

Plants and Their Relatives

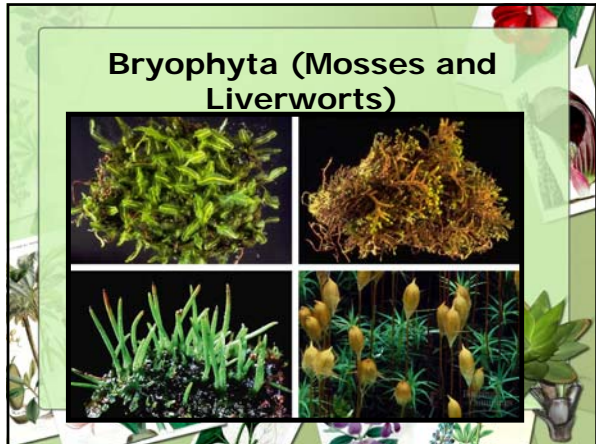
Non-vascular plants
Vascular plants
Plant reproduction

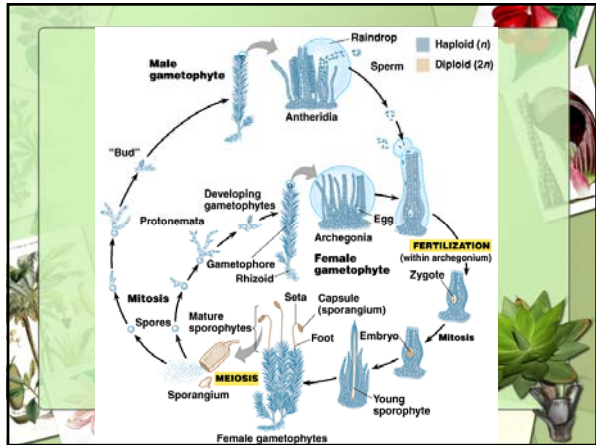
Alternation of Generations

- $N \rightarrow 2N$ etc...
- Sporophyte vs. Gametophyte

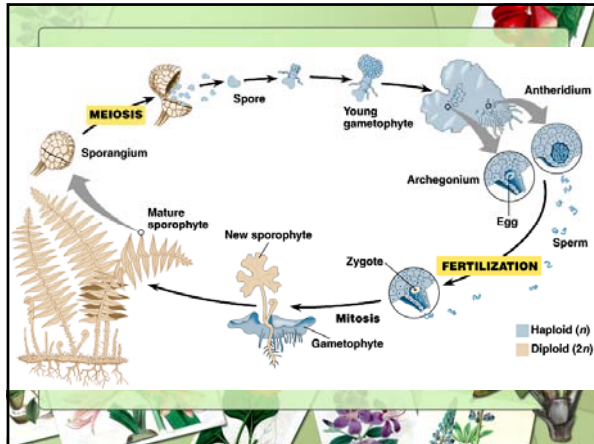
Objectives

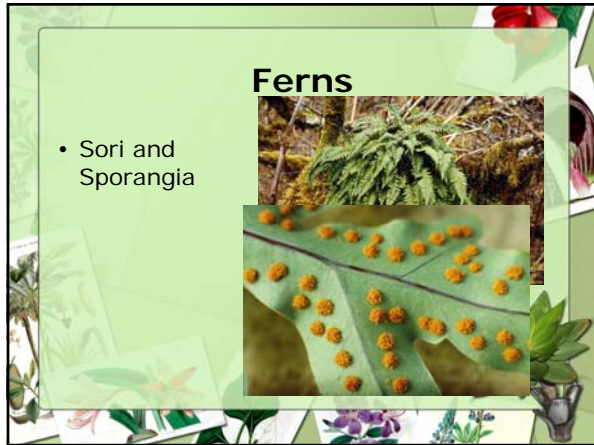
- Distinguish between the following using simple external recognition
- Bryophyta
- Filicinophyta
- Coniferophyta
- Angiospermophyta

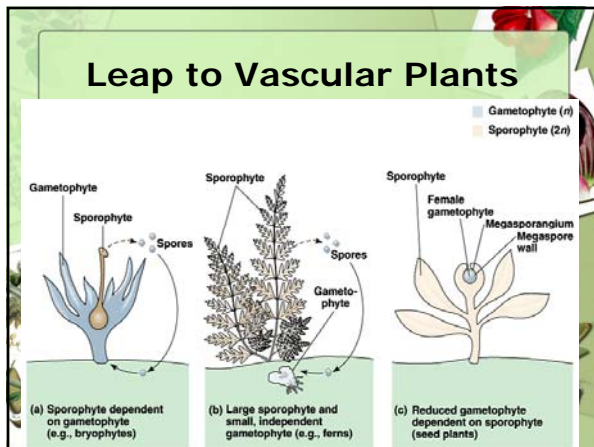






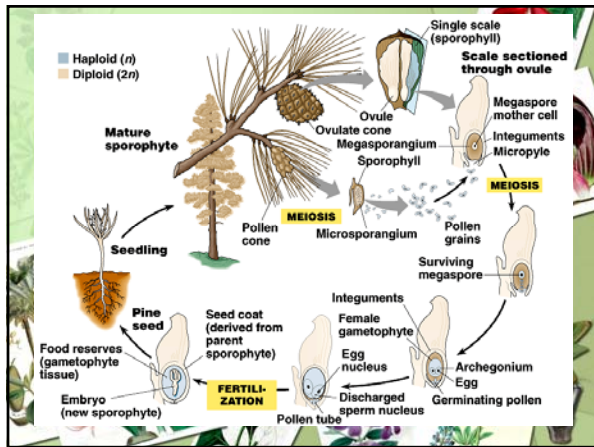






Gymnosperms: Conifers: Coniferophyta

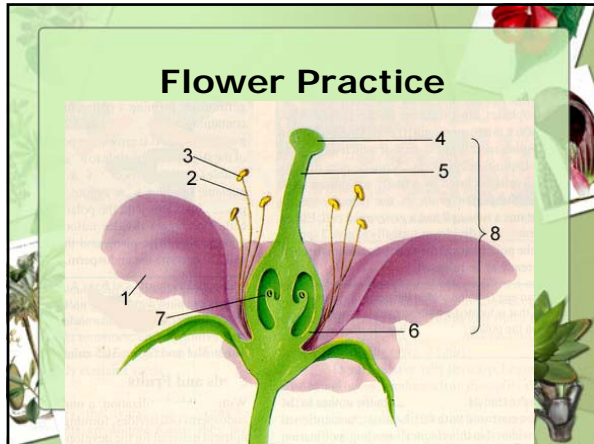
- Firs, Cedars, Pines etc...

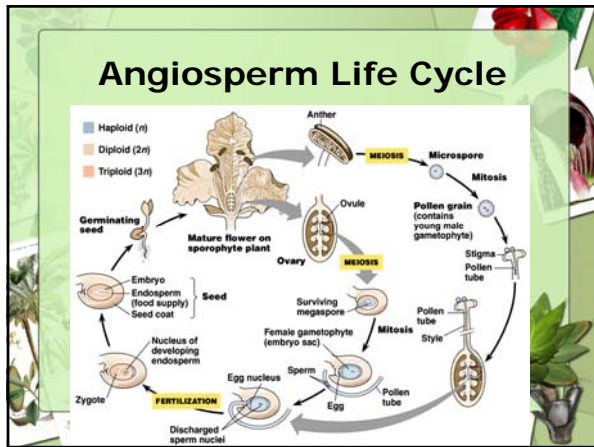


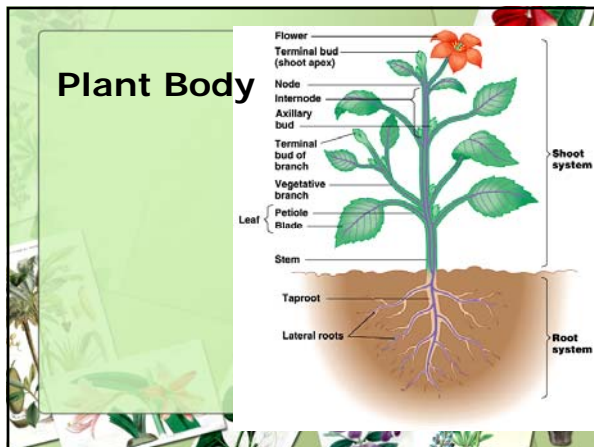
Angiospermophyta: Anthophyta or Flowering Plants

