

Kingdom Plantae :

“Plants”...

- nonmotile eukaryotic, multicellular, autotrophic organisms
- rigid cell walls built of “cellulose”
- life cycles show “**alternation of generations**”...two distinct phases called **sporophyte stage** and **gametophyte stage**.

Kingdom Plantae is subdivided into four major phyla.....the bryophytes, pterophytes, gymnosperms, and angiosperms. *You are responsible for knowing their characteristics, life cycles, how they reproduce, and examples of organisms in each phylum.*

Phylum Bryophyta :

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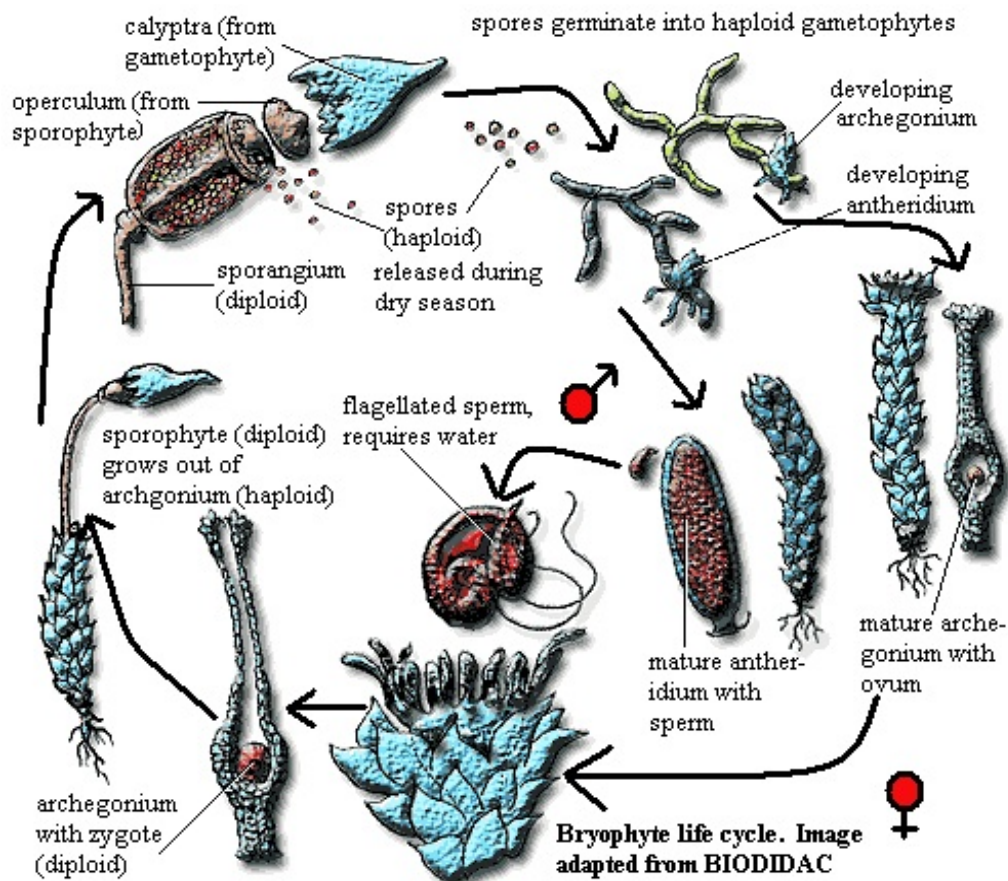
- 16 000 species, 2/3 mosses
- Liverworts, Hornworts, and mosses
- live in moist shaded areas...caves, riverbanks, bogs, base of shade trees
- the GAMETOPHYTE STAGE is the dominant part of their cycle

Reproduction :

- fertilized diploid adults begin the summer as a green gametophyte...the fertilized females grow a stalk, at the end of which is a capsule containing their spores.
- spores are released (haploid), which are dispersed by rain, wind, and animals
- spored develop into haploid male gametophytes having antheridia, and haploid female gametophytes having

archegonia

- antheridia release sperm in early spring...rain provides enough water for them to swim to a nearby archegonium to fertilize the ovum found there. Life cycle begins again.



