

What is a Plant?

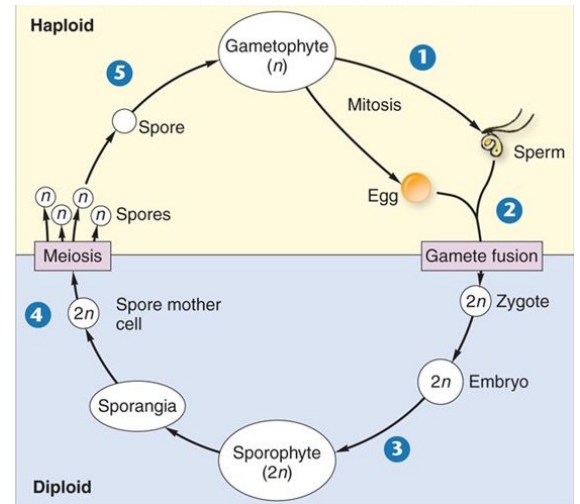
Amoeba Sisters Plant Structure and Adaptations <https://www.youtube.com/watch?v=DGpPHrLF-5M>

Characteristics of Plants

- Multicellular
- Eukaryotic
- Autotrophic (photosynthesis)
- Has cell walls containing cellulose
- Lacks mobility
- Display "Alternation of Generations" in their life cycle

Plant Life Cycle

- The lives of plants consist of two alternating stages, or generations: a gametophyte (gamete producing) generation and a sporophyte (diploid or spore producing) generation.
- One generation is dominant over the other. This means that it is larger and lasts longer.



What Did Plants Evolve From?

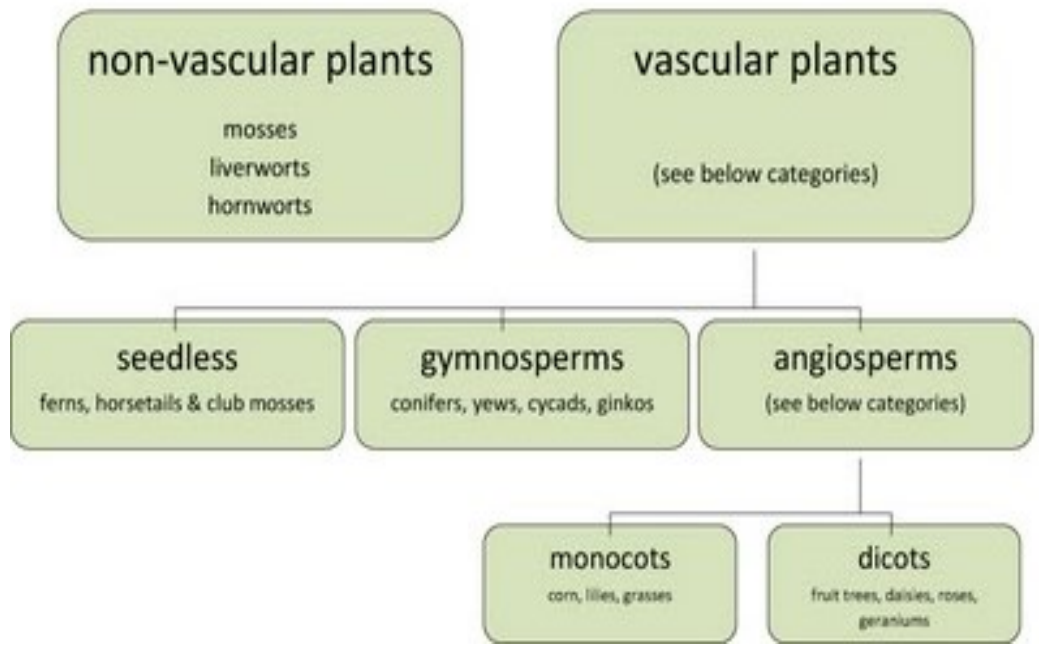
- Green Algae
 - Aquatic protists
- Similarities
 - contain chlorophyll
 - have cell walls made of cellulose
 - store energy as starch
- With time, plants adapted to live on land

Adaptations for Land

- Structures for retaining moisture
 - Cuticle = waxy coating on the outer surface of a plant
 - Stomata = openings in the outer layer of leaves & some stems which regulate water loss and allow gas exchange for photosynthesis
- Transport System
 - Vascular tissue to move nutrients & water throughout the plant
 - Also provides structure and support for the plant
- Reproductive Strategies
 - adaptations that allow gametes to meet without water

How are Plants Classified?

