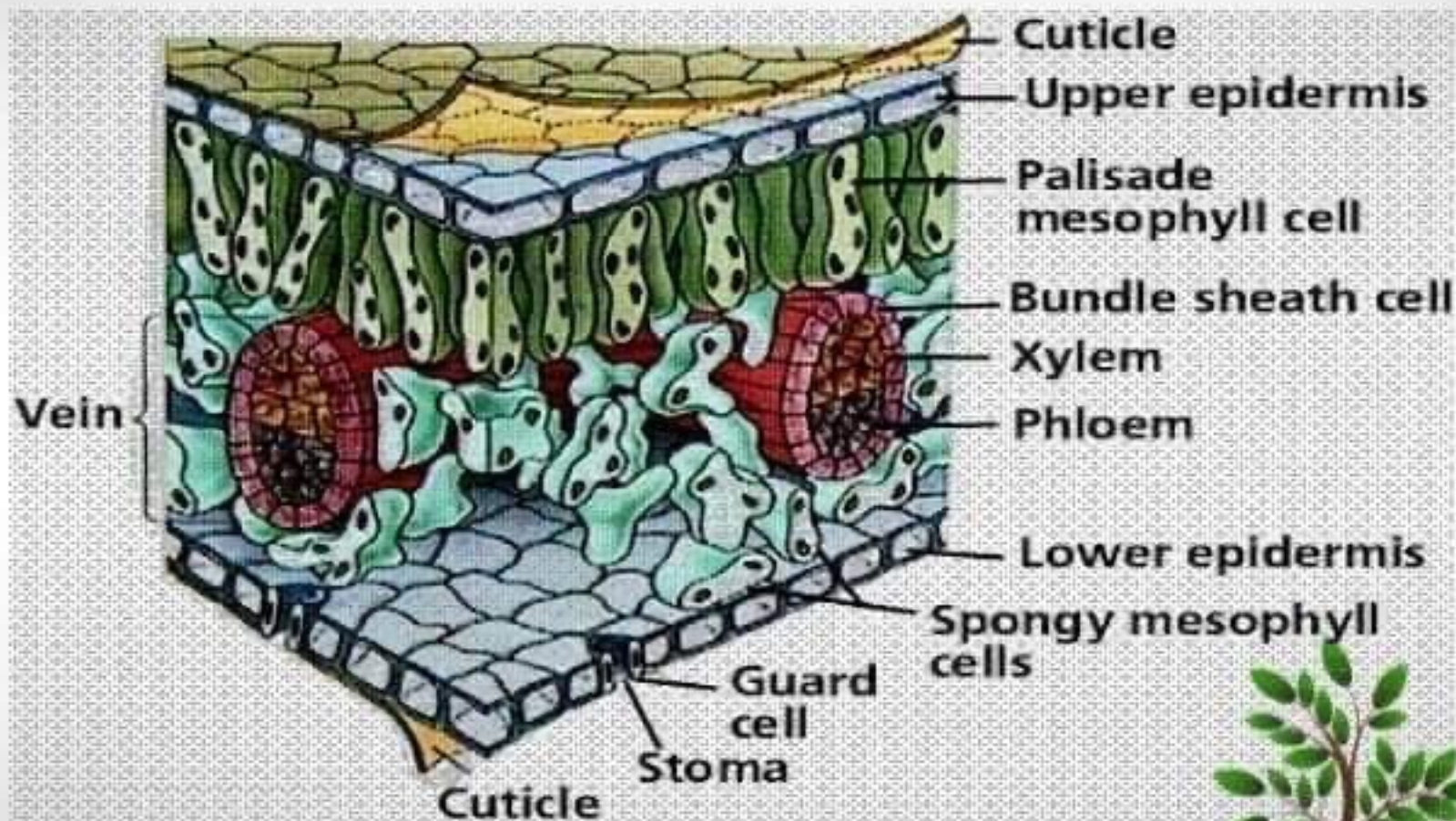
Permanent tissues

- **Epidermis**

- the outermost layer of the primary plant body
- covers the leaves, floral parts, fruits, seeds, stems and roots
- generally only one layer thick with cuticle
- composed mostly of unspecialized cells, either parenchyma and/or sclerenchyma
- contains **trichomes**, stomata, bulliform cells (in grasses)

