

Plant Reproduction



- *Plant Reproduction and Development*

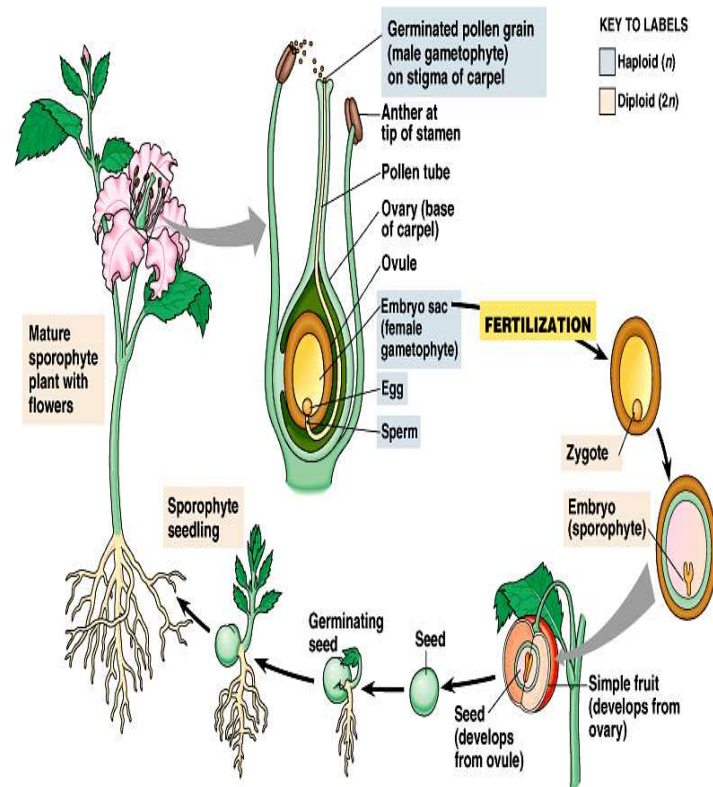
QOD

- List three modified seeds and briefly describe the advantage of each modification.



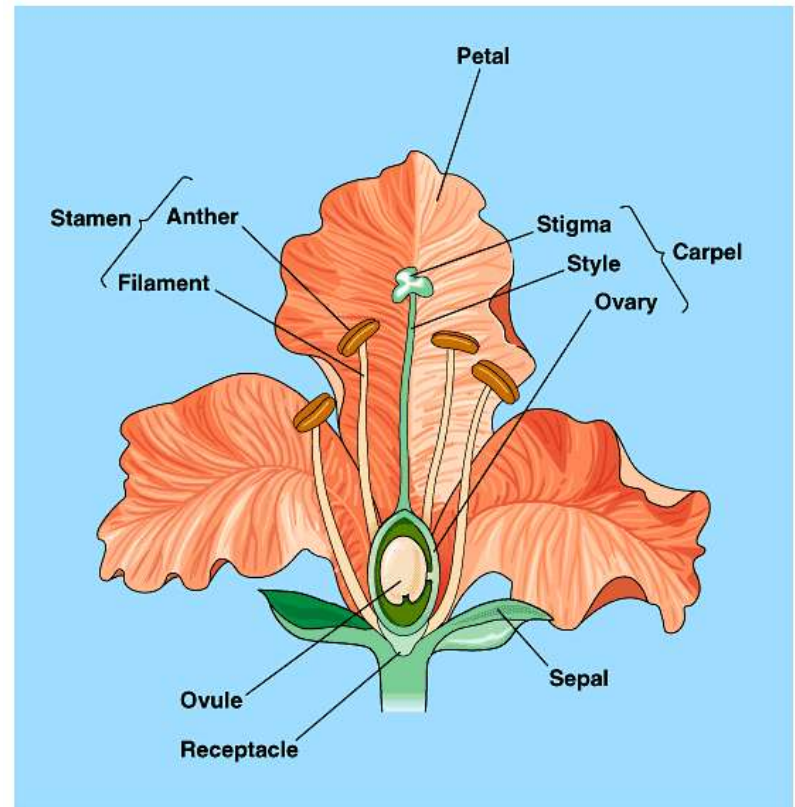
Sexual Reproduction

- Alternation of generations: haploid (n) and diploid ($2n$) generations take turns producing each other
- Sporophyte ($2n$): produces haploid spores by meiosis; these spores divide by mitosis giving rise to male and female haploid plants called....
- Gametophytes (n): develop and produce gametes