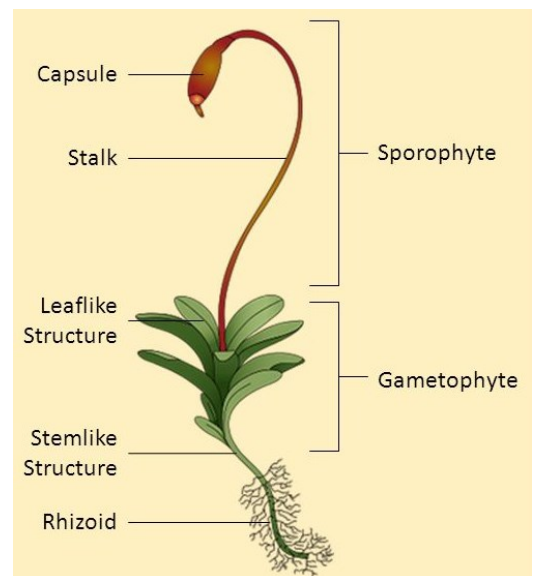
No phyla, rather plants are organized into 1-2 **divisions**



Non-Vascular Plants

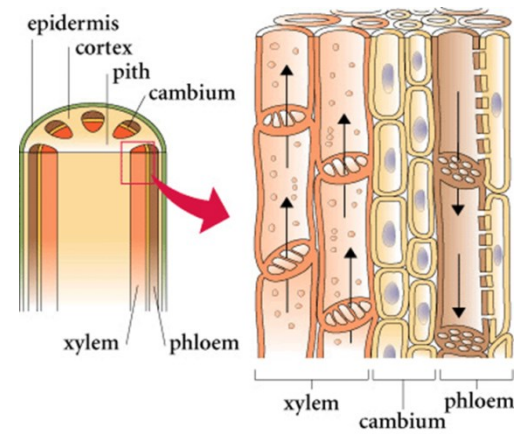
Crash Course Non-Vascular Plants <https://www.youtube.com/watch?v=iWaX97p6y9U>

- Are known as Bryophytes
- Include mosses, liverworts, & hornworts
- No transport system
 - no vascular "tubes" to transport water & nutrients so must live in **moist habitats**
- Small size
 - no **support** from vascular tissues
- Do not have true roots, stems and leaves
 - Have root-like **rhizoids** which **anchor** the plant and **absorb nutrients**
 - Absorb water through cell walls of leaf-like structures; water moves via **osmosis**
- Depend on water for reproduction
 - water is needed for **the sperm to swim to the egg**
- Mosses display Alternation of Generations with the **Gametophyte** stage being dominant & the sporophyte stage being dependent on it



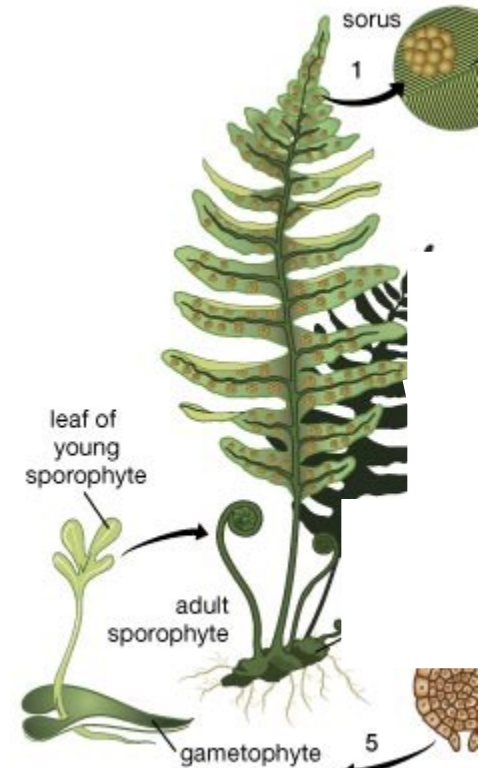
Vascular Plants

- Are known as Tracheophytes
- Are true **terrestrial** plants
- Contain vascular tissue
 - **xylem** transports water
 - **phloem** transports food and nutrients
 - run continuously through out the plant body
- Larger size.
 - vascular tissues provide **support** against gravity
- Cuticle
 - = reduces **water loss**



1. Sporophyta (Seedless Plants)

- Belong to the Class Filicineae
- Includes **ferns**, **horsetails** and **club mosses**
- Have vascular tissue, but have a **rhizome** underground instead of a stem and leafy **fronds**
- Are the most primitive Tracheophytes because they are still dependent on **water** for reproduction
- Ferns display Alternation of Generations with the **Sporophyte** stage being dominant
 - * Water is still necessary for **reproduction**



