BIOL 101
Plants 1

I. Terrestrial Invasion
   A. Mineral absorption
      1.
      2.

   B. Water conservation
      1. waxy cuticle
         - prevents water loss (or gain)
      2. stomata
         a. passages in the cuticle
         b. allow gas exchange
         c. water vapor

   C. Reproducing
      1. plants immobile
         - creates problem for sexual reproduction
      2. spores
         a. 
         b. 

   D. Life cycle changes
      1. alternation of generations
         - diploid alternates with haploid
      2. sporophytes (diploid)
         - form haploid spores by meiosis
      3. gametophytes (haploid)
         - form haploid gametes by meiosis

   E. Vascular system (found in 9 of 12 plant phyla)
      1. roots and shoots
      2. tall plants need good plumbing
      3. some vascular systems are simple
         a.
F. Avascular plants
1. first land plants
2. limited size
3. liverworts and hornworts

II. Vascular Plants
A. Features
1. dominant sporophyte
2. specialized conducting tissue
   - reinforced cell walls
   - vascular bundles
3. specialized body form

B. Conducting systems
1. sieve elements
   a. transport carbohydrates
   b. phloem
2. tracheary elements
   a. hard-walled cells
   b. transport water and minerals
   c. xylem

C. Growth
1. primary
   a. cell division at tips
   b. apical meristem
2. secondary
   a. new cells laid around periphery
   b. increased diameter
      - allows increase in height
   c. wood
   d. rings

D. Seedless varieties
1. water required for fertilization
2. ferns
a. independent sporophyte and gametophyte forms

b. gametes from gametophyte unite \(\rightarrow\) zygote

c. zygote develops into sporophyte
   - produces haploid spores
   - spores released

d. spores develop into gametophyte

e. gametophyte:

f. sporophyte: