References (Textbook - pages 420 - 436, Lab manual - page 137)

Major Characteristics

1. *Tracheophyta* is the largest and most advanced of the plant divisions (mention other being bryophyta)

2. The sporophyte (2N) is the dominant stage in the tracheophyte life cycle.
   a. Recall that the gametophyte is the dominant life stage in the bryophyte life cycle.
   b. In tracheophytes, the sporophyte is independent and autotrophic and possesses the specialized vascular tissues.

3. The largest and most conspicuous differences of tracheophytes from bryophytes are vegetative and morphological differences

4. *Tracheophytes* possess true vascular tissues. Thus they are called the vascular plants while bryophytes are called the non-vascular plants. (see handout of Figure 24.11 from page 420 of textbook).
   a. 2 types of specialized tissues for vascular functions are called
      - *xylem* - conducts water and dissolved minerals upward from the roots
      - *phloem* - conducts sucrose and other organic compounds throughout the plant
   b. 2 functions of the vascular tissues (xylem and phloem) are
      - *Transport* of food, water, and minerals in plant body
      - *Support* of plant

5. *Tracheophytes* have true roots.

6. They have true stems

7. They possess true leaves
8. The possession of *true roots, true stems*, and *true leaves* are largely responsible for the *success* of *tracheophytes* on *land*.

9. The ability of *primitive plants* that were *primarily aquatic* to *invade* and *succeed* on *land* required *5 major adjustments*.

   a. *Protection from water loss* - tracheophytes achieved this by developing a *cuticle*, which is an outside layer of *waxy cutin* that provides a *barrier* to help prevent water loss.

   b. *Gas Exchange* - tracheophytes developed small pores called *stomates* on underside of *leaf surfaces* that can be opened by *guard cells*, thus permitting *gas exchange* and keeping *water loss* to a minimum.

   c. *Conduction of food and water* - as mentioned already, tracheophytes have *true vascular tissues* (xylem and phloem) to accomplish this task.

   d. *Support of above ground parts* - tracheophytes possess masses of elongated, *thick walled cells* called *fibers* to provide support for the plant body above ground.

   e. *Safe transfer of sperm to egg* - This need was meet by tracheophytes by the presence of *pollen grains* that can withstand *dry conditions*.

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**Classification**

Division *Tracheophyta* - vascular plants

A. Subdivision *Psilopsida* - whisk ferns

B. Subdivision *Lycopsida* - club mosses, ground pine

C. Subdivision *Sphenopsida* - horsetails

D. Subdivision *Pteropsida* - ferns, conifers, flowering plants

   (1) Class *Felicinae* - ferns

   (2) Class *Gymnospermae* - conifers like pine trees

   (3) Class *Angiospermae* - flowering plants