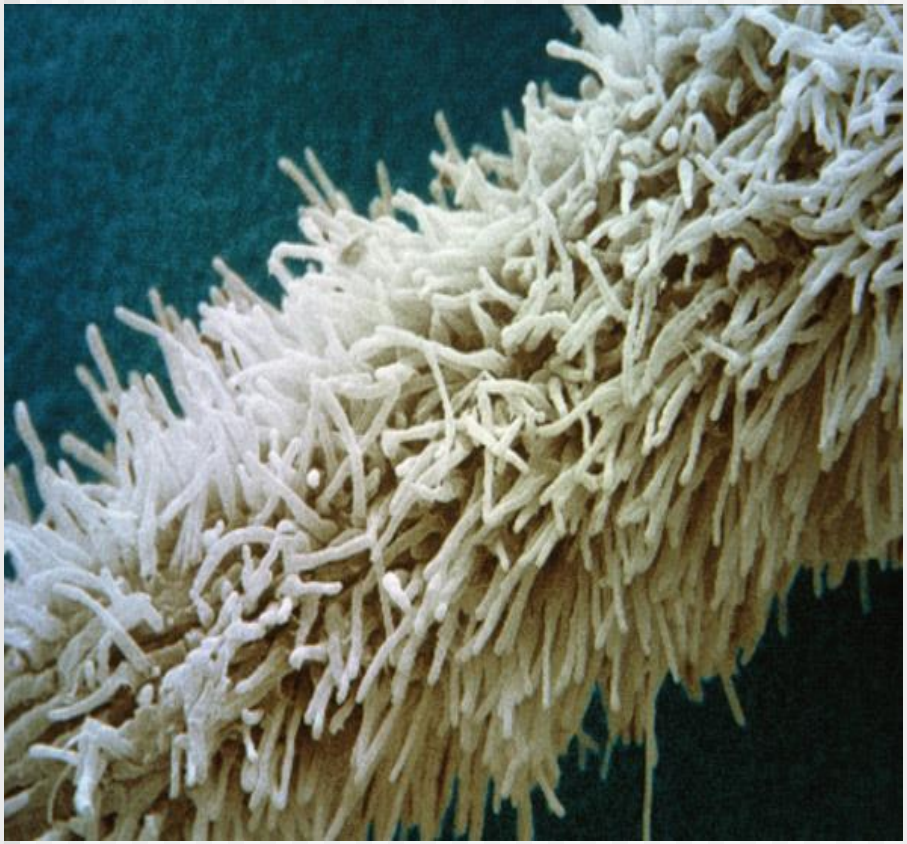
Roots and Stems

KEY CONCEPT

Roots and stems form the support system of vascular plants.

Roots anchor plants and absorb mineral nutrients from soil.

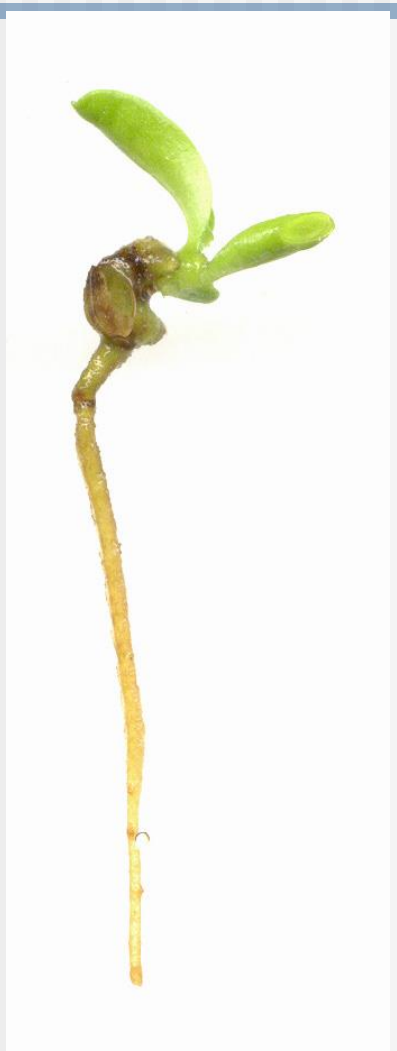


- Roots provide many functions.
  - support the plant
  - absorb, transport, and store nutrients
  - root hairs help absorption

Two types of root systems:

- Fibrous root system – many fine branches. (ex: grass).