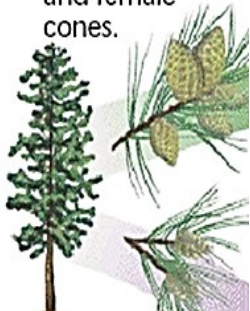
2. Spermatophyta (Seed Plants)

- Include Gymnosperms and Angiosperms
- Have specialized organs = **true roots, stems, & leaves**
- Do not depend on **water** for reproduction
- Produce **seeds**
 - a seed is a plant **embryo**

A. Gymnosperms

- They include the evergreens, junipers, cedars
- Gymnosperms have "**naked**" seeds usually protected by **cones**

① A pine tree produces male and female cones.

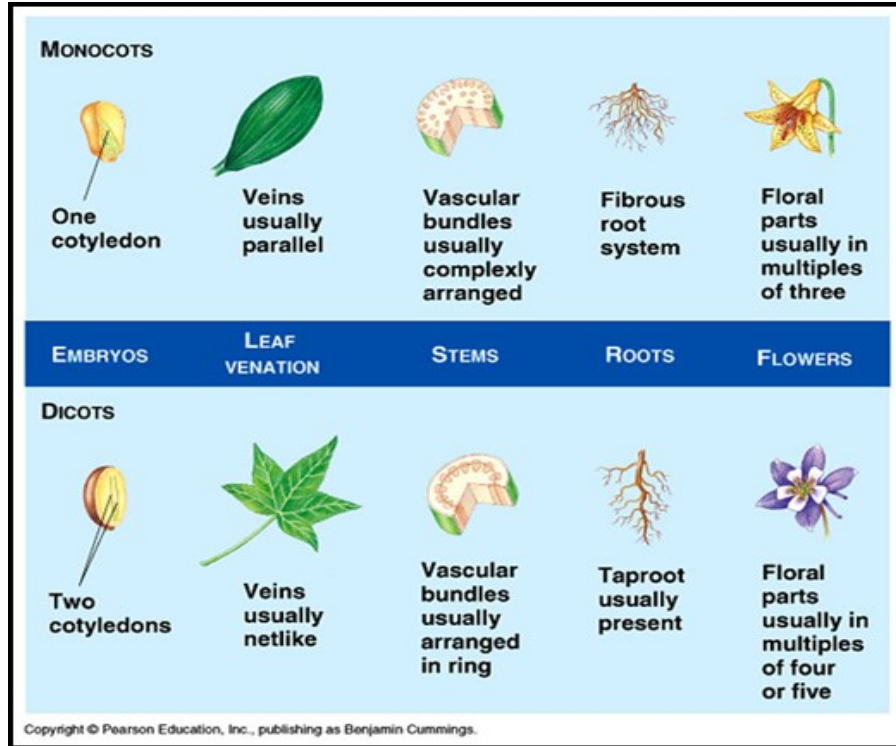


- Adaptations of Gymnosperms
 1. Thin, needle-like leaves = retains **moisture**
 2. No water needed for reproduction
 - = allows diversity of **habitats**
- Gymnosperm Reproduction
 - Gymnosperms display Alternation of Generations with the **Sporophyte** stage being dominant

B. Angiosperms

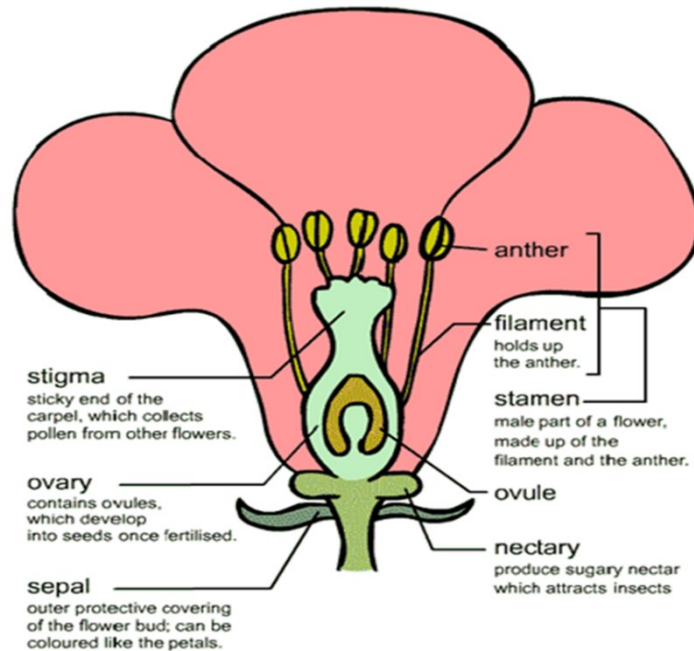
- Include members such as lilies, oak, roses, grasses, etc
- Angiosperms are **flowering** plants
- Further divided into **monocots** and **dicots**