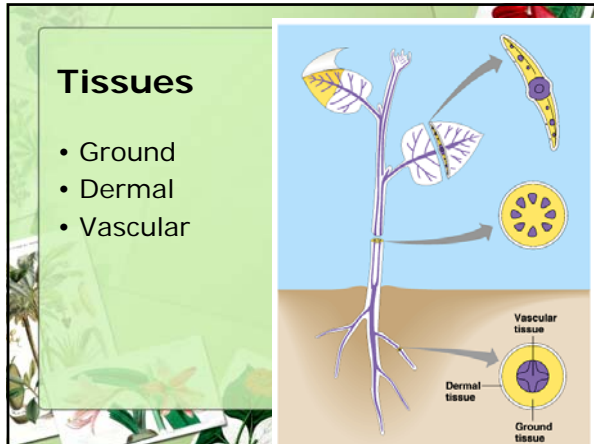
- Monocots vs Dicots

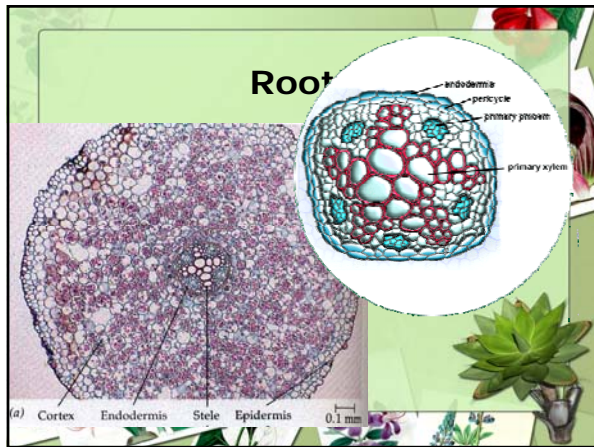
MONOCOTS	DICOTS
one cotyledon	two cotyledons
floral parts in threes	floral parts in fours or fives
parallel leaf veins	netlike leaf veins
pollen grain has one pore or furrow	pollen grain has three pores or furrows
vascular bundles throughout stem's ground tissue	stem's vascular bundles arranged in a ring

