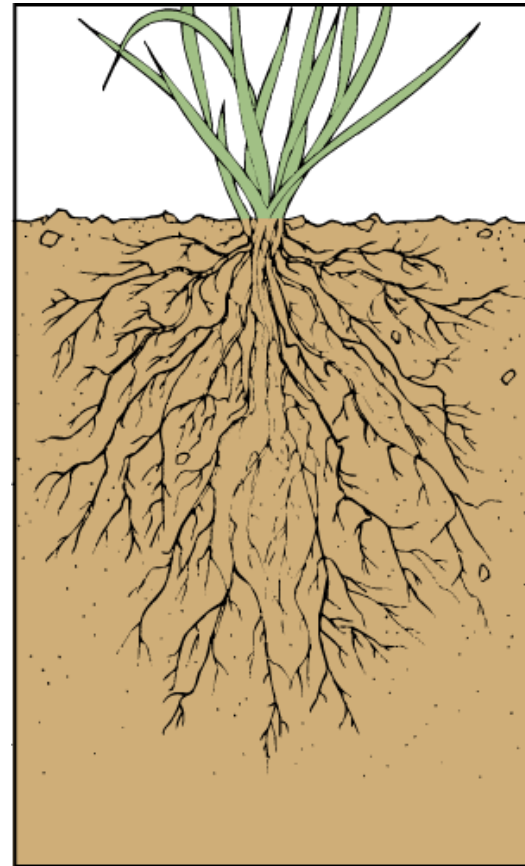




PLANTS: STEMS AND ROOTS

ROOTS

- ◆ Below ground
- ◆ Generally larger than the shoots above ground



ROOTS - FUNCTION

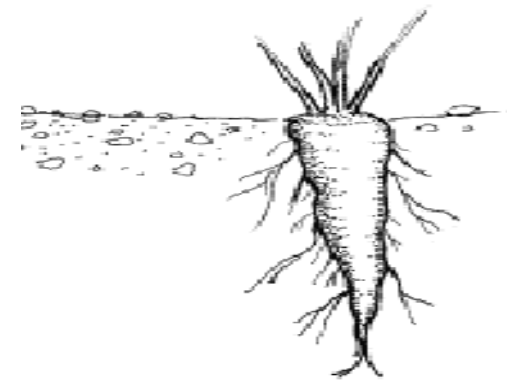
- ◆ Absorb water and minerals
- ◆ Support and anchor plant
- ◆ Food storage
- ◆ Food source
 - Ex. Carrots, radish, potatoes



ROOTS - TYPES

◆ Taproots

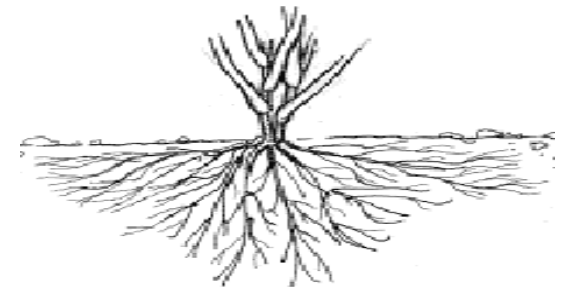
- Large, tapering main root
- Small side branches
- Go deep into soil to get water
- Ex. Carrot



tap root system

◆ Fibrous roots

- Many smaller roots of equal size
- Do not grow deeply
- Hold soil in place to prevent erosion
- Ex. grass



fibrous root system

ROOT GROWTH

- ◆ Apical Meristem – cell division occurs
- ◆ Root cap – protective cap covers the apical meristem and the new cells
- ◆ Zone of elongation – cells get larger
- ◆ Zone of maturation – cells mature and become different cells like phloem and xylem