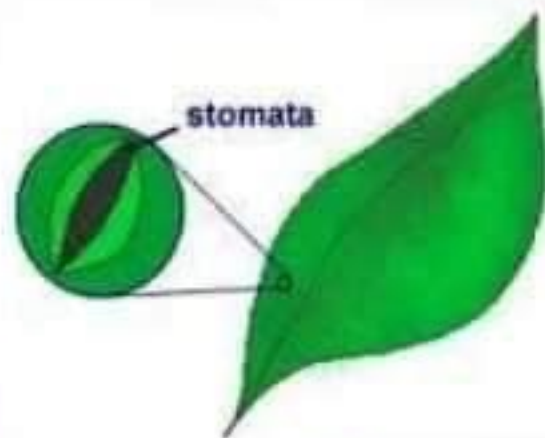
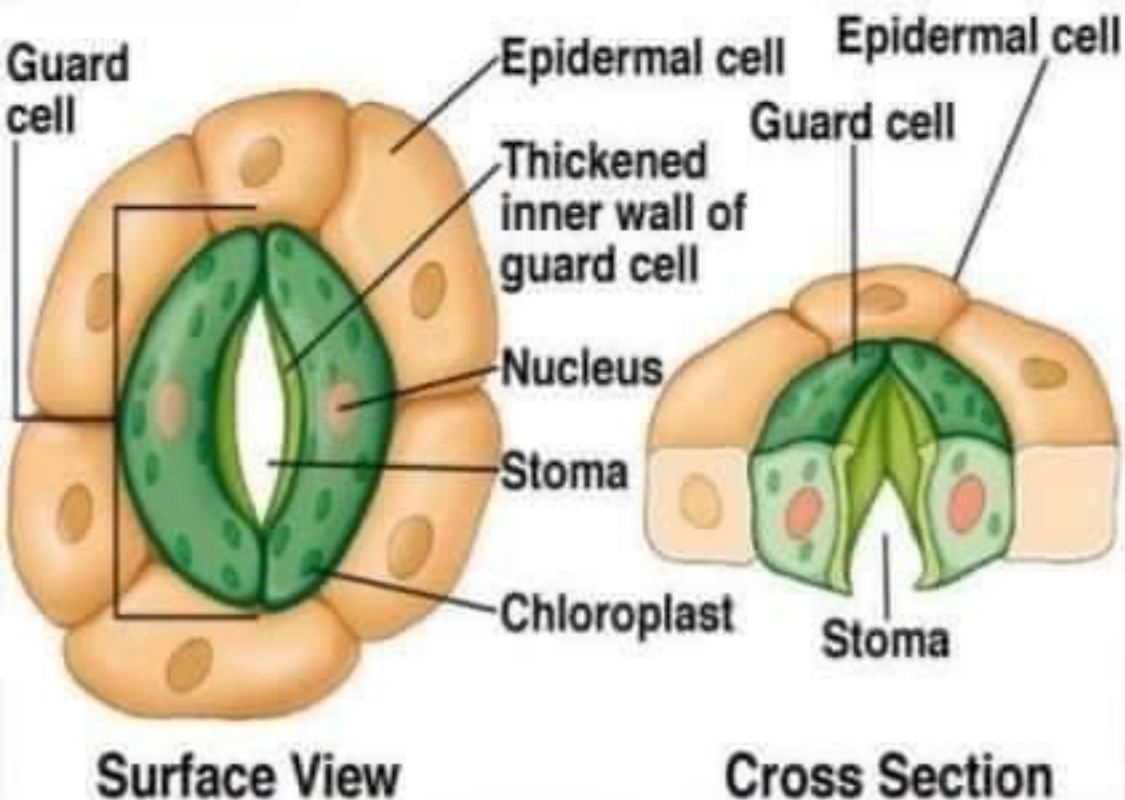


Structure of epidermis



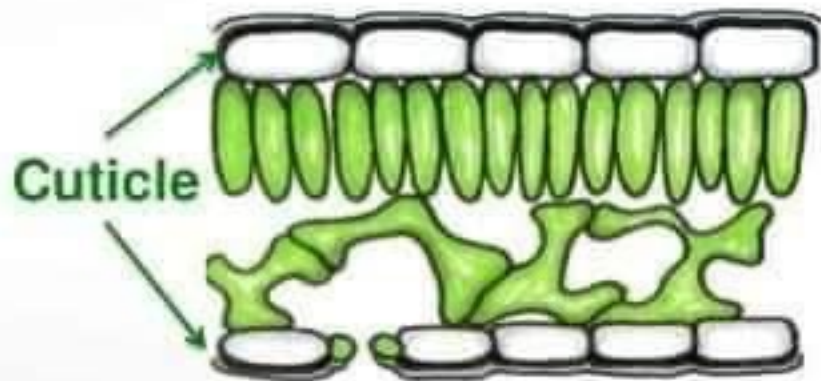
Stomata

- **Stomata** - pores for **gas exchange**
 - present on one or both surfaces of Leaves.



