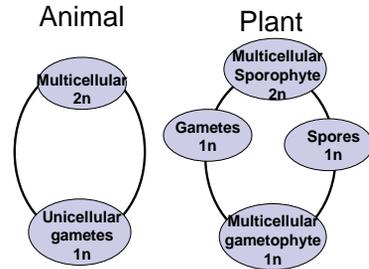


Chapter 38

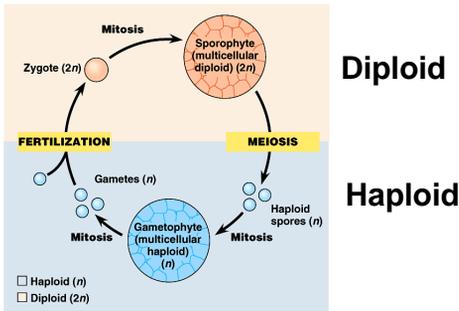
Plant Reproduction



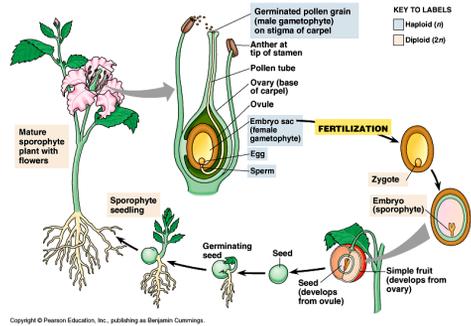
Animal & Plant life cycle



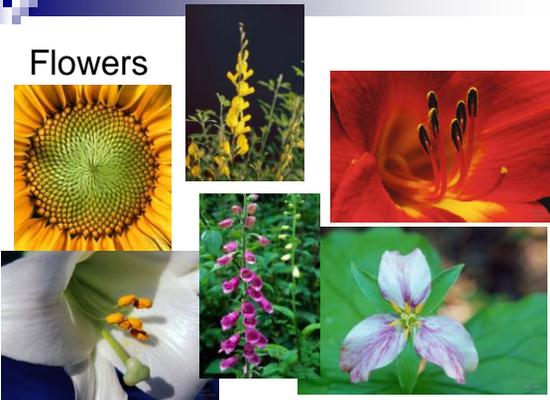
Alterations of generations



Angiosperm Life Cycle



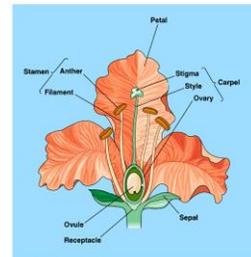
Flowers



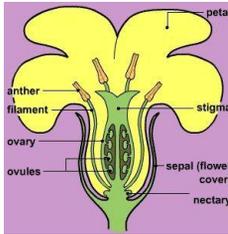
Idealized Flower

- Modified shoot with 4 rings of modified leaves

- Septals
- Petals
- Stamens
 - Male
- Carpels
 - female



Male & female parts of flower



- Pollen = male gametophyte (1n)
- Embryo sac = female gametophyte (1n)

Parts of flower

- Male
 - Stamens = male reproductive organs
 - Stamens have stalks (filaments) & terminal anthers which carry pollen sacs
 - Pollen sacs produce pollen
 - Pollen grain
 - Male gametophyte
 - Sperm-producing structures
 - sperm



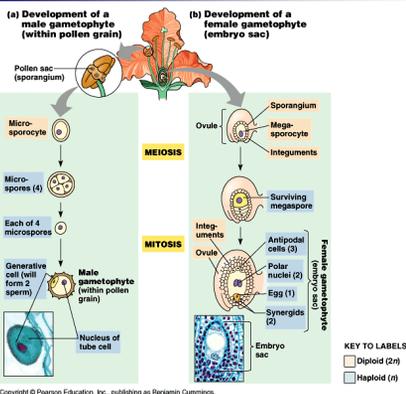
Pollen

- Male gametophyte
 - How is this similar to or different than a spore?
 - What is the adaptive advantage of pollen?



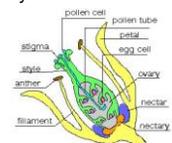
Parts of a flower

- Female
 - Carpels = female reproductive cells
 - Tip = stigma
 - Slender neck = style
 - Base = ovary
 - On ovary = 1 or more ovules
 - In ovules = embryonic sac
 - Embryo sac
 - Female gametophyte
 - Egg producing structure

