CONCEPT: LAND PLANTS

- Land plants evolved from fresh water algae, and evolved adaptations for life on land
    - □ Land plants is an informal name for the subgroup of plants (viridiplantae) called embryophytes
- ***Nonvascular plants*** – first land plants lacked thracheids, and were unable to support large vertical growth as a result
    - □ These plants have a gametophyte-dominant life cycle, many have internal water conducting tissue
- ***Seedless vascular plants*** – paraphyletic group, but vascular plants as a whole are monophyletic
    - □ These plants, and later lineages, have a sporophyte-dominant life cycle
    - □ Lignin allowed for the development of strong, extensive vascular networks capable of supporting vertical growth
- ***Seed plants*** – monophyletic group that is divided between gymnosperms and angiosperms
    - □ Gymnosperms have "naked seeds" because their seeds don't mature in enclosed containers, unlike angiosperms

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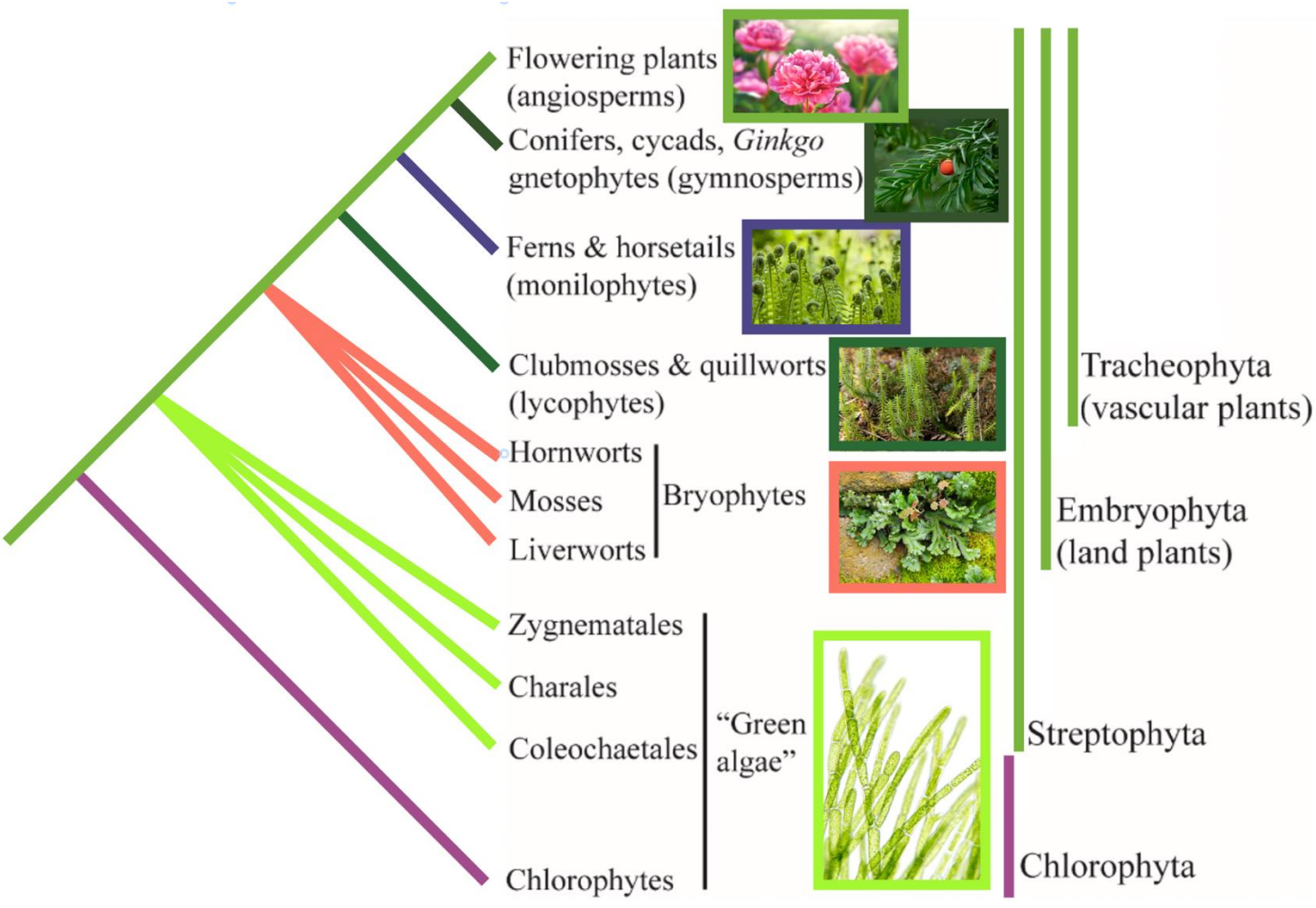


