1. List the adaptations plants had on land. What is the significance of each adaptation?

- cuticle - stops H_2O loss
- stomata - allows for gas exchange
- lignin in secondary cell wall provides support
- use of spores/alternative methods for transporting sperm
- archegonia keeps zygote moist & protected
- xylem & phloem transport H_2O & nutrients/provide support

2. Bacteria: peptidoglycan as plant spores: _____
   Sporopollenin
3. The following are all adaptations to life on land except:
   a. Rosette cellulose synthesizing complexes
   b. Cuticles
   c. Tracheids
   d. Reduced gametopohyte generation
   e. Seeds

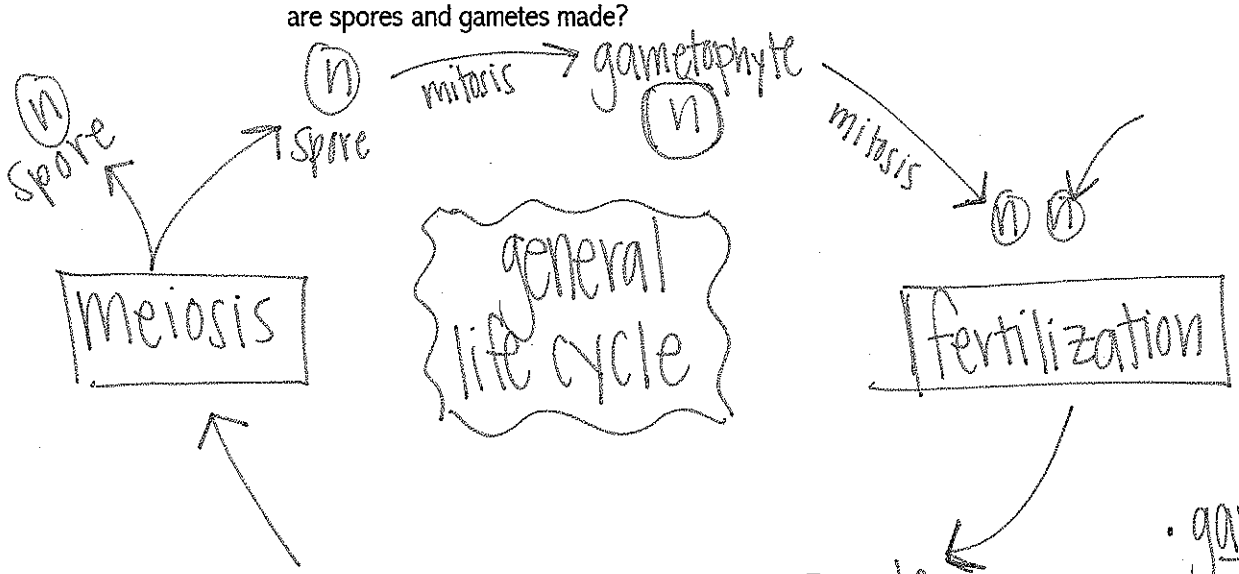
landplant & charophyte ~~similarities~~ differences

- alternation of generation
- apical meristem
- sporangia
- multicellular gametangia (archegonia/antheridia)

4. Land plants are related to Charophytes by what characteristics?
   a. Rose shaped cellulose complexes
   b. peroxisome enzymes (what is the importance of these?)
   c. Flagellated sperm
   d. Formation of phragmoplast

help minimize the loss of products through photorespiration

5. Describe the general process of alternation of generation. Where do you start in the cycle? How are spores and gametes made?



- gametes made through mitosis
- spores made through meiosis

* Start cycle @ dominant stage of cycle *

6.

	Nonvascular	Vascular
Common Name	Bryophytes	tracheophytes
Dominant Stage	gametophyte	sporophyte
True roots, stems, leaves?	no	yes

The Bryophytes

- **Non-Vascular, Spore Bearing**
- gametophyte **Dominant** (haploid)

non-vascular means no xylem/phloem = no extra support, so plant cannot grow tall or large

Explain why bryophytes are not well adapted for land:

- flagellated sperm requires these plants to be in a moist environment
- no cuticle to prevent H_2O loss

Phylum Bryophyta
Common Name: mosses
Reproductive Characteristics: homosporous

probably the 1st land plant (very primitive)

Phylum Hepatophyta
Common name: liverwort
Reproductive Characteristics: sexual or asexual w/ gemmae, homosporous

Phylum Anthocerophyta
Common Name: hornwort
Reproductive Characteristics: homosporous
What makes this phyla different from the other bryophytes?
- more like the vascular plants

The Tracheophytes

- **Vascular, Can be either seed or spore bearing**
- sporophyte **Dominant** (diploid)

Explain why the Tracheophytes are better adapted for land than the bryophytes:

- have vascular tissue that runs throughout the plant & provides support
- they also have a graph that use seeds instead of sperm

Explain how homospores and heterospores develop:

homospore:

homospore → spore → bisexual gametophyte → egg
bisexual gametophyte → sperm

heterospore:

megasporangium → megaspore → female gametophyte → egg

microsporangium → microspore → male gametophyte → sperm

Phylum Lycophyta
Common Name: Club moss
Reproductive Characteristics: homosporous, flagellated sperm
Contain sporophylls, which are:
modified leaves that contain sporangia
Phylum Pterophyta:
Contains 3 plant groupings: fern, horsetail, whisk fern
Reproductive characteristics: homosporous

Ferns

- Why are ferns incompletely adapted to land?
  flagellated sperm require H_2O
- Rhizomes- horizontal stem
- Fronds- leaves
- Sori - on underside of frond → produces spores
- What is the prothallus? homosporous, bisexual gametes
- Describe the life cycle of a fern:

fiddlehead: immature frond

Horsetails

- Reproductive Characteristics: flagellated sperm, free living gametophyte

Whisk Ferns

- Appearance: green stem
  lacks true roots & leaves

Fern Life Cycle

- The 2n sporophyte produces spores through meiosis (in sori)
- homospore develops into prothallus
- sperm swims & fertilizes another gametophyte (n)
- free living sporophyte (2n) develops

Plant Anatomy

Compare monocots and dicots:

	Monocots	Dicots
Cotyledon(s)	1	2
Leaf venation	parallel	net like
Flower Organs	multiples of 3	multiples of 4/5
Stems	scattered tissue	tissue arranged in rings
Roots	fibrous	taproot
Vascular Tissue		

Plants consist of two main parts:

Shoot

- Contains the leaves for photosynthesis
- Provides the plant with support
- Contains buds and flowers

Root

- Anchors the plant
- H_2O and minerals enter here
- the surface area of roots is increased due to the presence of root hairs
- Three types: adventitious
  taproot
  fibrous