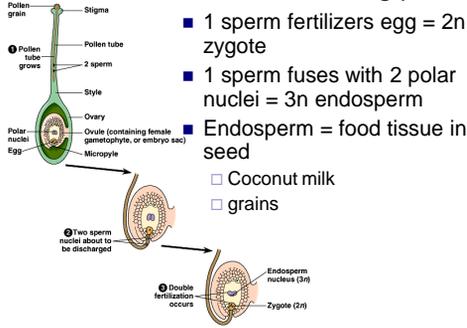


Fertilization

- Pollination
 - Pollen released from anthers carried by wind/animals to stigma
 - Pollen grain produces pollen tube
 - Pollen tube goes down style into ovary
 - Discharges 2 sperm into embryo sac
 - Double fertilization
 - 1 sperm fertilizes egg = 2n zygote
 - Zygote develops into new embryo (new plant)
 - 1 sperm fertilizes polar nuclei = 3n endosperm
 - Ovule develops into seed
 - Ovary develops into fruit containing one or more seeds



Double fertilization in flowering plants

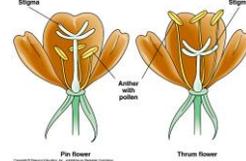


- 1 sperm fertilizes egg = 2n zygote
- 1 sperm fuses with 2 polar nuclei = 3n endosperm
- Endosperm = food tissue in seed
 - Coconut milk
 - grains

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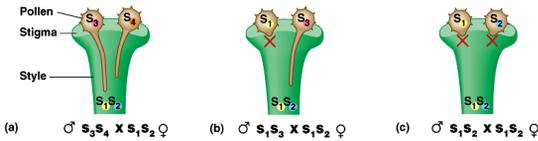
Preventing self-pollination

- Various mechanisms
 - Stamens & carpels may mature at different times
 - Arranged so that animal pollinator won't transfer pollen from anthers to stigma of the same flower
 - Biochemical self-incompatibility = block pollen tube growth



Preventing self-fertilization

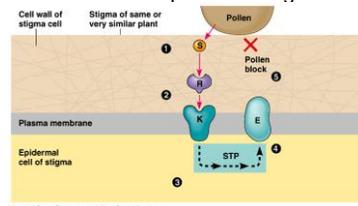
- This model involves the "S" allele
 - Pollen (male) with same allele cannot germinate on stigma (female)
 - Matching alleles interact & inhibit RNA production



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Biochemical mechanism

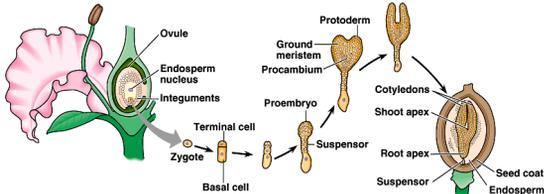
- Preventing self-fertilization
 - Pollen produces signal → receptor → kinase → signal transduction path → effector protein produced → block pollen tube growth



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Fertilizer in flowering plants

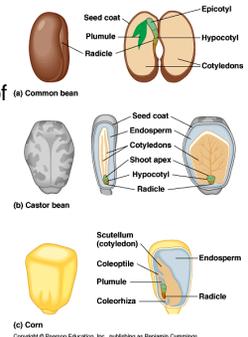
- Development of the new sporophyte
 - Zygote → embryo → new seedling



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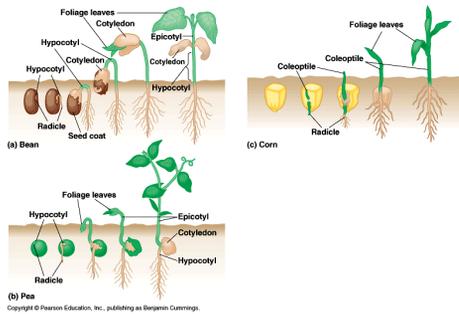
Seed Anatomy

- Sporophyte in seed
 - Set stage for structure of plant
 - Roots
 - Shoots
 - Leaves



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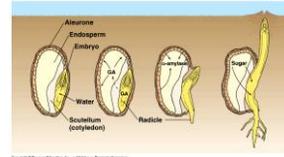
Germination



Mobilization of nutrients

Seed Germination

1. Seed inhibits water
2. Gibberellin release signals aleurone layer
3. Amylase is released which hydrolyzes starch
4. Sugar is absorbed by embryo



Fruit

- Fruit is a mature ovary
 - Seeds develop from ovules
 - Wall of ovary thickens to form fruit
 - Fruits protect dormant seeds & aid in their dispersal
- Fruit Development
 - Pea (legume)



Fruit Development

- Peach (stone fruit or drupes)
 - 1 flower: 1 carpel: 1 ovary: 1 seed



Fruit Development

- Apple (pome fruit)
 - 1 flower: 5 carpels: many ovules: many seeds



Fruit Development

- Citrus fruits (berry)
 - 1 flower: many carpels: many ovaries: many seeds



Fruit development

- Raspberry (aggregate fruit)
 - 1 flower: many ovaries: many seeds



Seed Dispersal

- Plants produce enormous numbers of seeds to compensate for low survival rate
 - A lot of genetic variation for natural selection to screen