Cuticle

Cuticle – Lines the outer wall of the epidermal cells
- made up of waxy material that **protects plants from desiccation**

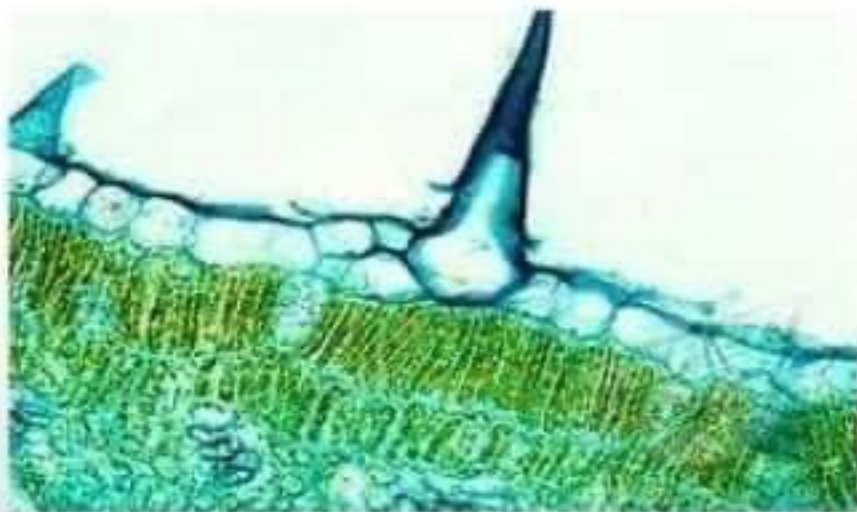


Layer of
the leaf



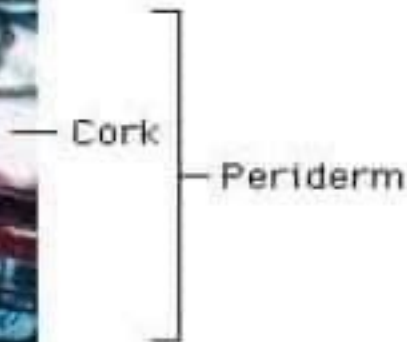
Trichomes

Trichomes – outgrowths of epidermal cells



Periderm (Bark)

- **Periderm (Bark)** is the outermost layer of stems and roots of woody plants such as trees.



Ground tissues

1. Parenchyma

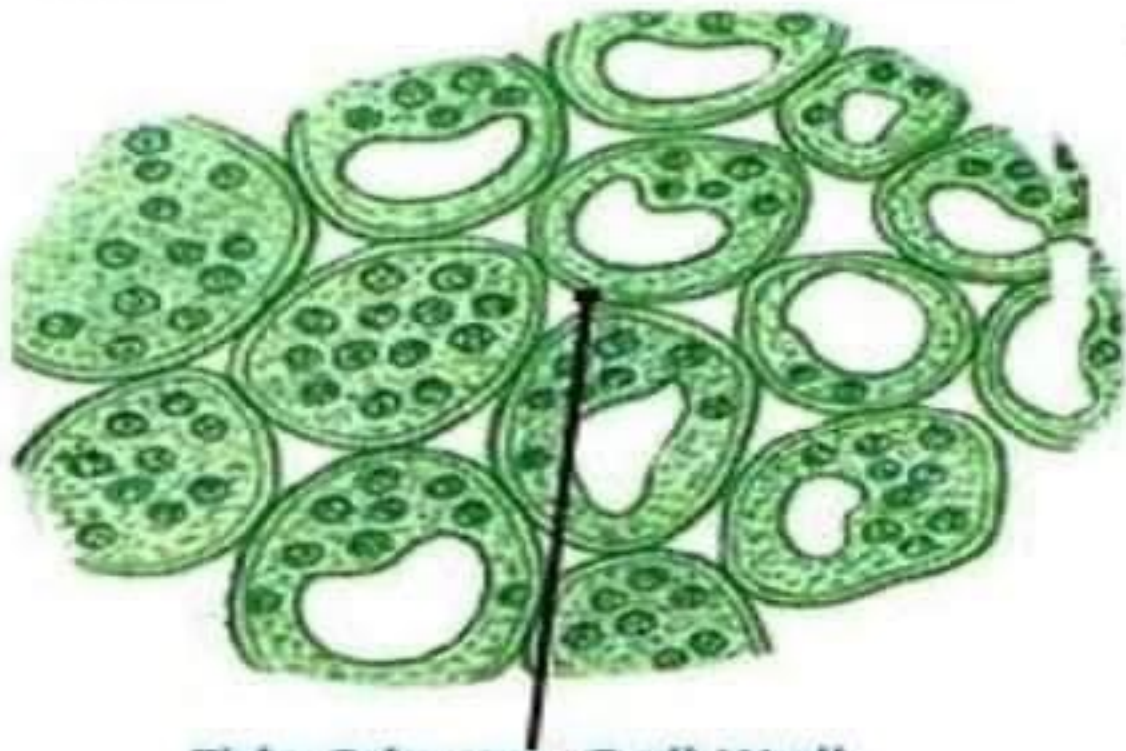
- are the general purpose cells of plants
- cells are rounded in shape & have uniformly thin walls found in all parts of the plants.
- living at maturity, have large vacuoles
- location leaf, stem (pith), roots, fruits