Two types of root systems:



- Tap root – Taproot systems have one main root. (ex: dandelions, carrots. May store food)

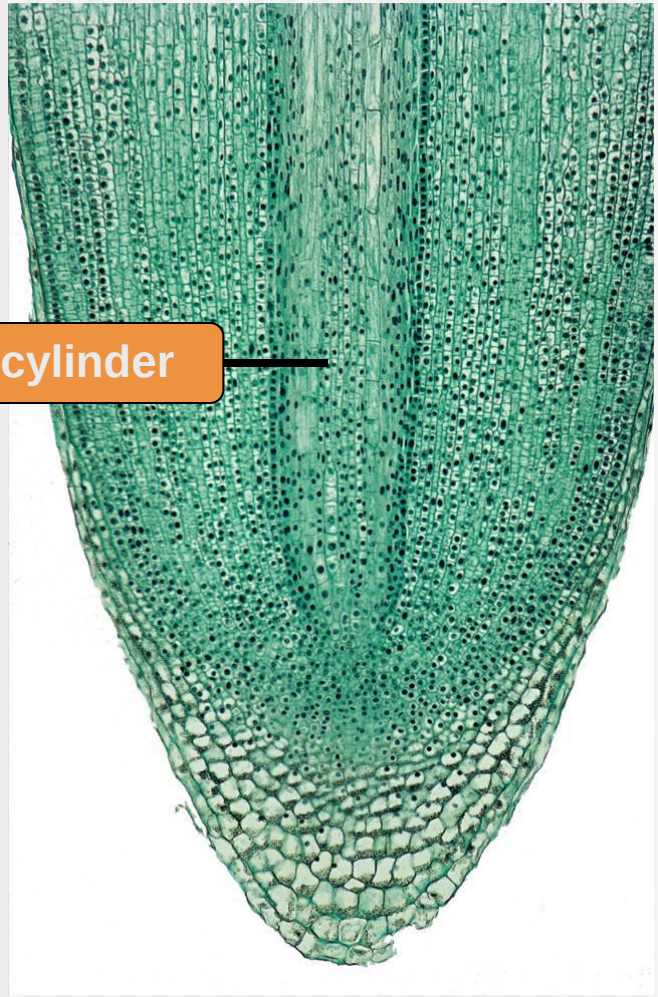
Root Structure

- Root cap – covers tip of root. Protects meristematic cells, eases growth of root through the soil

Root Structure

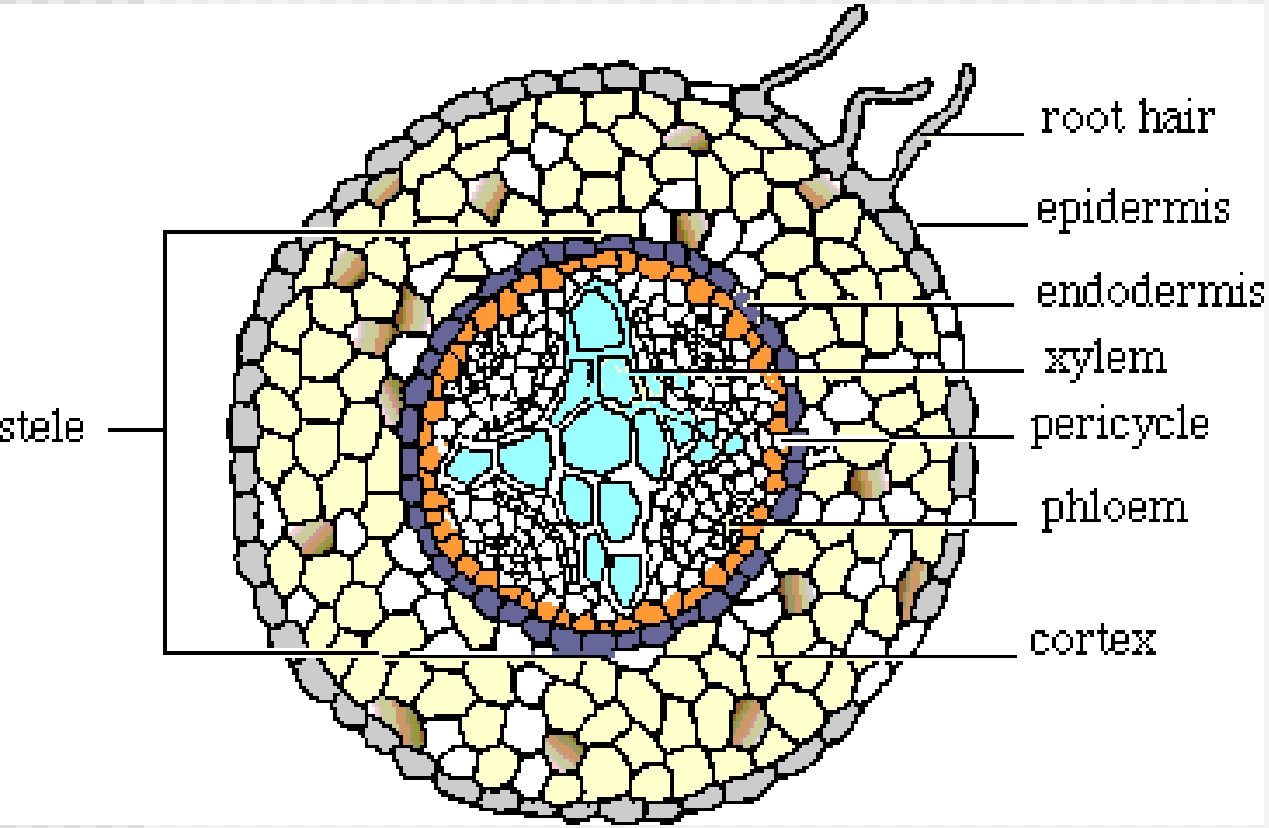
- Apical meristem is an area of growth in length.
- contains small, rapidly dividing cells.

