

## Exam 3 Study Guide

### Intro to Plants – Chapter 36

#### Vocabulary

- Collenchyma – support and protection
- Cuticle – fatty layer of cutin in plants to protect against ultraviolet damage and limit water loss
- Desiccation – tissue and cell drying
- Epidermis – one cell layer thick in most plants, forms outer protective covering
- Guard Cells – paired, sausage-shaped cells flanking a stomata
- Leaf Primordia – protect shoot apical meristem
- Lignin – highly branched polymer that makes cell walls more rigid
- Megaphyll – leaf with several to many veins
- Mesophyll – tissue between upper and lower epidermis
- Microphyll – leaf with one vein branching from the vascular cylinder of the stem and not extending the full length of the leaf
- Parenchyma – storage, photosynthesis, secretion
- Phloem – principal food-conducting tissue in vascular plants
- Primary Plant Body – extension of the root and stem
- Primary Tissues – tissues derived from apical meristems
- Procambium – produces primary vascular tissues (primary xylem for water transport and primary phloem for nutrient transport)
- Protoderm – forms epidermis
- Root Cap – protects root apical meristem
- Root Hairs – tubular extensions of individual epidermal cells, keep root in intimate contact with the surrounding soil particles, increase root's surface area and efficiency of absorption
- Root System – anchors plant, absorbs water/ions
- Sclerenchyma – support, transport, protection
- Secondary Plant Body – secondary tissues
- Secondary Tissues – tissues formed from lateral meristems (trunk, branches, older roots of trees and shrubs)
- Shoot System – stems, leaves, flowers
- Stele – tissues interior to the endodermis
- Stomata – mouth-shaped epidermal opening, serving gas exchange and diffusion of water vapor
- Tracheids – dead cells that taper at the end and overlap one another
- Trichomes – cellular or multicellular hair-like outgrowths of the epidermis, keep leaf surfaces cool and reduce evaporation
- Vascular Cambium – a lateral meristem that produces secondary vascular tissue
- Veins – consist of both xylem and phloem and are distributed throughout leaf blades
- Vessels – tubes of dead cylindrical cells arranged end-to-end in xylem
- Xylem – Principal water-conducting tissue