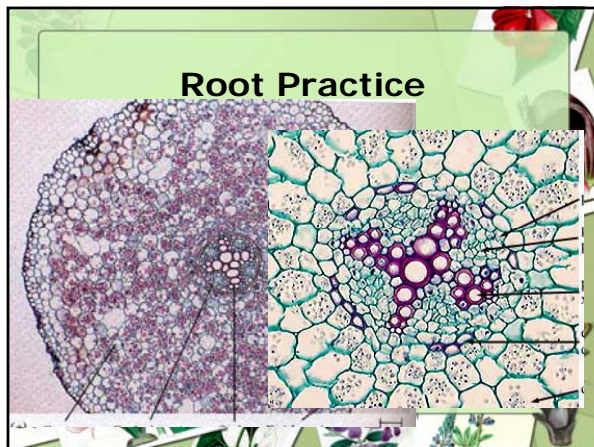








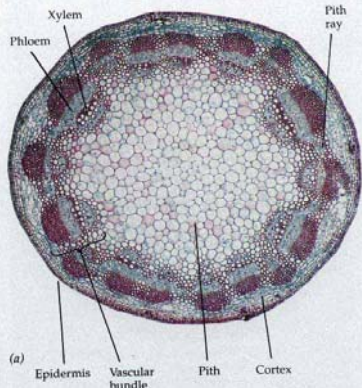




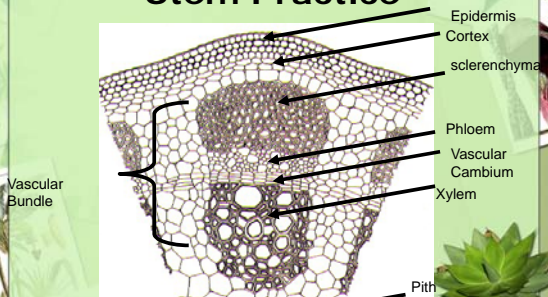
Root Hairs and Functions

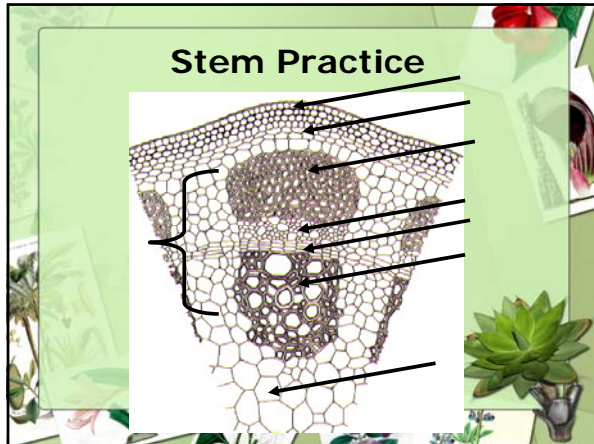


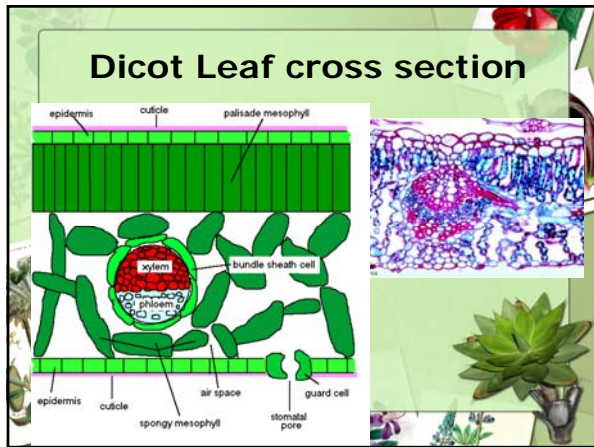
Stems

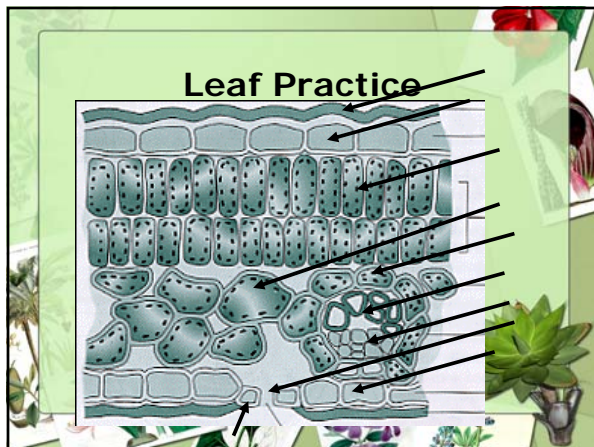


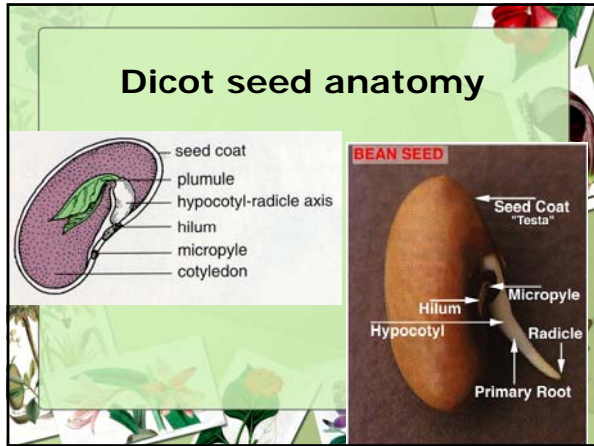
Stem Practice

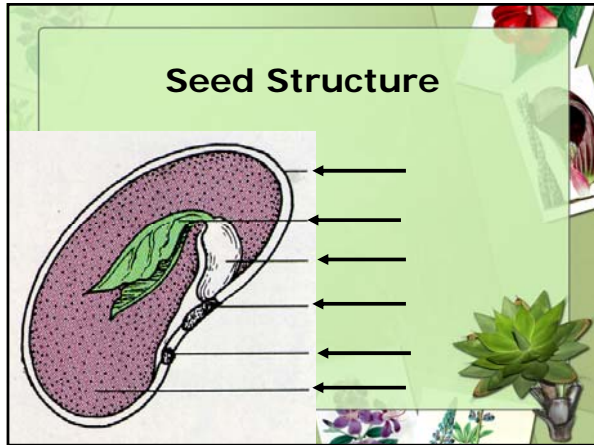








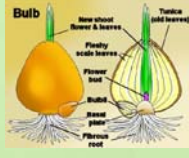






Modifications

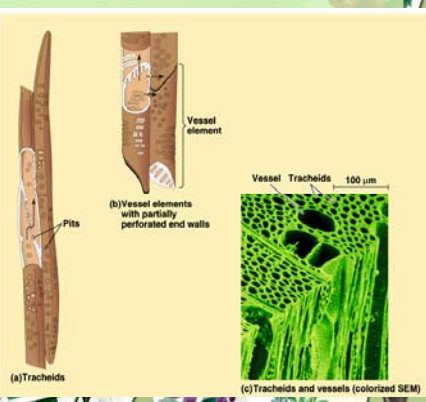
- Bulbs
- Stem Tubers (modified to store material) potato
- Storage roots: carrot and beet
- Tendrils: mod stem