Root Structure



- vascular cylinder contains xylem and phloem.

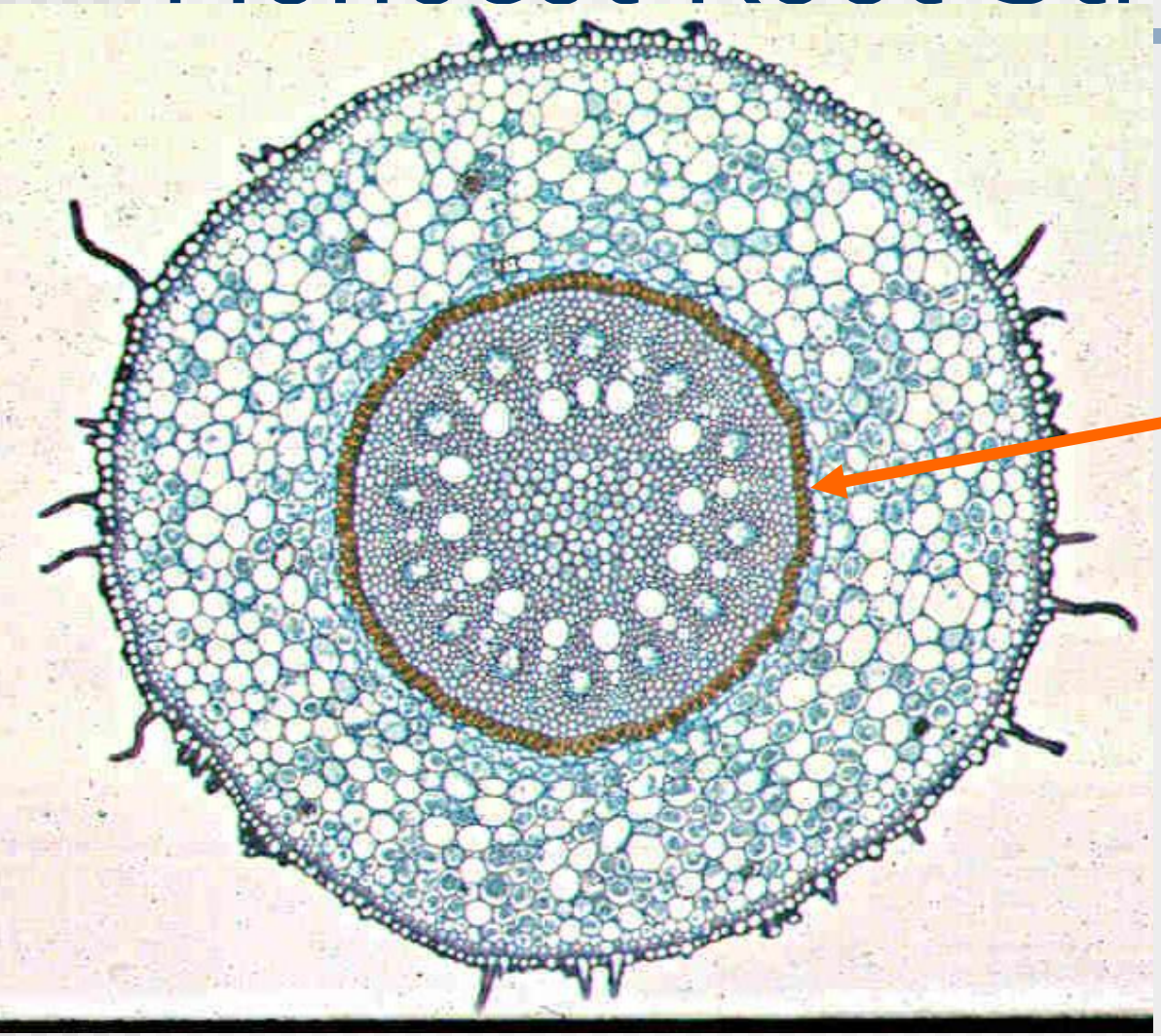
Root Structure