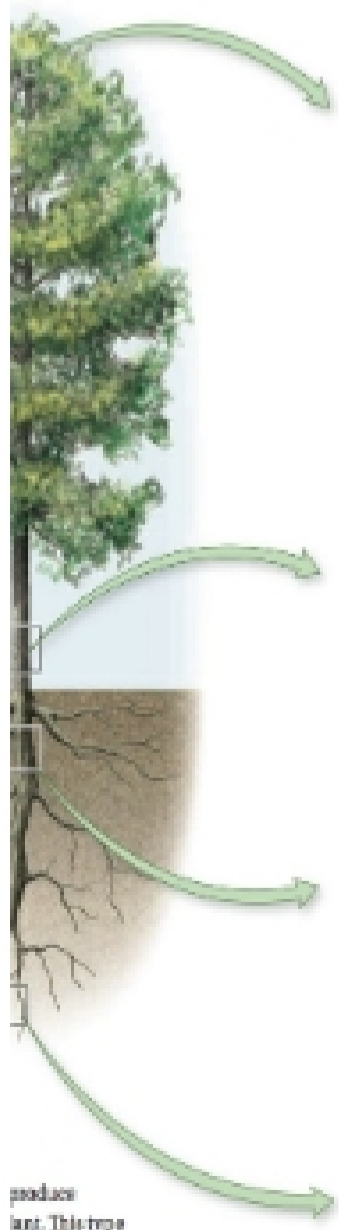
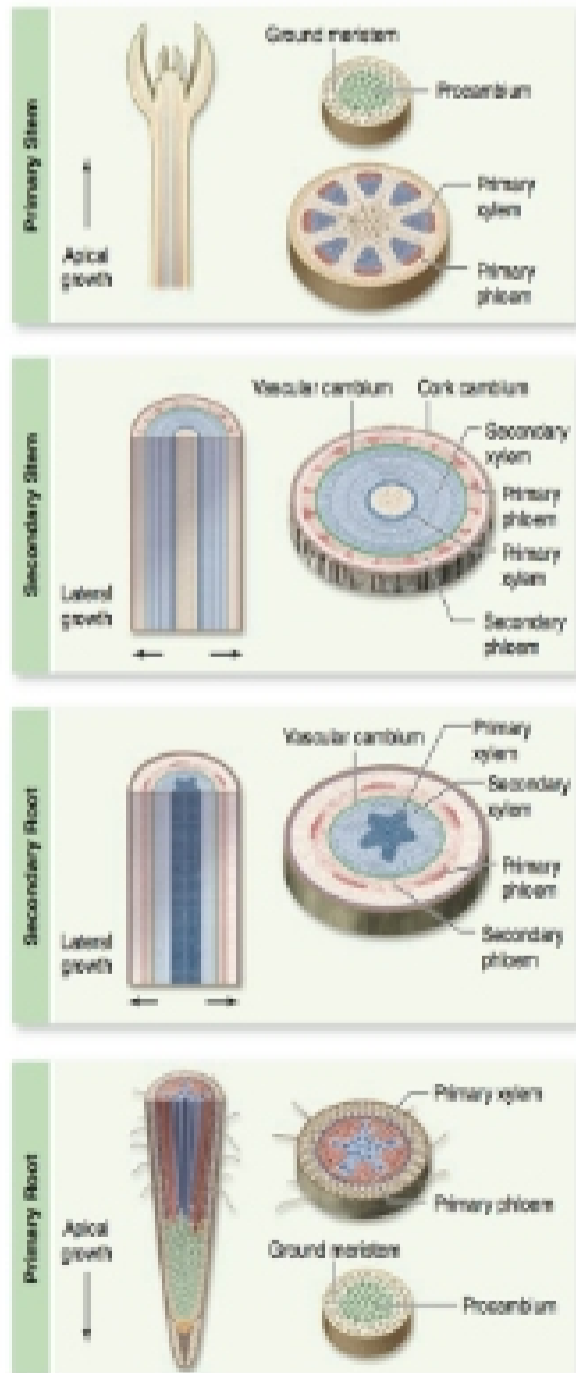
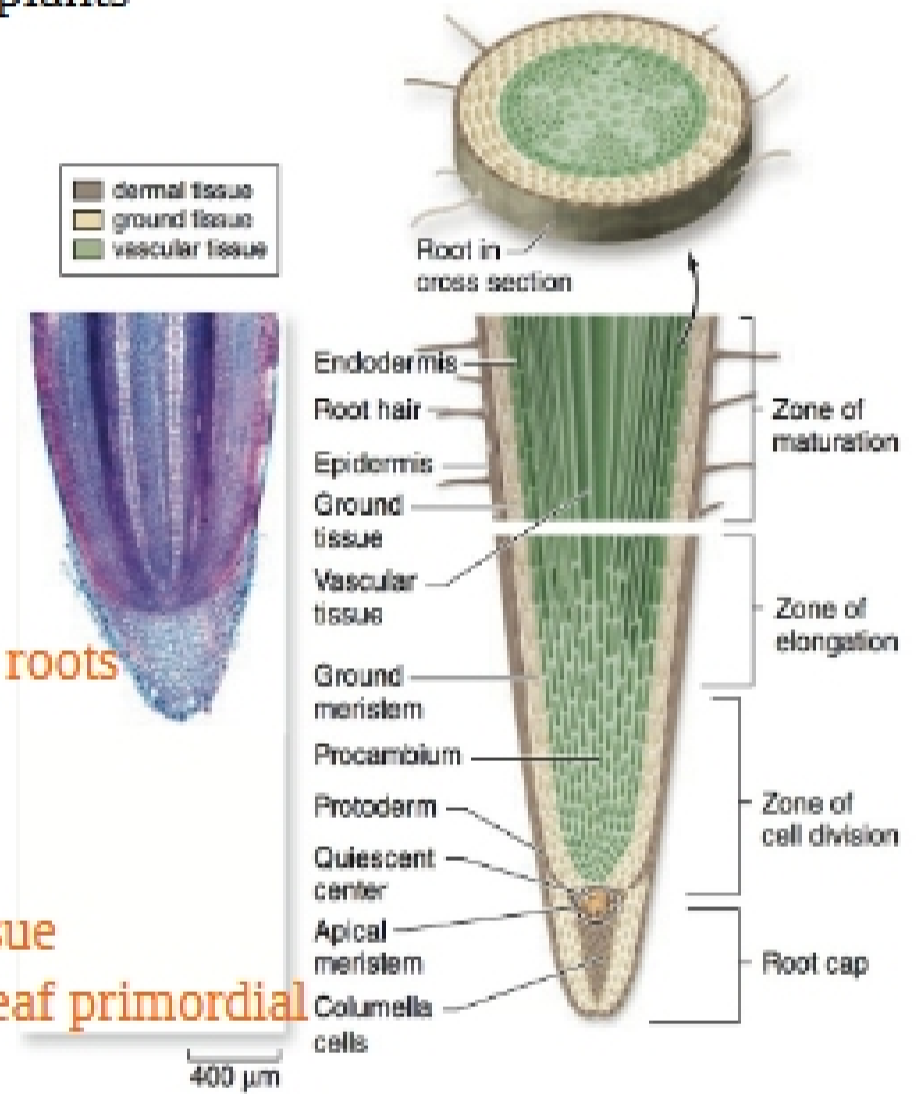
#### Key Concepts