Functions:

- * **basic metabolic function** (respiration, photosynthesis (chlorenchyma in Leaf) & protein synthesis)
- * **storage** (potatoes, fruits, & seeds)
- * **wound healing and regeneration**



Parenchyma



Thin Primary Cell Wall

Parenchyma



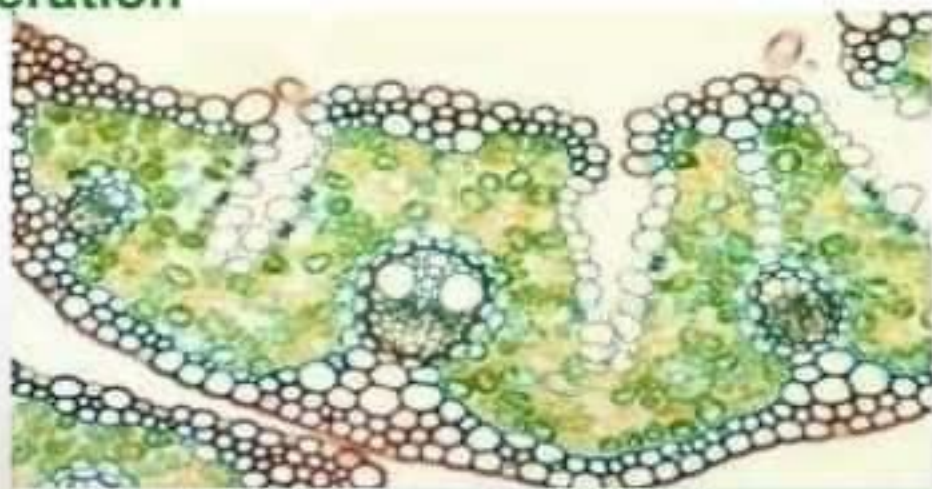
Chlorenchyma

2. Chlorenchyma - A specialized parenchyma tissue found in the green parts of the shoot and performs photosynthesis.

- differentiate from parenchyma cells & are alive at maturity

Functions:

- ❖ **Support & elasticity** (stem surfaces & along leaf veins)
- ❖ **Segeneration**



Sclerenchyma

3. Sclerenchyma

- ❖ sclerenchyma cells which are **non-living** and lack protoplasts at maturity
- ❖ Have thick, **lignified secondary walls**
- ❖ Provide strength and support in parts that have ceased elongating or mature

Types:

1. Sclereids or stone cells
2. Fibers



Complex Permanent Tissues

Vascular Tissues

- ❖ Specialized for long-distance transport of water and dissolved substances.
- ❖ Contain transfer cells, fibers in addition to parenchyma and conducting cells.
- ❖ Location, the veins in leaves

Types:

1. Xylem
2. phloem



Xylem

Xylem

- ❖ GW **xylos** w/c means "**wood**" transports water and dissolved nutrients from the roots to all parts of a plant.
- ❖ Direction of transport is upward.