Dicot Root XS

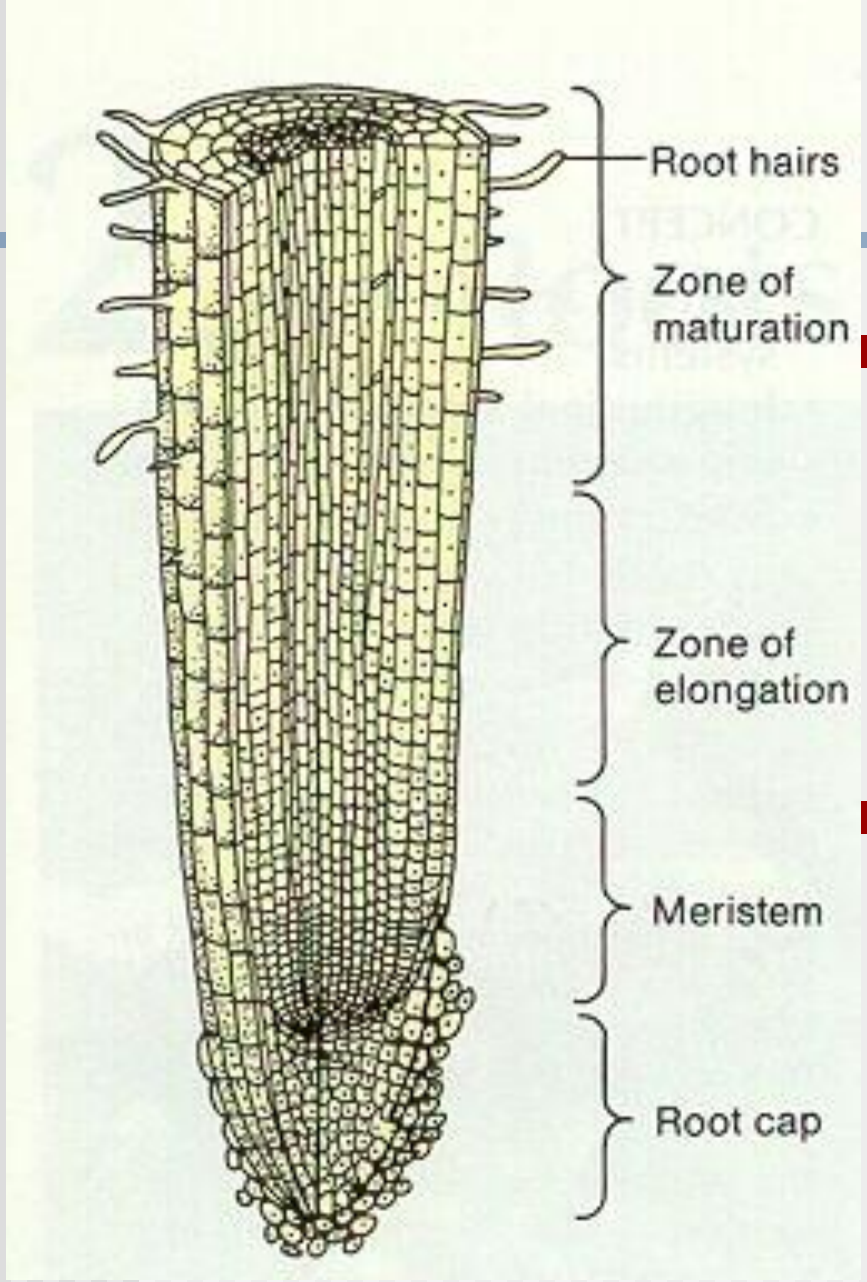
- **Xylem**- transports water and minerals.
- **Phloem**- transports sugars.