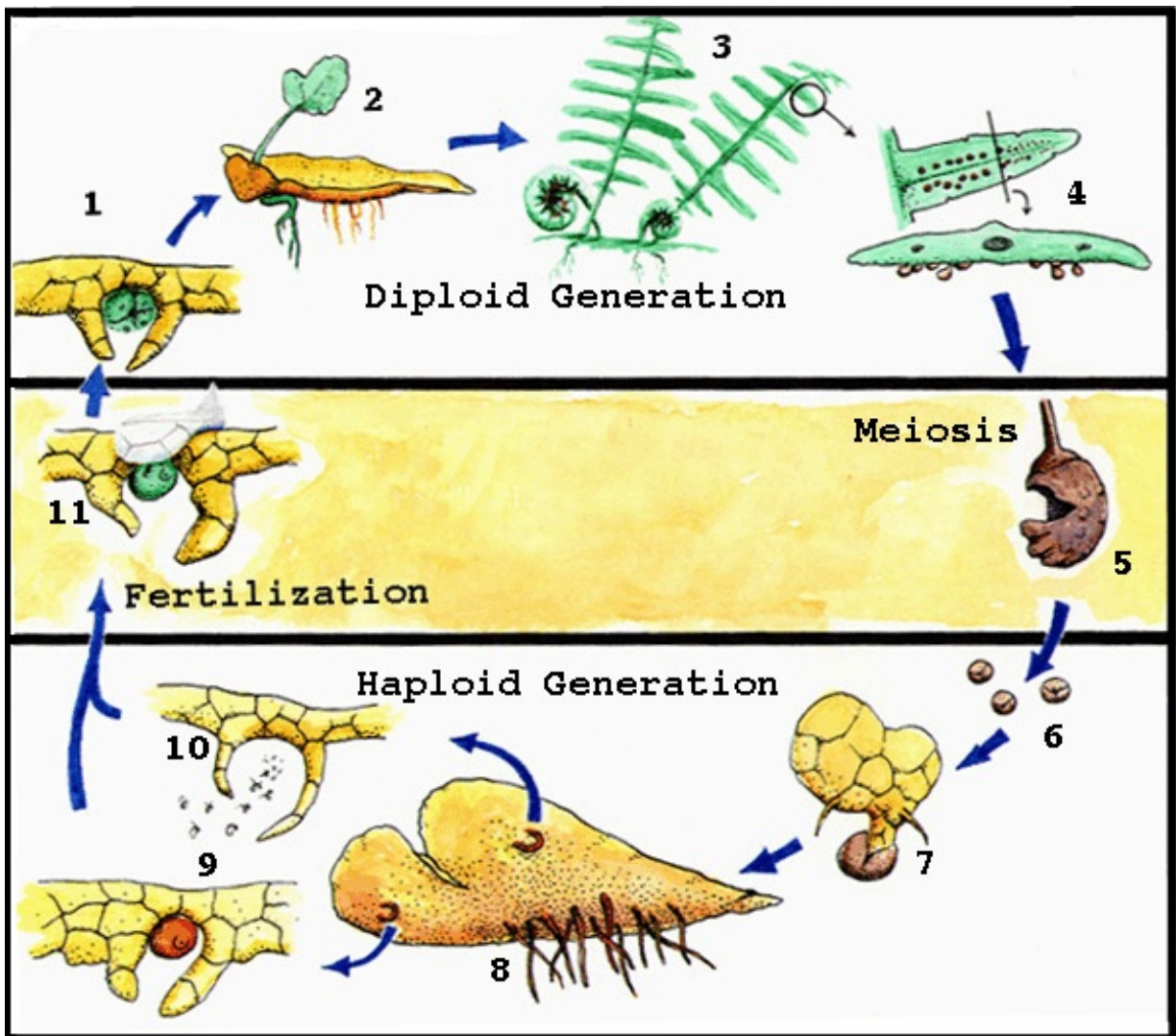
Phylum Pterophyta : The Ferns

- (Whisk ferns, club mosses, horsetails, and true ferns)
- grow in moist tropical or even temperate environments
- reproduce using spores
- Are vascular plants...they have a transportation system in them for water and nutrient delivery to all of their cells.
- The SPOROPHYTE STAGE of their life is the dominant part.

Reproduction :

- Adult, mature “fronds” have clusters of spore producing tissue (sporangia) on the underside...called “sori”. Spores are haploid.

- spores are released by midsummer to develop into a “prothallus” (the gametophyte part of their life), and it contains male and female parts. It can also develop a anchor system of rhizoids underground.
- sperm from its antheridia fertilizes ova in its archeogonia, and after that.....new diploid fronds grow. (Fiddleheads)



Gymnosperms :

- the first group of true “seed bearing” plant phyla
- they have true roots, leaves, and stem
- produce seeds found inside “cones”



- there are small male cones (produce microspores inside antheridia that develop into pollen grains) and female cones (larger...with archegonia on the scales)

- when pollen is made in the spring, some grains land next to an archegonium...it makes a pollen tube into it, sperm cells use this tube to reach the ovum. Seeds are formed after this fertilization. Male cones disintegrate, female cones stay on the tree...maturing a season or two.

They can....

- reproduce away from water (pollen, pollen tubes as adaptations)
- use bark to reduce water loss
- remove snow burden with a cone shape
- have needles instead of broad flat leaves to prevent moisture loss, with a thick waxy cuticle
- retain needles through the winter...ready for an early startup in a short growing season
- can survive in poorer soils, since they don't have to make all their leaves in one shot

Angiosperms :

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- the flower producing plants
- the most successful group of plants on earth