1. Explain how plants met the evolutionary challenges of life on land
  - Desiccation – tissues and cells dry out
    - Developed protective epidermis, covered with a waxy cuticle or bark
    - Stomata to facilitate gas exchange through epidermis
    - Water movement through tissues
  - Gravity – plants cant rely on natural buoyancy of water
    - Root-shoot system
      - Roots anchor plants in the soil
      - Tracheids, depending on size
  - Fertilization – land plants inherit motile gametes from green algae ancestors
    - Early land plants remain dependent on water for fertilization
    - Internal fertilization in seed plants

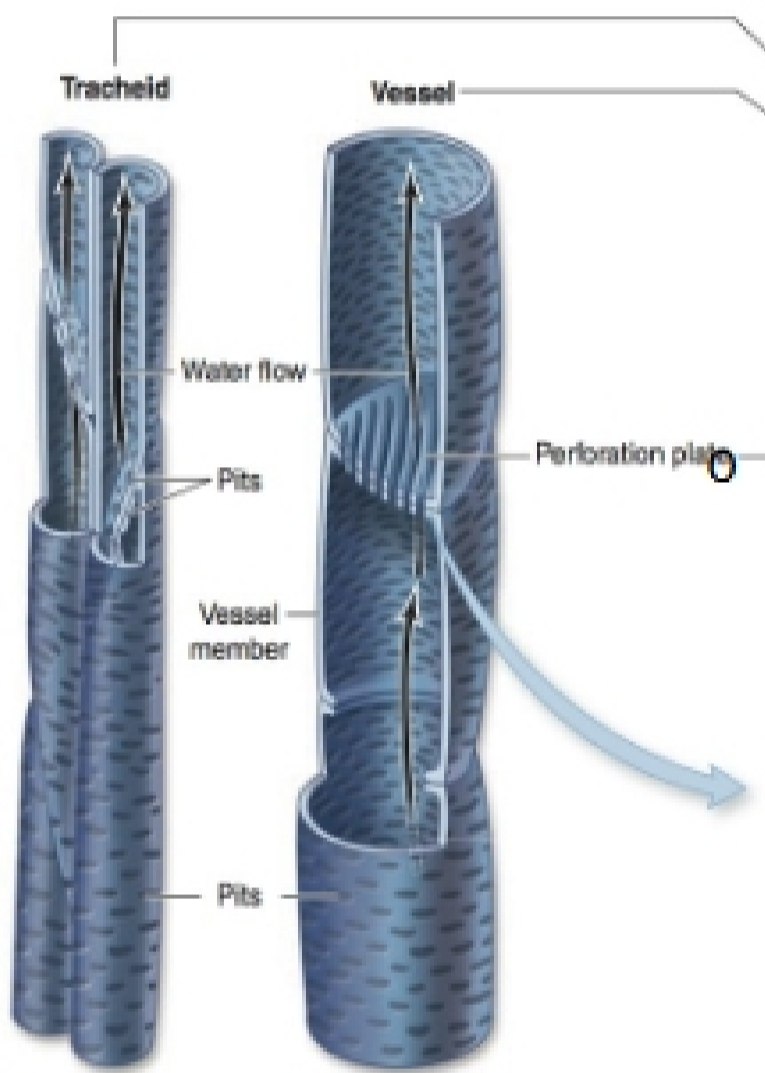
2. Identify basic organs, tissues, and anatomical structures of plants

- 3 basic functions
  - Growth (meristem)
  - Support (parenchyma)
  - Transport (xylem, phloem)
- Tissue Types
  - Meristem

- Act as “stem cells” for plants
- Apical meristem
  - Extension of shoot and root
  - Located at tips of stems and roots
  - Give rise to primary tissues
    - Epidermis
    - Ground tissue
    - Primary vascular tissue
  - Composed of root cap and leaf primordia
- Lateral meristem
  - Increase in shoot and root diameter
  - Found in plants that exhibit secondary growth
  - Give rise to secondary tissues
  - Two types
    - Cork cambium → outer bark
    - Vascular cambium → secondary vascular tissue



- Parenchyma
- Xylem
- Phloem
- 3 Main Types of Tissues
  - Dermal
    - External surfaces that serves a protective function
    - 1 cell layer thick
    - Covered with cutin layer (cuticle)
    - Forms several special cells
      - Guard cells
      - Trichomes
      - Root hairs



- Ground
  - Forms several different internal tissue types
    - Parenchyma
      - Most common type
    - Collenchyma
    - Sclerenchyma
  - Can participate in photosynthesis
  - Serve a storage function
  - Provide structural support

○ Vascular

- Conducts water and nutrients
- Xylem
  - Vessels + Tracheids
  - Principal water-conducting tissues
  - Typically includes some ground tissue cells
  - Conducts inorganic ions
- Phloem
  - Principal food-conducting tissue in vascular plants
  - Two types of elongated cells
    - Sieve cells (seedless vascular/gymnosperms)
    - Sieve-tube members (Angiosperms)

• Plant Body Organization

- Vascular Plant
  - Root System
  - Shoot System
- Primitive plants rely on diffusion
- Root-shoot system

