Plant Body Structure

shoot system (above ground)
produce organic material via photosynthesis
stems and leaves
nodes & internodes
terminal bud and axillary buds

root system (below ground)
anchors plant
absorb water and minerals
store food produced by shoot system

Plant Structure: The Cell

• Review: Plant cells differ from animal cells:
  – Fluid filled vacuole
  – Thick cell wall made of cellulose
    • plasma membrane (similar to animal cells)
    • primary cell wall
    • secondary cell wall
  – Cells held together by “middle lamella”
  – Cells interconnected by plasmodesmata
Plant cells differ from animal cells!

Plant Structure: Tissues

1) Epidermis
   - general function = protection
   - specialized function based on location
     - root epidermis has “root hairs” for absorption
     - leave epidermis develops waxy cuticle, stomates, & trichomes
2) Vascular tissue
   - Xylem
     • Tracheids
     • Vessel members

   Cells are dead!

Note heavy secondary cell walls

2) Vascular tissue (cont)
   - Phloem
     • Sieve-tube members
     • Companion cells

Cells are living!
Plant Structure: Tissues

3) Ground Tissue
   - Parenchyma
     • unspecialized cells with no secondary cell walls
     • perform many functions depending on where they are
   - Collenchyma
     • secondary cell walls give structural support to plant
     • retain some flexibility to allow plant to bend
   - Sclerenchyma
     • heavy secondary cell walls are often lignified
     • dead when mature
     • Two types- fibers and sclereids

Plant Structure: Tissues

4) Meristems- perpetually embryonic tissue
   - Apical meristems are located at the tips of stems and roots
   - The apical meristem produces 3 primary meristems which in turn produce the other 3 tissue types
     • protoderm --> epidermis
     • procambium --> primary vascular tissue
     • ground meristem --> ground tissue
Plant Structure: Tissues

4) Meristems- (cont.)
   - Lateral meristems cause thickening of shoot or root
   - Two types of lateral meristems
     - cork cambium- produces heavy protective layer (“bark”)
     - vascular cambium- produces secondary vascular tissue (“wood”)
Plant Structure: Leaves

• External Leaf Structure
  – Composed of a blade and petiole
  – Types of leaves
    • simple leaf has a single blade
    • compound leaves have several leaflets sharing single petiole
      – pinnately compound
      – palmately compound
  – Leaf attachment
    • alternate
    • opposite
    • whorled

Plant Structure: Leaves

• Internal Leaf Structure (Figure 34.31)
  – Epidermis
    • upper and lower epidermis secretes cuticle
    • stomata= openings for gas exchange
  – The mesophyll (ground tissue) fills space between upper and lower epidermis
  – Mesophyll cells contain chloroplast for photosynthesis
  – Vascular bundles (veins) conduct materials around leaf
Figure 26.19

Eucalyptus leaf, cross section. Most photosynthesis occurs in the densely packed palisade mesophyll cells, which are just beneath the upper epidermis of the leaf. Gas exchange occurs through stomata, which are usually most abundant on the lower side of the leaf. Water loss is minimized by the waxy cuticle that covers the leaf.