Monocots vs Dicots Explained <https://www.youtube.com/watch?v=gI2RxzAT-ww>



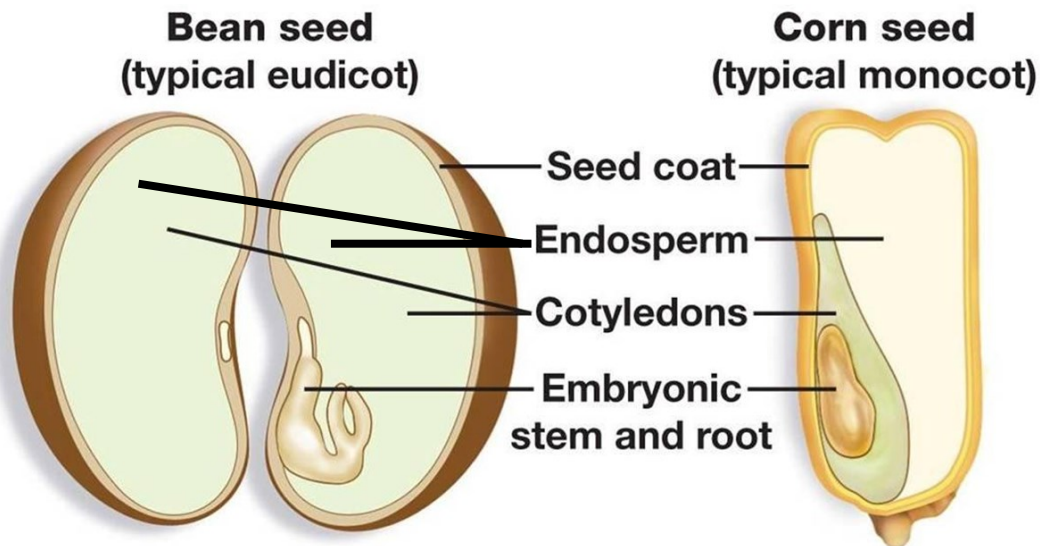
➤ Angiosperm Reproduction

- A flower is the **Gametophyte** reproductive structure of a plant

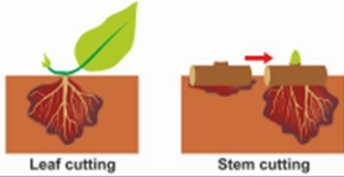

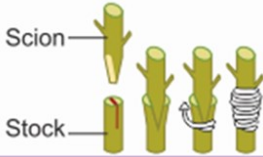



Plant Reproduction <https://www.youtube.com/watch?v=ExaQ8shhkW8>

- Seeds are produced within the **ovary** which develops into a **fruit**
- Fruits are not always edible, anything with a seed inside can be considered a fruit (**cherry, acorns, bean, dandelion**)
- Fruits are dispersed in a variety of ways (**wind, water, animals, mechanical**)
- Each seed is composed of the plant embryo and a food source called the **endosperm**



- Many plants can clone themselves, a process called **vegetative propagation**
 - = use organs of the sporophyte stage (roots, stems, leaves) to produce a new plant
 - result in plants that are genetically identical to the parent plant = **clones**

<p>Cutting – A part of stem is cut and the cut end grows into new plant when placed in moist soil e.g. mango, guava, litchi, lemon, rose</p>  <p>Leaf cutting Stem cutting</p>	<p>Layering – The stem of a plant is bent down until it touches the soil. The stem is then cut once it develops roots and grows into a new plant e.g. lemon, rose, jasmine</p> 
<p>Grafting – The stem of a plant is cut and then fitted on another strong plant and covered with grafting wax. e.g. apples, oranges, water melon, ornamental plants</p>  <p>Scion</p> <p>Stock</p>	<p>Tissue culture - A collection of techniques used to maintain or grow plant cells, tissues or organs under sterile conditions on a nutrient culture medium of known composition</p> 

- Angiosperms display Alternation of Generations with the **Sporophyte** stage being dominant