Plant Structure and Growth

Now the fun really begins…

Why should we care about plants?
- Do you enjoy breathing?
- Hungry?
- Don’t feel well?
- What are you writing on?
- Local uses

Lecture outline
- Plant evolutionary tree
- Plant structure
  - Organs
  - Tissues
  - Cells
- Plant growth

Plant evolutionary tree

Angiosperms

Cots
- Cotyledon = seed leaf

(b) Angiosperm phylogeny

Fig. 30.14b

Fig. 29.5

Fig. 30.16
The beginning, a very good place to start

- Two major systems
  - Their roles?
- Three major organs

**Fig. 35.2**

The root system

- Root hairs—role?
- Fibrous roots—role?
- Tap roots—role?
- Adventitious roots—role?

**Fig. 35.3**

The shoot system

- Stems and leaves
- Vegetative or reproductive
- Apical dominance—the apical buds rule
- Pruning?

**Fig. 35.2**

Modified stems

- Stolons—surface
- Rhizomes—underground
- Tubers—enlarged ends of rhizomes
- Bulbs—enlarged bases of leaves

**Roles?? Fig. 35.5**

Leaves

- Leaf = blade + petiole
  - Many monocots lack petioles
- Simple vs. compound
  - The bud always knows: one bud = one leaf

**Fig. 35.6**

Modified leaves

- Tendrils
- Spines
- Storage
- Reproductive
- Bracts

**Fig. 35.7**

Dogwood photo © Hilton Pond Center
Modified leaves (2)

Figures from *Smithsonian* article, 2010

Tissue systems

- Leaves, stems, and roots each have three tissue systems

Fig. 35.8

Dermal tissue (1)

- Epidermis
- Root hairs
- Cuticle
- Periderm

Vascular tissue (2)

- Xylem
- Phloem

Fig. 29.5

Xylem

- Tracheids
- Vessel elements

Functional = dead

Fig. 35.10

Phloem

- Sieve-tube members
- Companion cells

Functional = alive

Fig. 35.10
Ground tissue (3)
- Pith (internal to vascular tissue)
- Cortex (external)
- Several functions

Grape stem

Other types of plant cells
- Parenchyma, collenchyma, sclerenchyma
- Roles?

Fig. 35.10

Plant growth overview
- Most plants have indeterminate growth
  - Meaning?
  - How is this possible?
    - Perpetually embryonic tissues: meristems
- Apical meristems give rise to primary growth
  - = lengthening
- Lateral meristems give rise to secondary growth
  - = thickening

Growth at the meristems

Primary growth of roots
- 4 major sections

Fig. 35.13

Secondary growth cross-section

Fig. 35.19
Tree trunks

Fig. 35.22

Fig. 35.23