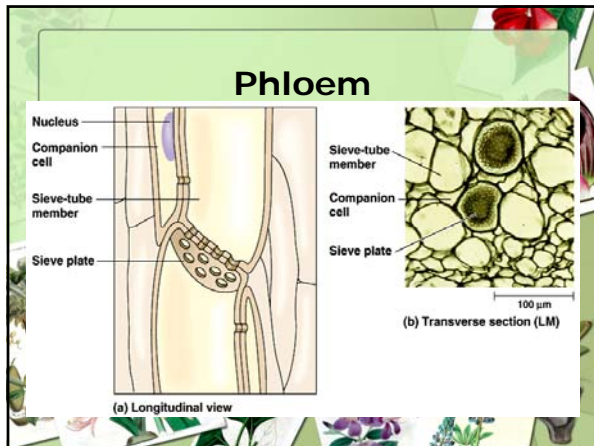


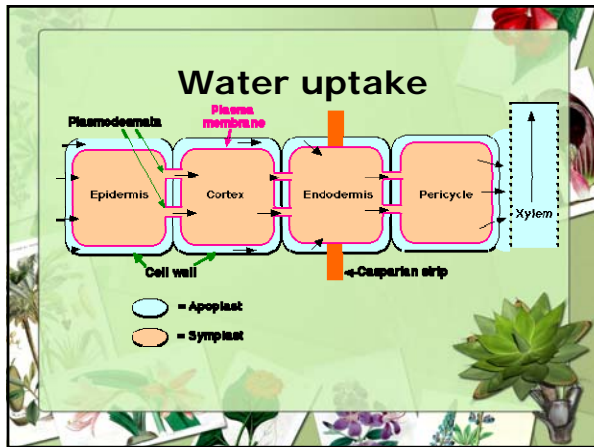
Vascular

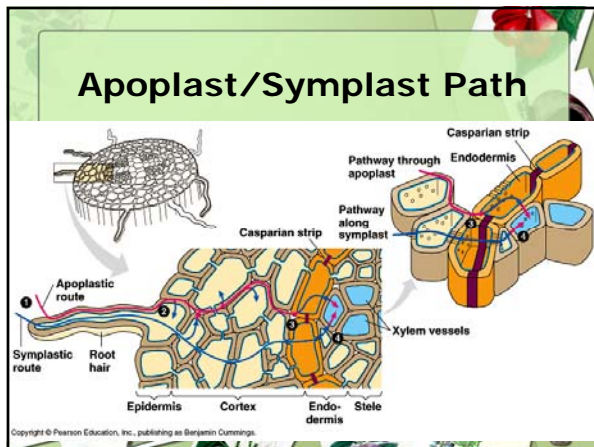
- Xylem- Water and mineral transport
 - Tracheids
 - Vessel Elements
- Phloem- Sugar Transport
 - Sieve tubes
 - Companion cells











Mineral uptake

- Minerals can be up to 10,000 times the concentration inside vs outside the cells.
 - Actively transported in. Against gradient with proteins.
 - Chemiosmotically transported.
 - H^+ pumped out and then positively charged ions rush in to balance charge. K^+ , NH_4^+ ,
 - Some negatively charged ions move in as the H^+ diffuses back inside. HPO_4^- , NO_3^-

Other Mineral Transport Methods

- Fungal Mycorrhiza Hyphae (Mutualism)
 - **Improved Mineral Nutrition:** the hypha growing away from the root is very much like a root hair in that it increases the mycorrhiza's surface area, and thus increases the plant's access to nutrients. Also, fungal hyphae can migrate through the soil absorbing nutrients with only about 1/100th of the energy cost of plants sending their roots there.
- Mass flow
 - Dissolved in water



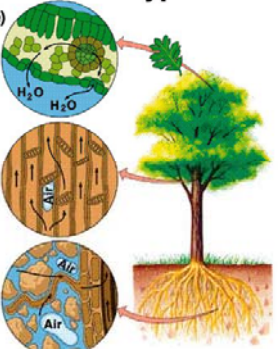
Transpiration—Cohesion Hypothesis

Randy Moore, Dennis Clark, and Darrell Inoué, Botany Visual Resource Library © 1998 The McGraw-Hill Companies, Inc. All rights reserved.