Floral variations

- Floral organs: sepals, petals, stamens (male), carpels (female)
- complete: all 4 floral organs
- incomplete: lacking 1 or more floral organs
- perfect: both stamens and carpels on 1 flower
- imperfect: lacking either a stamen or carpel
- monoecious: staminate and carpellate flowers on 1 plant)
- dioecious: staminate and carpellate flowers on separate plants



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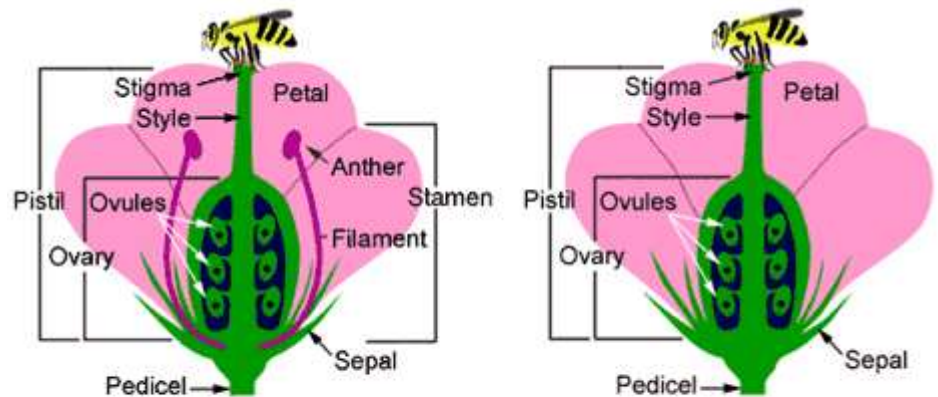
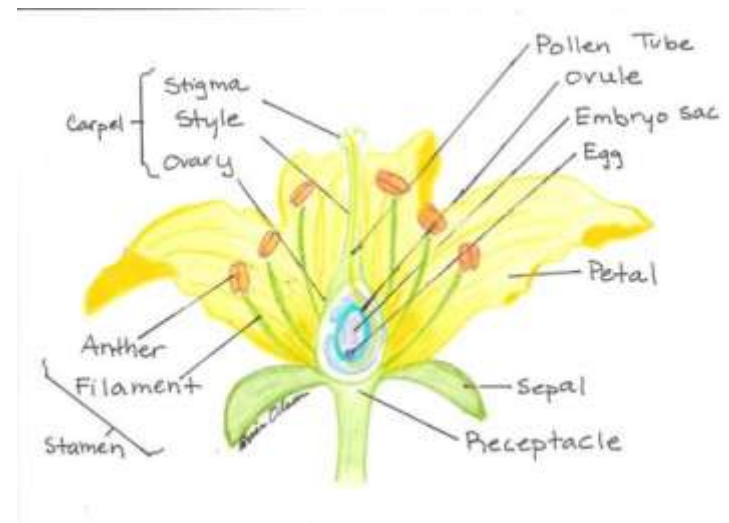
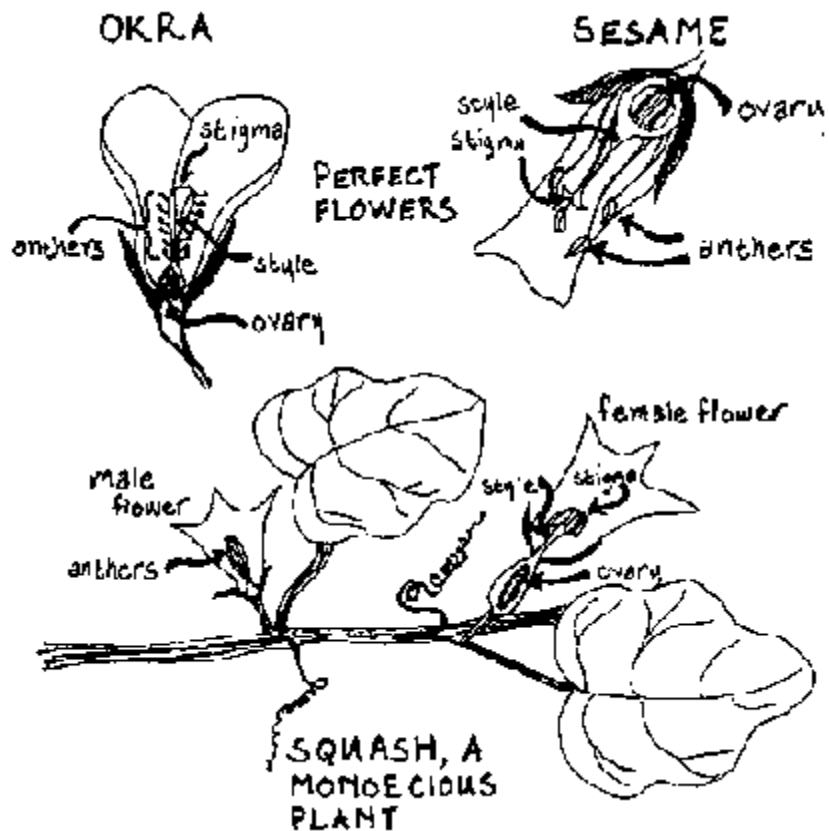


