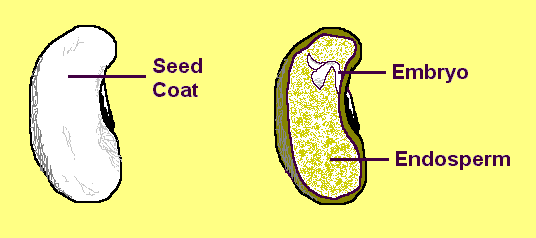
**Plant Evolution**

-All plants lived in the water until the ozone layer formed.

-All plants evolved from water algae.

-In order to live on land, plants had to make 3 adaptations:

1. Prevent water loss
2. Reproduction in the absence of water
3. Absorb and Transport nutrients
4. Prevent water loss
   1. Plants were drying out die to water evaporation (transpiration happening too quickly), so plants evolved a cuticle.
      1. Cuticle: a waxy covering on the surface of the plant
      2. Keeps water in and CO2 out
      3. Stomata: small openings that control the amount of H2O released and CO2 intake.
5. Reproduction without H2O
   1. Sporophytes (adults) produce gametophytes (spores)
      1. Female spores= seeds: ovaries or cones
      2. Male= pollen (so can be transported by wind
   2. Spore- reproductive cell covered by hard outer wall; used for dispersal
      1.  wings
      2. wind
   3. Seed-embryo surrounded by protective coat
      1. Endosperm= nutrients for embryo
      2. 
6. Absorb and Transport Nutrients
   1. Vascular tissue:
      1. transports water and dissolved nutrients
         1. Xylem- water and inorganic- one way: UP
         2. Phloem- nutrients in ANY DIRECTION
      2. Body support (plants grow tall)
         1. Rigid cell walls

**Classifying Plants**

12 phyla divided by:

1. Nonvascular plants- no vascular tissue, roots, stems, leaves
2. Vascular plants-vascular tissue, true roots, stems, leaves
   1. Seedless: ferns
   2. Seeds: gymnosperms, angiosperms
      1. Gymnosperms- seeds not enclosed in fruits (ex: pine tree)

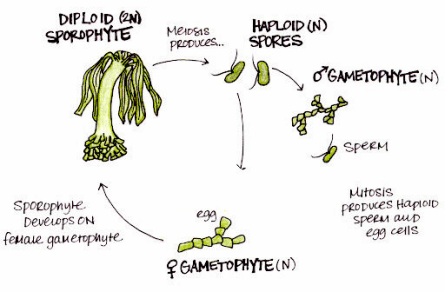


* + 1. Angiosperms- flowering plants; seeds in protective fruit



**Plant Life Cycles**

2 stages

1. Diploid (2n) sporophyte that will produce spores (adult form that you can see)
   1. Diploid= has an entire set of chromosomes (one half set of chromosomes came from female egg and the second half set came from male sperm)
2. Haploid (n) gametophyte that produces egg and sperm
   1. Haploid= half the number of chromosomes (ex: eggs have a half set of chromosomes, because the egg will later combine with a sperm which provides the embryo with the other half set of chromosomes)
   2. 

Types of plants:

|  |  |  |  |
| --- | --- | --- | --- |
| Phylum | common | picture | characteristics |
| Bryophyte | Mosses, liverworts,  hornworts | http://2.bp.blogspot.com/-xWRJj9HRUfc/Tq0iJ29NtEI/AAAAAAAACYQ/WeWeA_cXr-U/s1600/bryophytes-3.jpg | * Seedless * No vascular tissue, so small * Need water for sexual reproduction * Alternation of generations life cycle |
| Pteridophyte | Ferns  Horsetails  mosses | http://universe-review.ca/I10-22a-ferns.jpg | * Seedless * No roots * spores |
| Gymnosperms | Cycads  Gingkoes  conifers |  | * Naked seeds * cones |
| Angiosperms | Flowers and fruits | https://dr282zn36sxxg.cloudfront.net/datastreams/f-d%3Adab44d03b8090eec52cf314255539db778b7ddab5d80cd9e79dbf803%2BIMAGE_THUMB_POSTCARD%2BIMAGE_THUMB_POSTCARD.1 | * seeds * flowers and fruits |