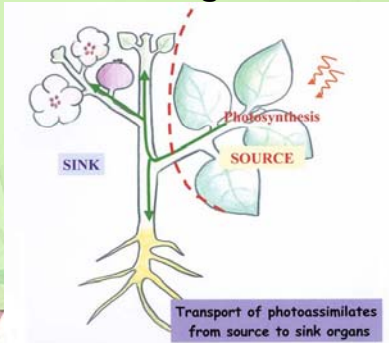
Evaporation (the driving force)
The lower water potential of air causes evaporation from cell walls.
This lowers the water potential in cell walls and in cytoplasm.

Cohesion (in xylem)
Cohesion holds water columns together in capillary-sized xylem elements.
Air bubbles block movement of water to next element.

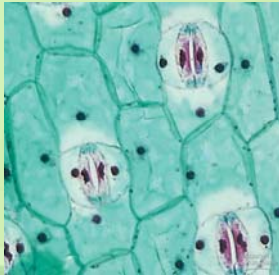
Water uptake (from soil)
Lower water potential in root cells draws water from soil. The absorptive surface increases with the production of more root hairs.
Water moves through endodermis by osmosis.



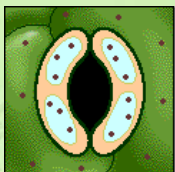
Source to Sink: Movement of Sugar



Guard Cells and Stomata



Guard Cells and Stomata

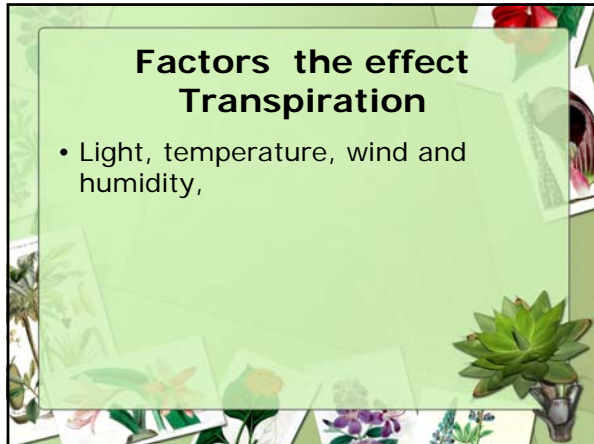


- K^+ is moved out (active) of vacuoles
- Water follows by osmosis
- Guard cells lose turgor and close
- Opposite for opening.
- Abscisic Acid causes them to close

http://www.phschool.com/science/biology_place/labbench/lab9/stomamov.html

Factors the effect Transpiration

- Light, temperature, wind and humidity,



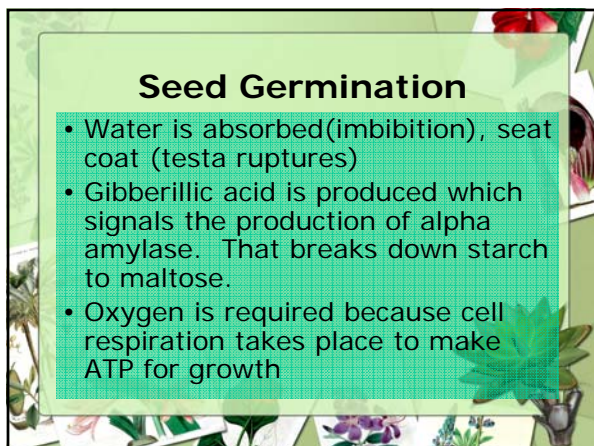
Where Plants

- Xerophytes: (outline 4)
 - Adaptations: CAM C4 pathways, reduced leaves, deep roots, waxy cuticle, lower stomata, stomata in pits with hairs, water storage tissue, short life cycles



Seed Germination

- Water is absorbed(imbibition), seat coat (testa ruptures)
- Gibberillic acid is produced which signals the production of alpha amylase. That breaks down starch to maltose.
- Oxygen is required because cell respiration takes place to make ATP for growth




Germination

- Dormancy (quiescent seeds)
 - To break some need a period of cold
 - Day length (night length)
 - Scarification
 - Burning

Polinators and Coevolution

- Plants and animals have coevolved to be dependent upon one another.



Seed Dispersal