Monocot Root Structure



- Vascular tissue in a ring.
- Note endodermis.

Typical root p.



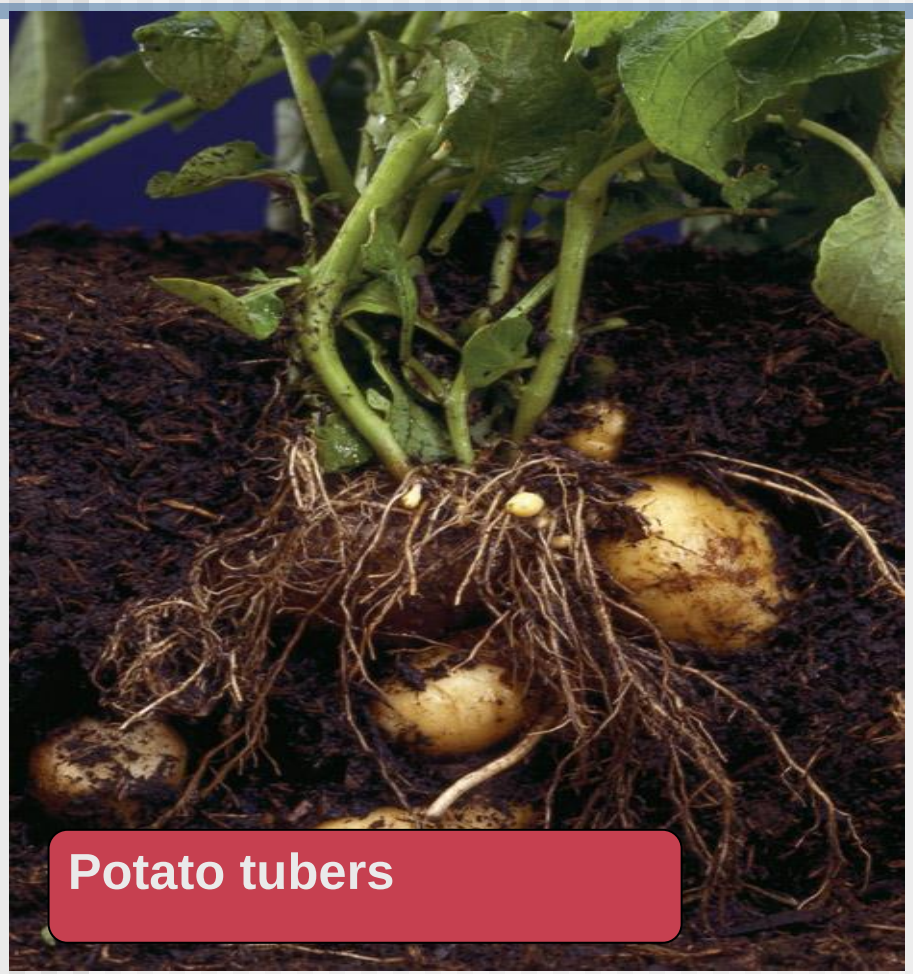
- Zone of elongation – cells have stopped dividing, cell walls expand and the cell gets longer.
- Zone of maturation – is above the zone of elongation. Cells begin to differentiate (develop into other types of tissue).

STEMS


Baobab trees

- Stems support plants, transport materials, and provide storage.
- Stems have many functions.
  - support leaves and flowers
  - house most of the vascular system
  - store water