**Structures and Tissues:**

|  |  |  |
| --- | --- | --- |
| **Plant Organs** | **General Info** | **Physiological Process:**  **Photosynthesis, Cellular Respiration, Transpiration, Growth, Reproduction** |
| Roots | -Found at below the surface in the soil  -anchors plant  -absorb water and nutrients |  |
| Stems | Structure, transport  -node: where leaf attaches to stem |  |
| Leaves | -Appendage of stem in vascular plants |  |
| Flowers | Brightly colored to attract pollinators |  |
| Fruits |  |  |
| Cones |  |  |
|  | | |
| **Plant Tissues** |  |  |
| Meristematic | -Regions where cell continually divides.  -Plant “stem” cells  -Found mostly in roots and leaves (fast growing areas) |  |
| Dermal | -outside covering of plants  -epidermis made of parenchymal cells |  |
| Ground  (see pic above) | - surrounded by dermal tissue  -storage, metabolism. Support  -most common |  |
| Vascular | -surrounded by ground tissue  -transport and support  -xylem and phloem |  |
|  | | |
| **Plant Structures** |  |  |
| Cambium | -secondary growth  -contributes to “thickness” |  |
| Guard cells | -border stomata |  |
| Phloem | -organic and inorganic  -NUTRIENTS |  |
| Root Hairs | -increase surface area of root=absorb more water and nutrients |  |
| Root Cap | -Protective coat  -lubricating oil |  |
| Seed  https://encrypted-tbn1.gstatic.com/images?q=tbn:ANd9GcTOWxx9jr2oUWv4Mzjt31Id42NCzjrikXAxLSTMv7jaz570A4Rx | -plant embryo surrounded by protective coat |  |
| Stomata  http://images.fineartamerica.com/images-medium-large-5/stomata-of-lavendula-dentata-sem-power-and-syred.jpg | -open and close for CO2 and H2O |  |
| Xylem  http://www.differencebetween.info/sites/default/files/images/xylem-phloem.jpg | -water transport  -inorganic material transport |  |
| Stamen  http://www.wpclipart.com/plants/diagrams/plant_parts_2/stamen.png | -male reproductive organ |  |
| Pistil | - female reproductive organ |  |
| Petals  http://1.bp.blogspot.com/-BdWR6cDIzSQ/UlnTHo3mIzI/AAAAAAAAAaE/mC1ZYbWD0J4/s1600/Early+Natives+for+print+144.jpg | -brightly colored  -attract pollinators |  |
| Ovary | -ripened fruit |  |
| Sperm  http://www.psmicrographs.co.uk/_assets/uploads/arnica-chamomile-pollen--arnica-chamissonis--80018322-l.jpg | -in pollen |  |
| Egg  http://1.bp.blogspot.com/-AZFGcPixQEI/TlElJWnvHUI/AAAAAAAAAA8/xWtGVF6pYWs/s1600/458856236.jpg | -develops in ovule |  |
| Sepal  http://blogs.warwick.ac.uk/images/jsyrett/2014/07/25/plants-diagram-66.jpg?maxWidth=1024&maxHeight=768 | -protects flower before opening  -“bud” |  |
| Filament  http://classconnection.s3.amazonaws.com/496/flashcards/1435496/png/stamen_(psf)1337740486400.png | - supports anther |  |
| Anther  (see pic above) | -holds pollen |  |
| Style  http://www.naturenorth.com/spring/flora/pwillow/images/typical.JPG | -tube pollen travels down |  |
| Stigma  See pic above | -pollen receptor |  |
| http://msscherman-science.weebly.com/uploads/1/3/7/9/13790131/4815457_orig.png | | |

