

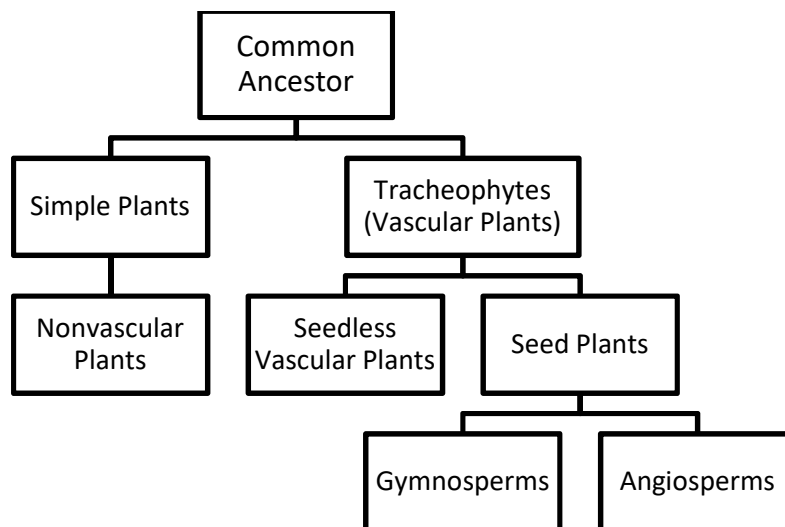
LIFE SCIENCES 11

GENERAL CHARACTERISTICS OF PLANTS

General Characteristics:

- land plants first appeared 470 million years ago
- photosynthetic autotrophs
 - organism that uses CO₂ as the only or main source of carbon
- multicellular
- producers of food energy and oxygen
- cell walls of cellulose
- demonstrate alternation of generations

Classification of Kingdom Plantae



Alternation of Generation

- life cycle in which there are two vegetative forms that each plant has; these forms alternate and each produces the other
- Sporophyte
 - Diploid generation (2n)
 - Stage that produces spores by meiosis
 - Spore then undergoes mitosis to produce the gametophyte
- Gametophyte
 - Haploid generation (n)
 - Stage that produces the gametes (egg and sperm) by mitosis
 - Sperm and egg fuse, then undergoes mitosis to produce the sporophyte
- depending on the type of plant, either the sporophyte or gametophyte form is dominant
- simple plants → gametophyte generation is dominant
- tracheophytes → sporophyte generation is dominant

Evidence to support the evolution of plants from green algae

- both contain chlorophyll a and b
- both store carbohydrates as starch
- both have cellulose in their cell walls
- similar DNA sequences for their ribosomal RNA

Evolutionary Events of Plants

1. development of vascular tissue (420 mya)
 - xylem → used to transport water throughout the plant
 - phloem → used to transport nutrients (particularly sugar) throughout the plant
 - benefit – allows plant to grow taller for sunlight and better spore, pollen and/or seed dispersal
2. production of a seed (350 mya)
 - nourishment of a multicellular embryo within the body of the female plant
 - benefit – allows the embryo to be larger before it germinates increasing chance of survival
3. production of a flower (200 mya)
 - attract pollinators and produce fruit
 - benefit – less energy spent on fertilization because it is direct
 - production of fruit increases seed dispersal

Other Land Adaptations

1. Cuticle
 - fatty or waxy coating found on the outside of leaves
 - helps to prevent the evaporation of water through the leaves
2. Stomata
 - pores found on leaves that can open and close to regulate the movement of gases