STEMS

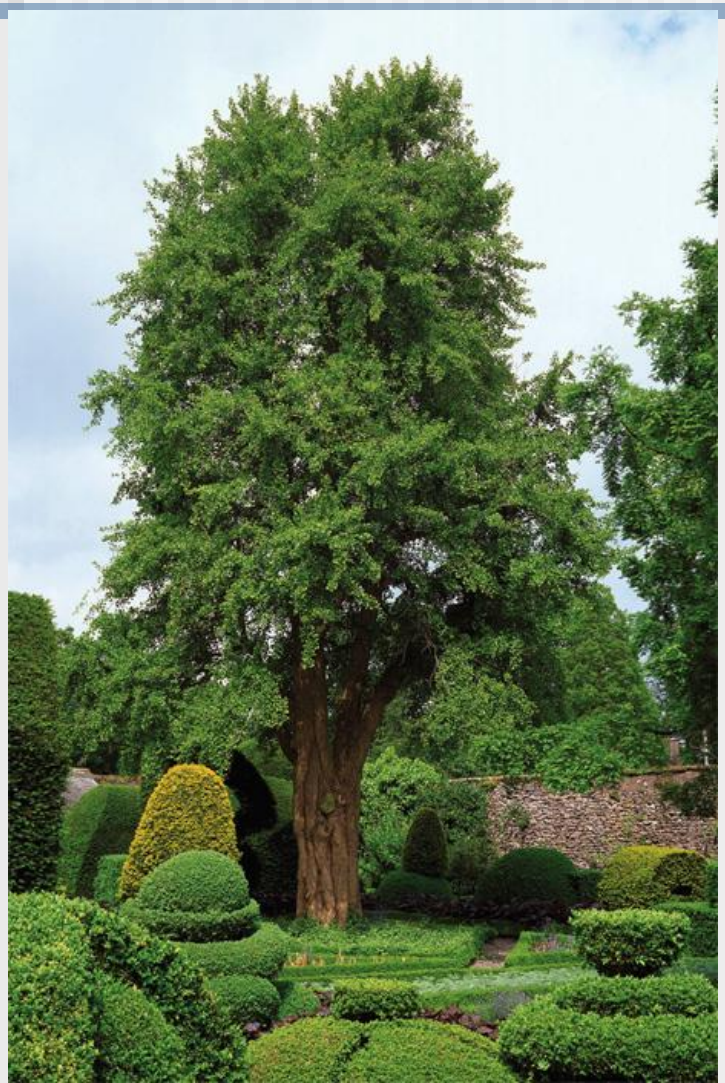


- Stems have many functions.
  - support leaves and flowers
  - house most of the vascular system
  - store water
  - grow underground for storage
  - form new plants

STEMS

Some stems are herbaceous and conduct photosynthesis.

STEMS

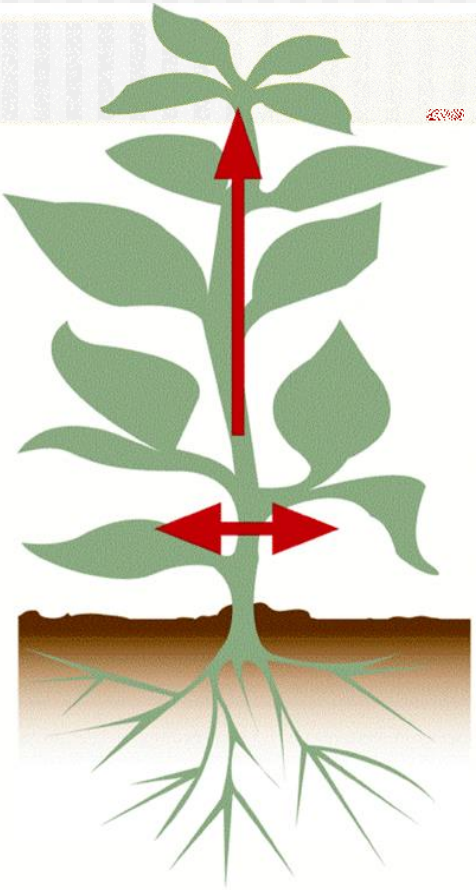


- Some stems can be woody, and form protective bark.

STEM GROWTH

Primary growth lengthens roots and stems.

Secondary growth widens roots and stems.