Vascular cylinder

Root hair

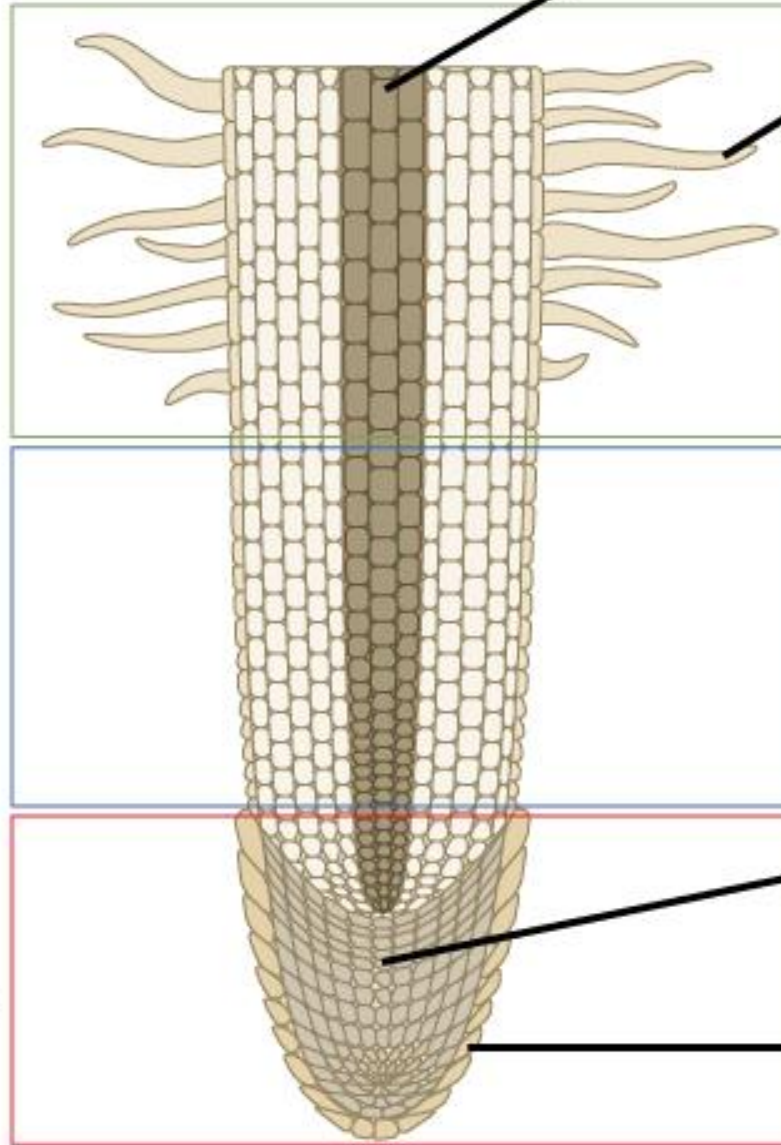
Area of maturation

Area of elongation

Area of cell division

Apical meristem

Root cap



STEMS

- ◆ With the leaves, make up the shoot



STEMS - FUNCTIONS

- ◆ Support for above-ground structures
- ◆ Link roots with leaves
- ◆ Store food and water
- ◆ Allow plant to grow in size and mass