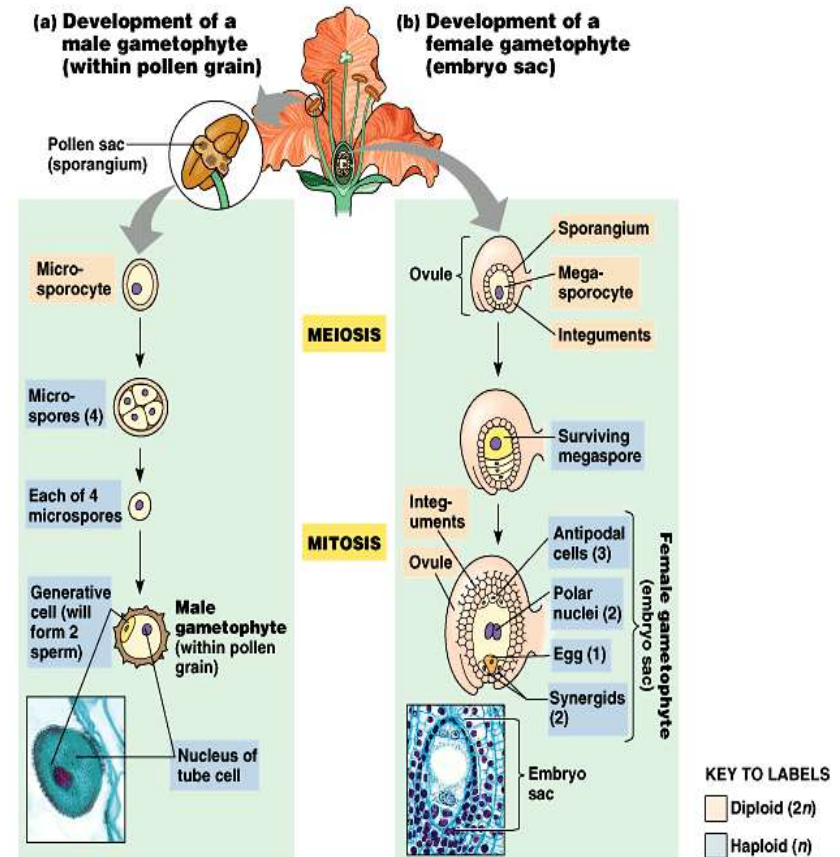
Figure 20. Complete flower structure

Imperfect (pistillate) flower structure



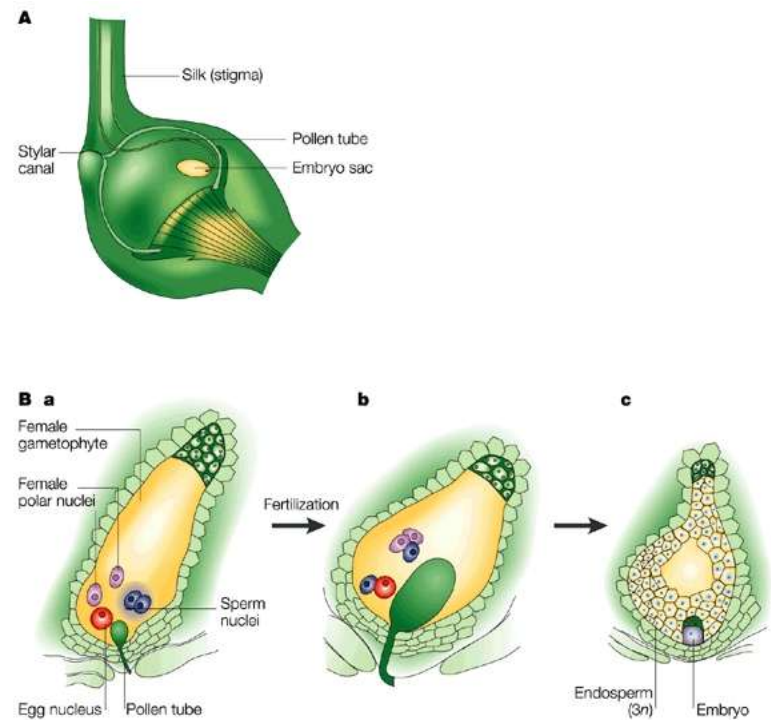
Gametophyte development

- **Male gametophyte:** *microsporocyte* (in pollen sacs of anther) divides by meiosis into 4-1N microspores; mitosis produces a generative cell (sperm) and a tube cell (pollen tube)= a pollen grain
- **Female gametophyte:** *megasporocyte* (in ovule) divides by meiosis to 4 cells, only 1 