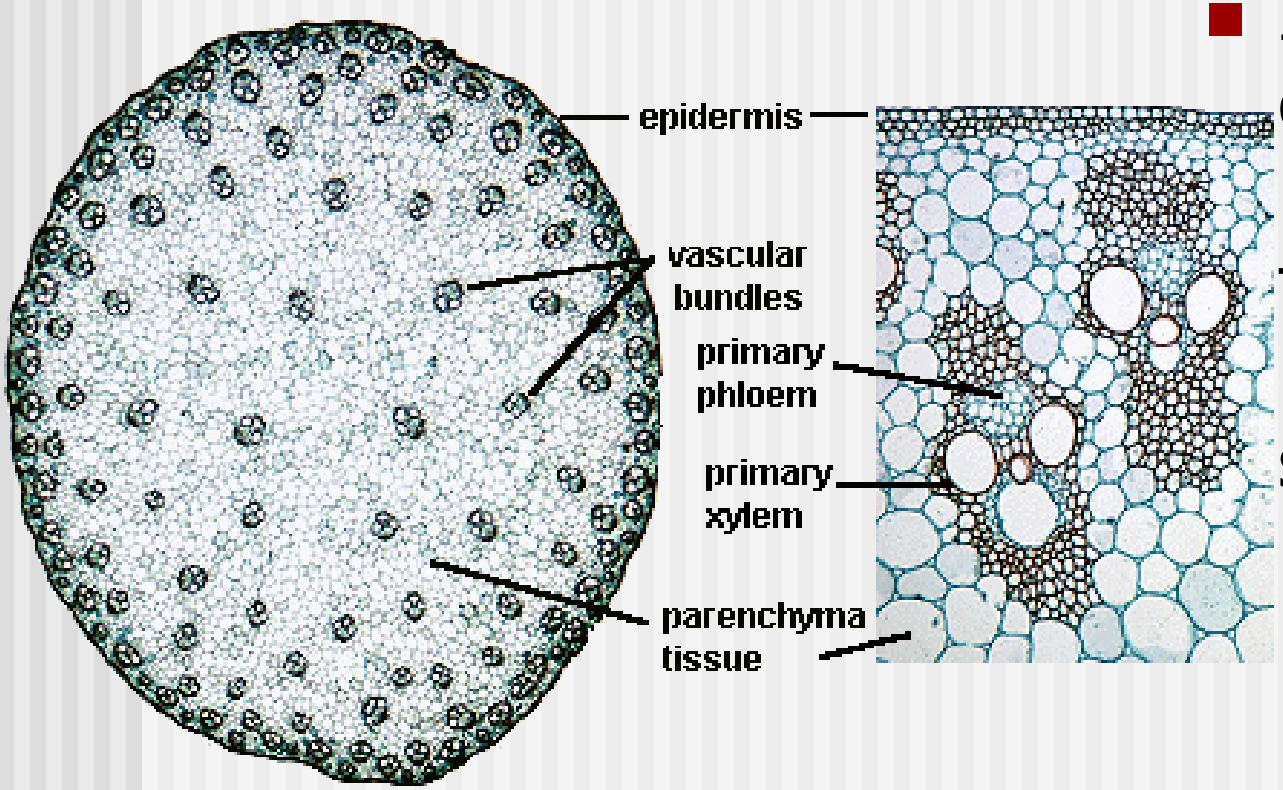
Primary growth increases a plant's length.

Secondary growth increases a plant's width.