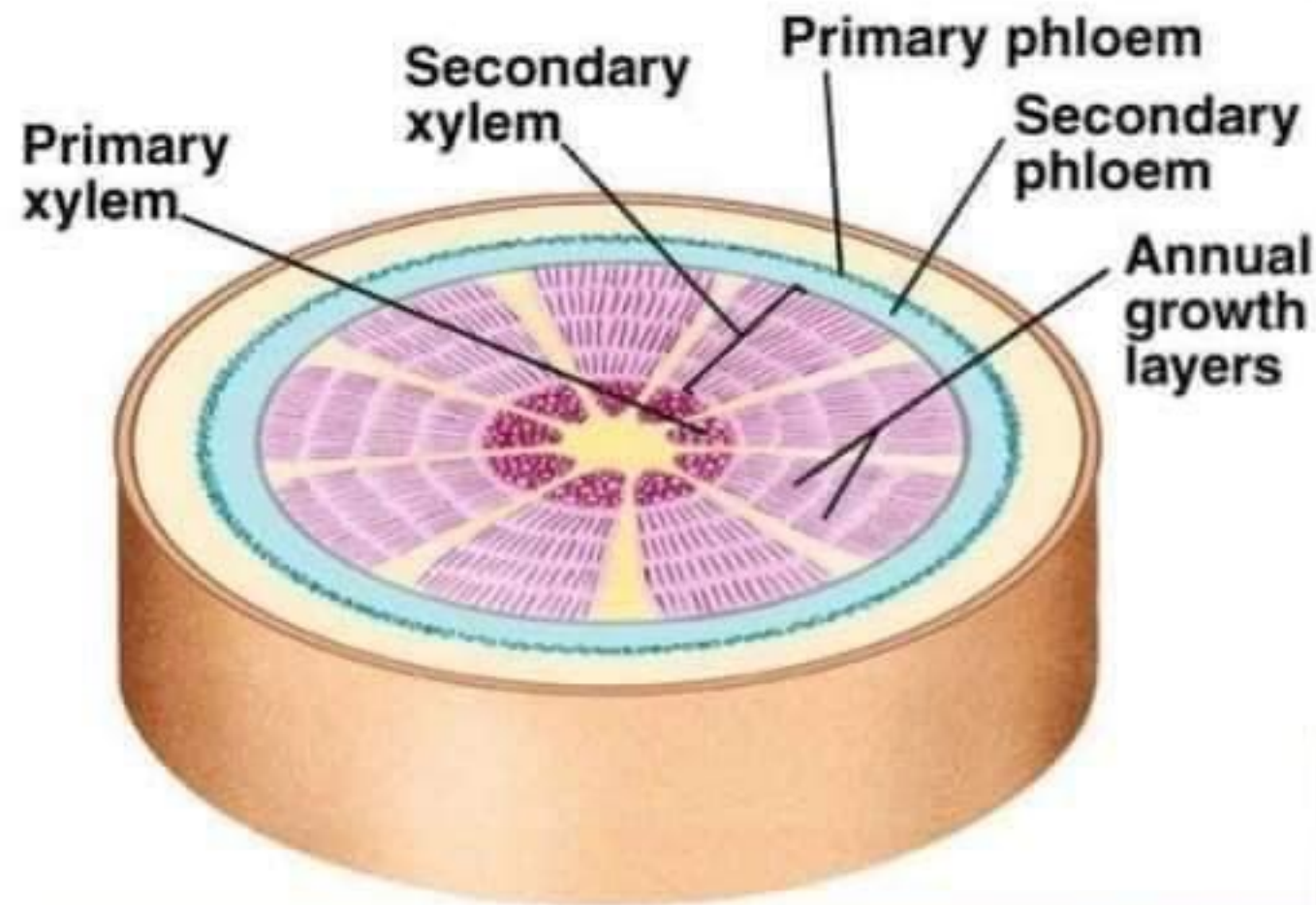
There are two types

- **Primary xylem** – differentiates from procambium in the apical meristem & occurs throughout the primary plant body.
- **Secondary xylem** – differentiates from vascular cambium & is commonly called wood.



Xylem

Continued Secondary Growth



Xylem

- **Xylary elements** - the conducting cells in xylem
 - 2 kinds of xylary elements:
 - **tracheids** - the only water conducting cells in most woody, non flowering plants.
 - **vessel elements** - occur in several groups of plants, including angiosperm.
 - both are elongated, dead at maturity, lignified secondary cell walls.



Tracheids



Vessel elements



Phloem

Phloem

- Greek word ***phloios*** meaning, "**bark**"
- transports dissolved organic / food materials from the leaves to the different parts of the plant
- glucose in phloem moves in all directions

Types

1. **Primary phloem** – differentiate from procambium and extends throughout the primary body of the plant.
2. **Secondary phloem** – differentiates from the vascular cambium and constitute the inner layer of the bark.



Phloem

Sieve tube elements

- ❖ main conducting cells of phloem
- ❖ elongated and non-nucleated
- ❖ uniformly thin walled with the end walls perforated to form the **sieve plate**.
- ❖ Sieve tube elements are attached end to end to form the sieve tube.

Sieve Plates in Phloem