- vascular
- reproduce using seeds (often inside fruits), and pollinators
- 3/4 of all known plant species, including some tree types, grasses, shrubs, herbs, vines, and aquatic plants
- found in all global biomes, from tundra to the tropics

Phylum is subdivided into **monocots** (whose seeds contain ONE **cotyledon**) and **dicots** (seeds contain TWO **cotyledons**)...comparison of characteristics, 175

Factors contributing to their success...

- special leaf **stomata** and hair like fibers to reduce water loss
- use of a flower to attract **pollinators** (insects, bats, birds), and flower adaptations for specific pollinators

Flower Parts :

<http://www.uoregon.edu/~sdenner1/flower/partsofflower.htm>

Male (**stamen**) - **anthers** (antheridia)
bearing pollen.
Mounted on top of
filaments

Female (**pistil**) - **stigma, style, and ovary**
/ ovaries

Sepals

Petals

peduncle

Angiosperm Reproduction :

1. Pollination ⇒

delivery of sperm cells from male to female parts.

Each pollen grain contains two sperm. One fertilizes an ovum, while the other joins with another cell in the ovary to form endosperm (a tissue rich in starch and / or fats) which serves as a food source for any new germinating sprout until its leaves are ready for photosynthesis.

2 types...

self pollination -

pollen on an anther contacts the stigma of the **same** plant. Clones the parent, no new diversity.

Cross pollination -

Pollen from one plant contacts the stigma of a different plant, forming

new genetic combinations. (Some species have male and female flowers blooming at different times, use chemical barriers to self pollination, or have the stigma high above its own anthers)

2. Fertilize an ovum ⇒

Each pollen grain grows an extension, called a “**pollen tube**”, down through the tissues of the style and to the ovaries at the bottom. Ova are fertilized. The ovary wall hardens to form the **seed coat** (resistant to digestion and adverse weather), and the ovary itself forms a **fruit**.