survives to a 1-N megaspore; 3 mitotic divisions forms the embryo sac; includes: 1 egg cell (female gamete) and 2 polar nuclei (synergids)



Double Fertilization

- pollen lands on stigma, pollen tube forms
- 2 male sperm travel to embryo sac
- One sperm fertilizes egg nucleus to make zygote
- Other sperm fuses with double polar nuclei to make endosperm

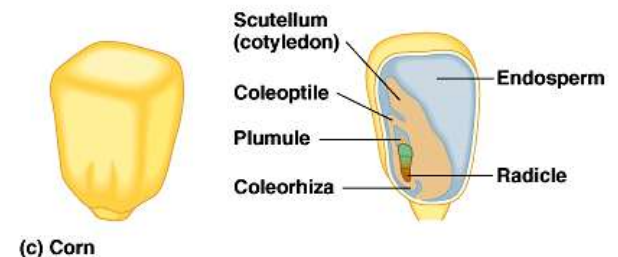
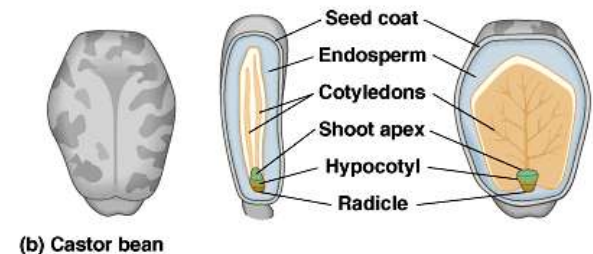
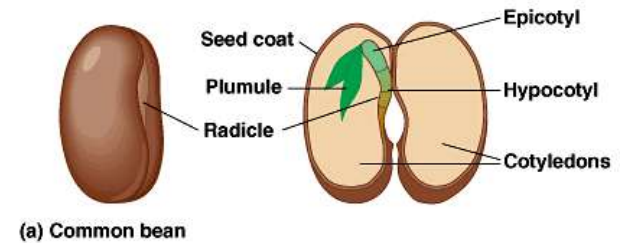