STEM GROWTH

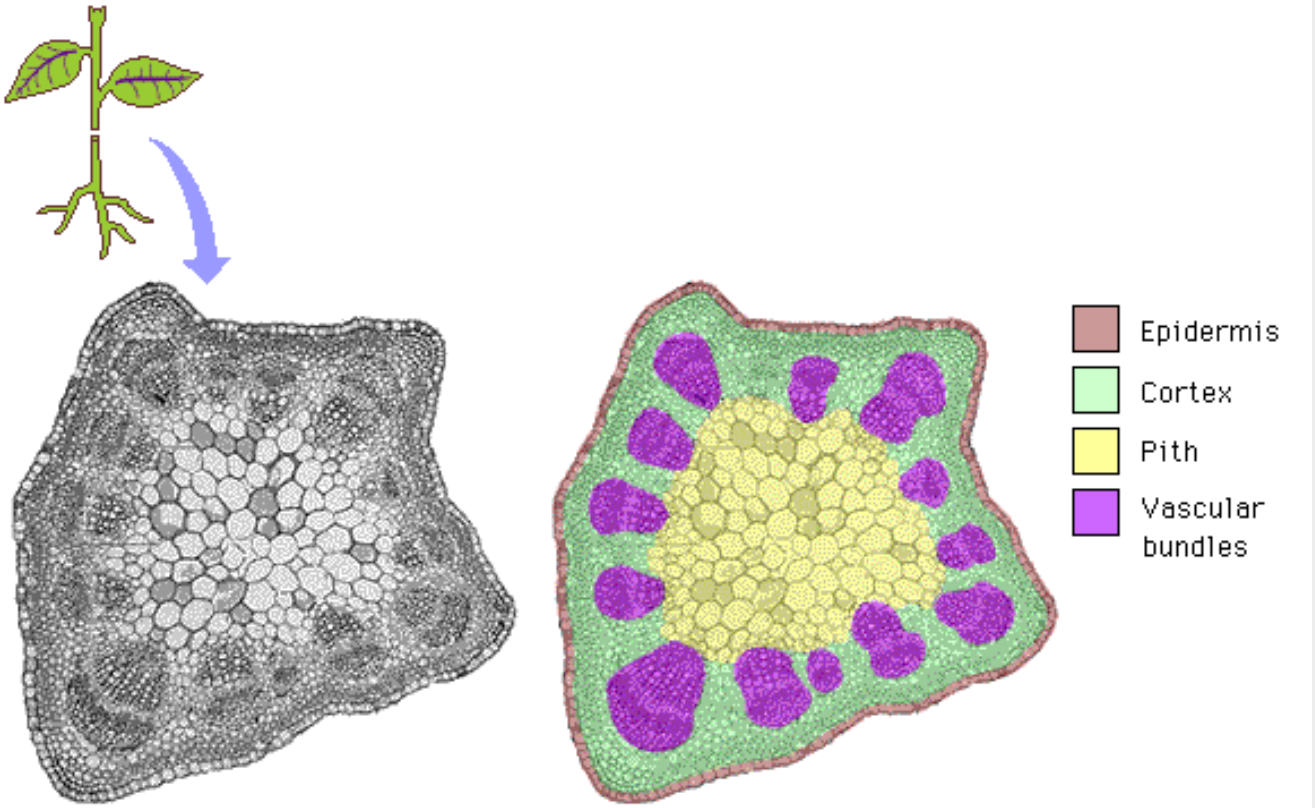
- Tree rings help determine the age of a tree.

STEM STRUCTURE



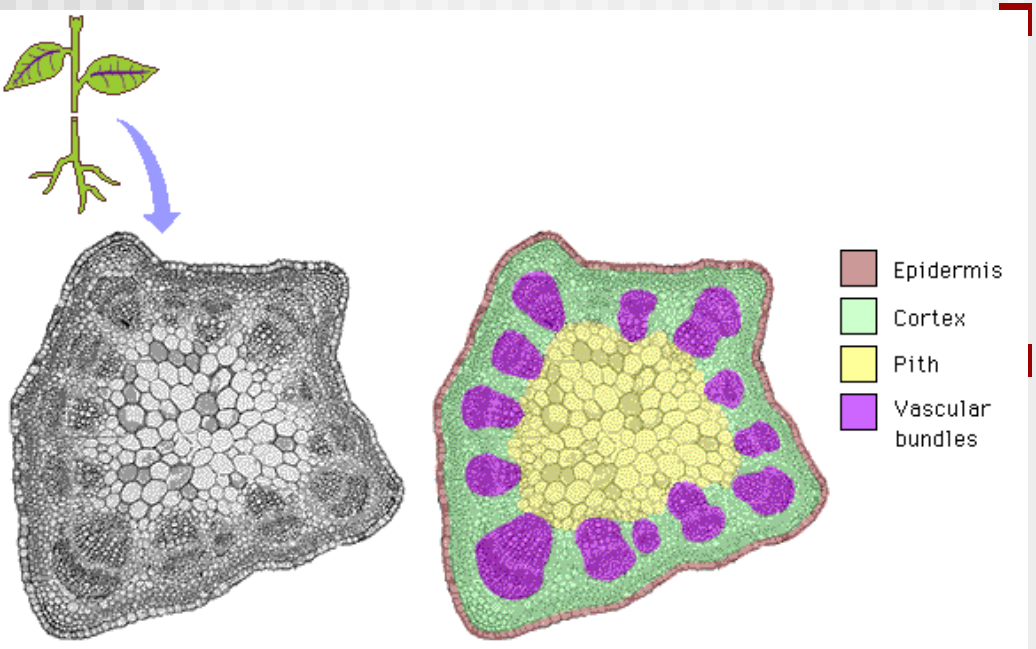
- In the stem of a monocot, the vascular bundles are scattered

STEM STRUCTURE



- In a dicot stem, the vascular bundles are arranged in a ring.

STEM STRUCTURE



- Pith – region of parenchyma cells in the middle of a dicot stem.
- Vascular bundles – consist of phloem cells on the outside, xylem cells on the inside, and cambium in the middle.