HERBACEOUS STEMS

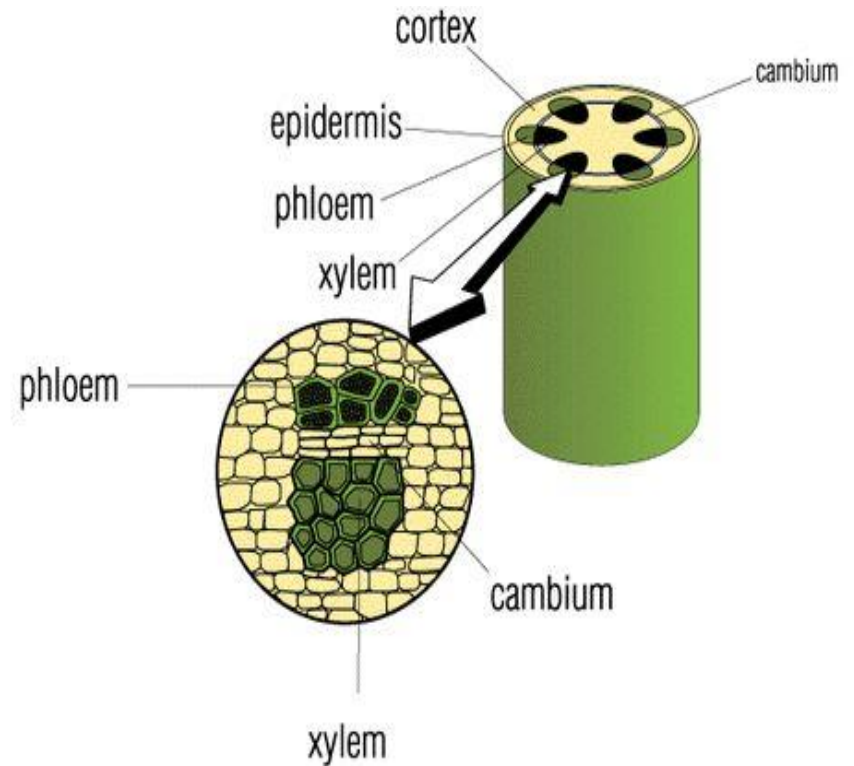
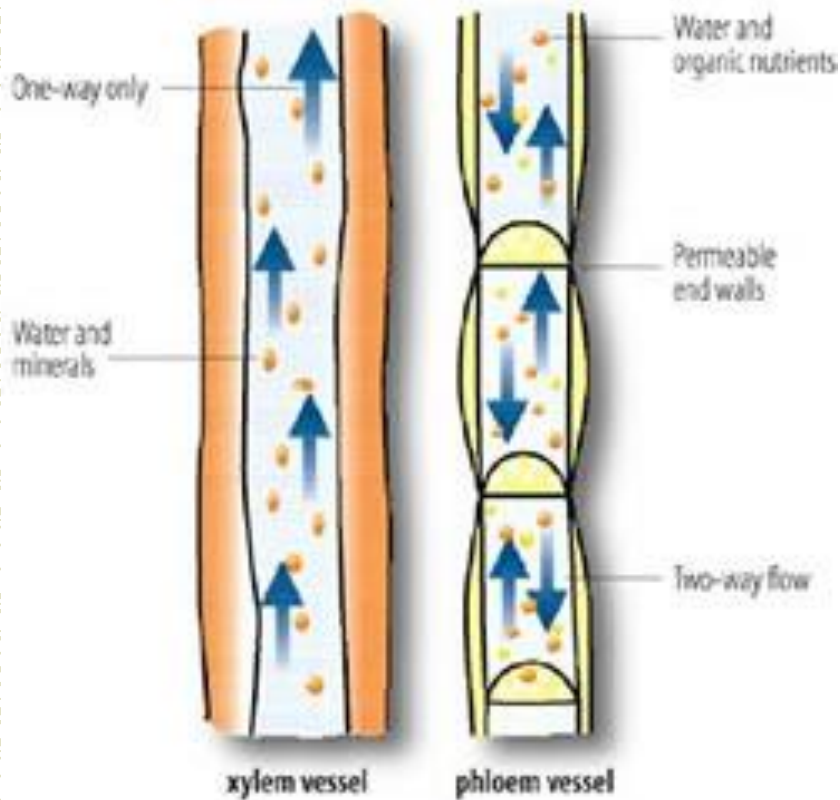
- ◆ Herbaceous (non-wood) plants have soft, bendy stems
- ◆ Relatively weak so generally don't grow more than 1m high
- ◆ Xylem and phloem are arranged in bundles



VASCULAR TISSUE

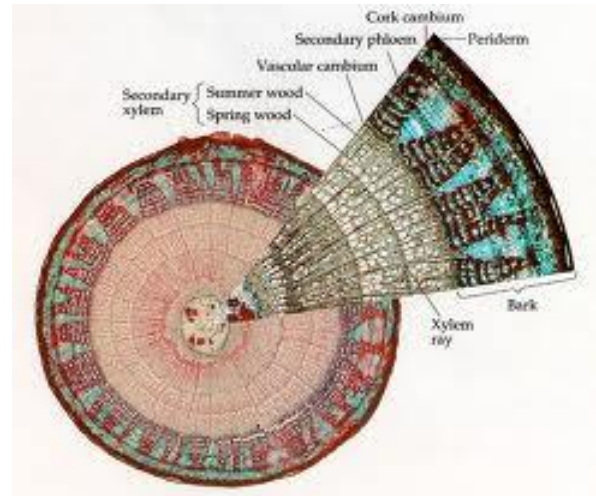
- ◆ Xylem (ZEYE-lum):
 - Tissue that moves water and minerals from roots to leaves
 - Consists of non-living cells
- ◆ Phloem (FLOW-um):
 - Tissue that moves nutrients from leaves to all other plant cells
 - Consists of living cells

XYLEM AND PHLOEM TRANSPORT



WOOD STEMS

- ◆ Hard and do not bend easily
- ◆ Extremely strong so wood plants can grow over 100m tall
- ◆ Xylem and phloem form rings in wood trees and shrubs



STEM ADAPTATIONS

- ◆ Cacti stems absorb and store large amounts of water
- ◆ Potatoes use stems for food storage
- ◆ Stems produce new plants by asexual reproduction
 - Ex. Strawberries

USING ROOTS AND STEMS

- ◆ Wood and maple syrup are both from stems
- ◆ Food such as carrots, yams, sugar
- ◆ Flavourings: root beer, ginger ale come from root extracts
- ◆ Cinnamon from the bark of trees
- ◆ Latex sap used in chewing gum and erasers
- ◆ Dyes, resins and tannins