Video of Double Fertilization

- <https://www.youtube.com/watch?v=bUjVHUf4d1I>

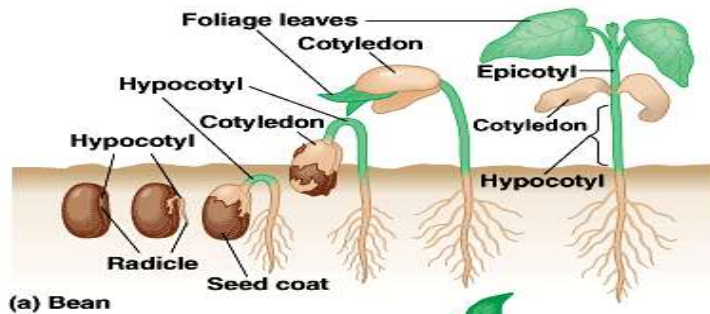
The seed

- From fertilized ovule.....
- The mature seed:
 - seed coat (protection)
 - cotyledons (seed leaves)
 - hypocotyl (lower embryonic axis)
 - radicle (embryonic root)
 - epicotyl (upper embryonic axis)
 - plumule (shoot tip)
 - coleoptile (sheath for embryonic shoot)

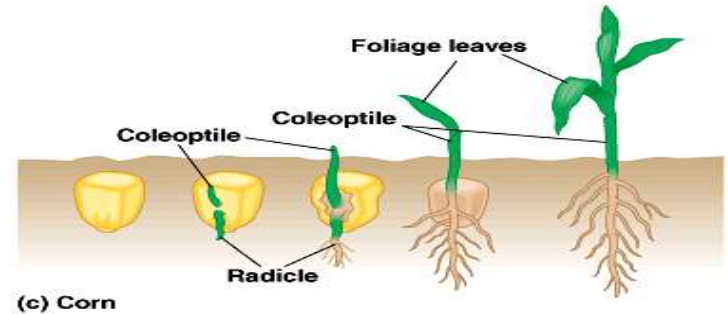


Seed germination

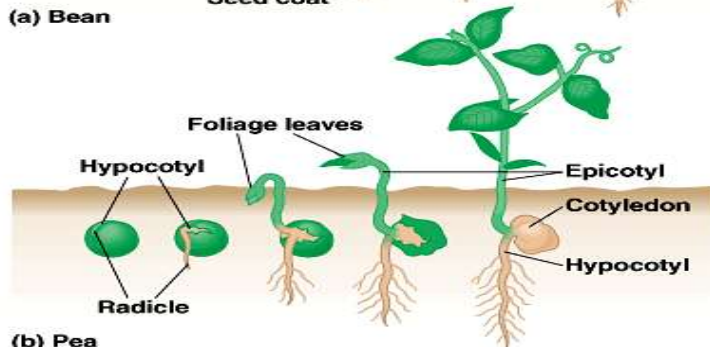
- Seed dormancy (low metabolic rate and growth suspension)
- Imbibition (uptake of water)
- Radicle 1st, then shoot tip (hypocotyl); stimulated by light
- Germination



(a) Bean



(c) Corn



(b) Pea

The fruit

- From ovary....
- Fruit protects seeds and aids in their dispersal
- Pericarp (thickened wall of fruit from ovary wall)
- Fruit types:
 - simple (1 ovary/1 flower)~ cherry, soybean
 - aggregate (1 flower with many carpels/ovaries)~ blackberry
 - multiple (inflorescence; group of flowers/ovaries) ~ pineapple

