

Chapter 29 and Chapter 30  
Plant Tissues, Plant Nutrition and Transport  
I. Overview of the Plant Body

- A. \_\_\_\_\_ – flowering plants
- B. Shoots and Roots
  - 1. \_\_\_\_\_-stems, leaves and flowers
    - Water, minerals – transported
    - Store food
  - 2. \_\_\_\_\_ – below ground (usually)
    - Absorb water, minerals transport upward
    - Anchor plant

C. Water Transport

- 1.
  - a. Water moves from roots to stems and then to leaves
  - b.
  - c.

■ D. Three Plant Tissue Systems

- 1. \_\_\_\_\_ – bulk of plant body
- 2. \_\_\_\_\_ – conducting tissues
- 3. \_\_\_\_\_ – Protective tissues

■ E. Meristems

- 1. Meristems – \_\_\_\_\_ cells
  - a. Apical Meristems – tips of roots and stems

- (1)
- (2) Primary growth
- b. Lateral Meristems – older roots and stems
  - (1) Increase in diameter

- (2) \_\_\_\_\_ growth

## II. Types of Plant Tissues

### ■ A. Simple Tissues (composed of only one type of cell)

- 1. \_\_\_\_\_ and help strengthen the plant
- 2.

### ■ B. Complex Tissues – A variety of cell types

- 1. \_\_\_\_\_ uses two kinds of cells (vessel members and tracheids)
  - a. Function – \_\_\_\_\_ absorbed from the soil
- 2. \_\_\_\_\_ – two kinds of cells (Sieve and companion)
  - a. Function –
  - b.
  - 
  - 
  - c.
  - d.
- 3. Component of the Vascular Tissue System.

### C. Complex Tissues (cont.)

- 1. A **dermal tissue system** \_\_\_\_\_ covers all primary plant parts.
  - a. A waxy cuticle covers the external surfaces of the plant to restrict water loss and resist microbial attack.
  - b.
  - c. Guard cells change shape in response to changing conditions.

- 1.
- 2.

### III. Primary Structure of Shoots

#### ■ A. How Stems and Leaves Form

- 1. Leaves develop from \_\_\_\_\_ along the apical meristems of stems.
  - a. A \_\_\_\_\_ is the point where a leaf or leaves attach to the stem.
  - b. An \_\_\_\_\_ is the region on the stem between the nodes.
- 2. Buds develop in the leaf axils (the upper angle where leaves attach to the stem)
  - a. Mostly an undeveloped shoot covered by \_\_\_\_\_ scales.
  - b. Buds give rise to \_\_\_\_\_.

#### Dicots and Monocots – Same Tissues, Different Features (Two types of Angiosperms)

- A. \_\_\_\_\_ include common trees and shrubs (other than conifers) - maples, elms, roses, cacti, peas, beans, lettuces, cotton, and carrots
  - 1. Seed has \_\_\_\_\_ to store or absorb food for plant embryo – germination – new leaves grow and start to make food.
- B. Monocots include \_\_\_\_\_ and palms.
  - 1. Seed has

### V. Internal Structure of Stems

- A. Xylem and Phloem develop inside the same sheath of cells as vascular bundles.
  - 1. \_\_\_\_\_ run lengthwise through the ground tissue of *shoots*.
- B. The arrangement of vascular bundles is \_\_\_\_\_ in dicots and monocots.
  - 1. The *stems* of most dicots have vascular bundles arranged as a \_\_\_\_\_ that divides the ground tissue into the outer \_\_\_\_\_ and inner pith.

- 2. In most monocots, the vascular bundles are \_\_\_\_\_ throughout the ground tissue.

## VI. A Closer Look at Leaves

### ■ A. Similarities and Differences Among Leaves

- 1. Leaves contain
- 2. \_\_\_\_\_ trees drop their leaves as winter approaches, \_\_\_\_\_ retain theirs.
- 3. Monocot leaves tend to have a \_\_\_\_\_ surface, like a knife blade, the base at which encircles and sheaths the stem.
- 4. Dicot leaves have a \_\_\_\_\_ blade attached by a petiole to the stem.

## VII. Primary Structure of Roots

### ■ A. Taproot and Fibrous Root Systems

- 1. In most \_\_\_\_\_, the primary root emerges from the seedling, increases in diameter and grows downward.
  - a. \_\_\_\_\_ roots emerge sideways along its length.
  - b. The \_\_\_\_\_ plus lateral roots form the taproot system.
- 2. In \_\_\_\_\_, the taproot is replaced by adventitious roots that arise from the stem.
  - a. These roots and their branchings form a \_\_\_\_\_ root system.
  - b. \_\_\_\_\_ roots do not penetrate as deeply as taproots.

## VIII. Seasonal Growth Cycles

### ■ A. Growth cycles proceed from germination, to seed formation to death.

- 1. \_\_\_\_\_ – complete their life cycle in one season, they are herbaceous such as corn and alfalfa
- 2. \_\_\_\_\_, such as carrots, live two growing seasons, vegetative growth the first year, flower and seed formation the second year.
- 3. \_\_\_\_\_ live many years and have secondary growth (roses, grapevines, apple trees)