CONCEPT: LAND PLANTS

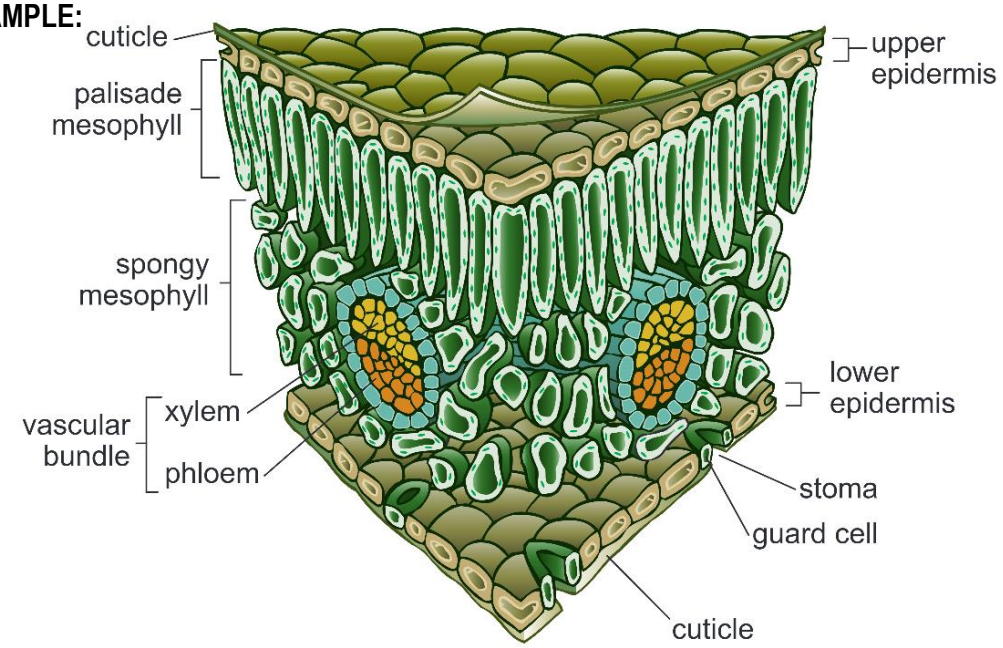
● Plants evolved many structural features to allow for life on land, including those that helped them retain water

□ ***Cuticle*** – waxy film covering the epidermis of many plants

□ ***Stomata*** – pores that control gas exchange, and help regulate water loss

- ***Guard cell*** – specialized cell that use turgidity to open and close the pore

EXAMPLE:



● Vascular tissue evolved to transport water and nutrients throughout the plants body, lignin allowed them to grow tall

● ***Xylem*** – transport tissue, like wood, that transports water and minerals, most include tracheids

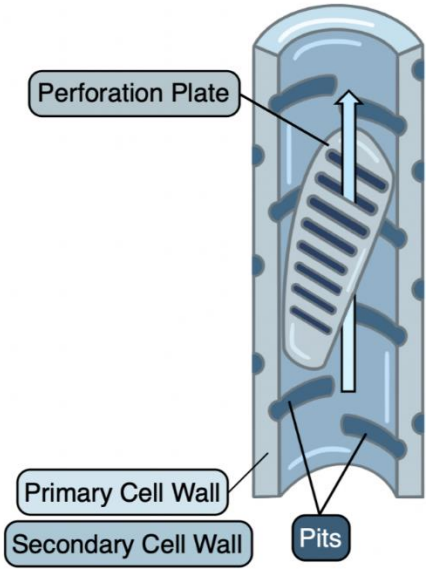
□ ***Tracheids*** – long cells that help carry water up from roots, contain secondary cell walls for increased rigidity

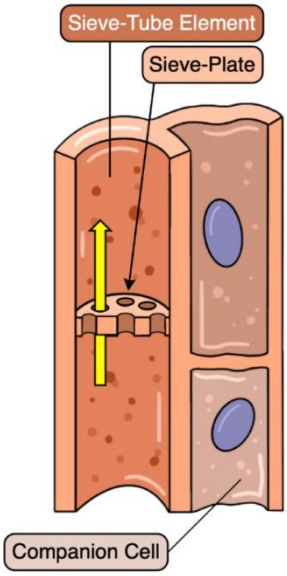
- ***Primary cell wall*** – exterior cell wall made of cellulose

- ***Secondary cell wall*** – interior cell wall made of cellulose and other materials, like lignin

● ***Phloem*** – transport tissue that's transports sugar, amino acids, and other nutrients

EXAMPLE:

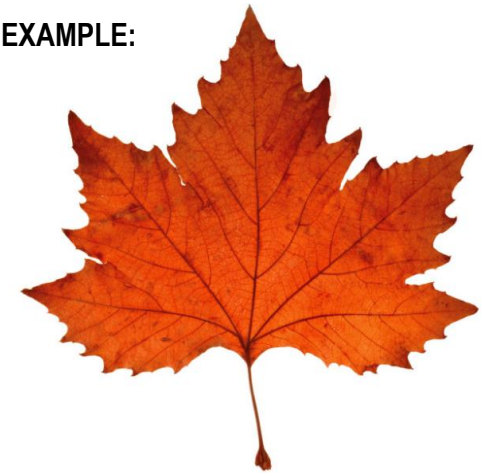


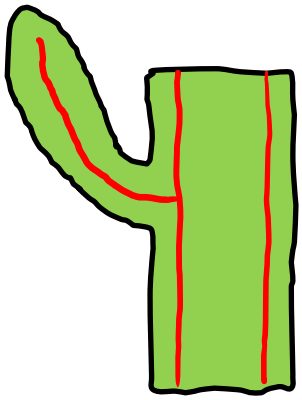


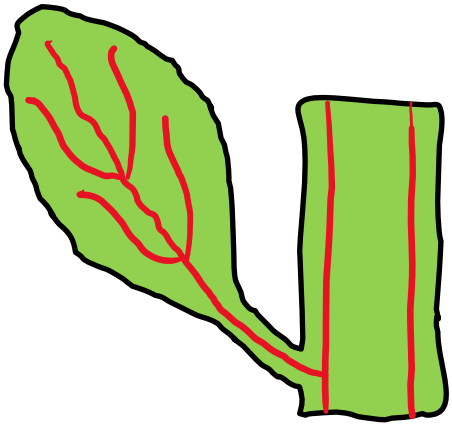
CONCEPT: LAND PLANTS

- ***Roots*** – organ of vascular plants that generally lie below ground, and absorb water and nutrients for the plant
- ***Leaves*** – organ of vascular plants that is specialized for photosynthesis
    - □ ***Micophylls*** – small leaves supported by a singular strand of vascular tissue
    - □ ***Megaphylls*** – leaves with highly branched vascular systems

EXAMPLE:

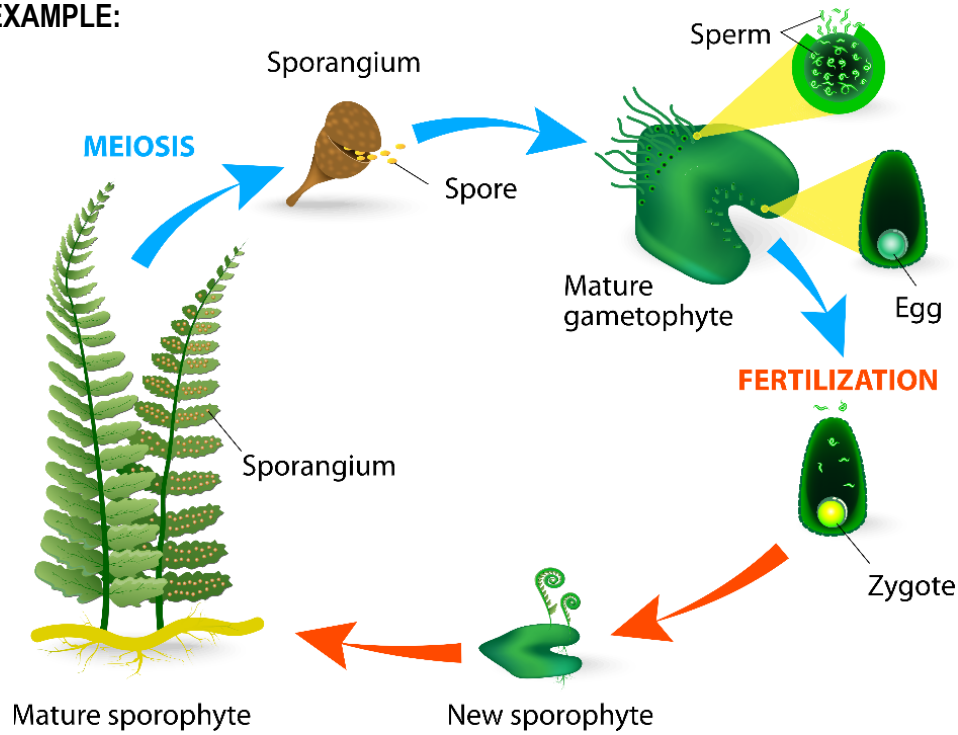






- Seedless vascular plants show the transition from gametophyte-dominant to sporophyte-dominant life cycles
- ***Alternation of generations*** – life cycle in which both the haploid and diploid stages are multicellular
    - □ ***Gametophyte*** – haploid, multicellular stage of life cycle that produces gametes
    - □ ***Sporophyte*** – diploid, multicellular stage of life cycle that produces spores by meiosis
        - ***Spore*** – unit of asexual reproduction, generally haploid and unicellular
        - ***Sporophylls*** – modified leaves that bear ***sporangia***, enclosed structures in which spores are formed

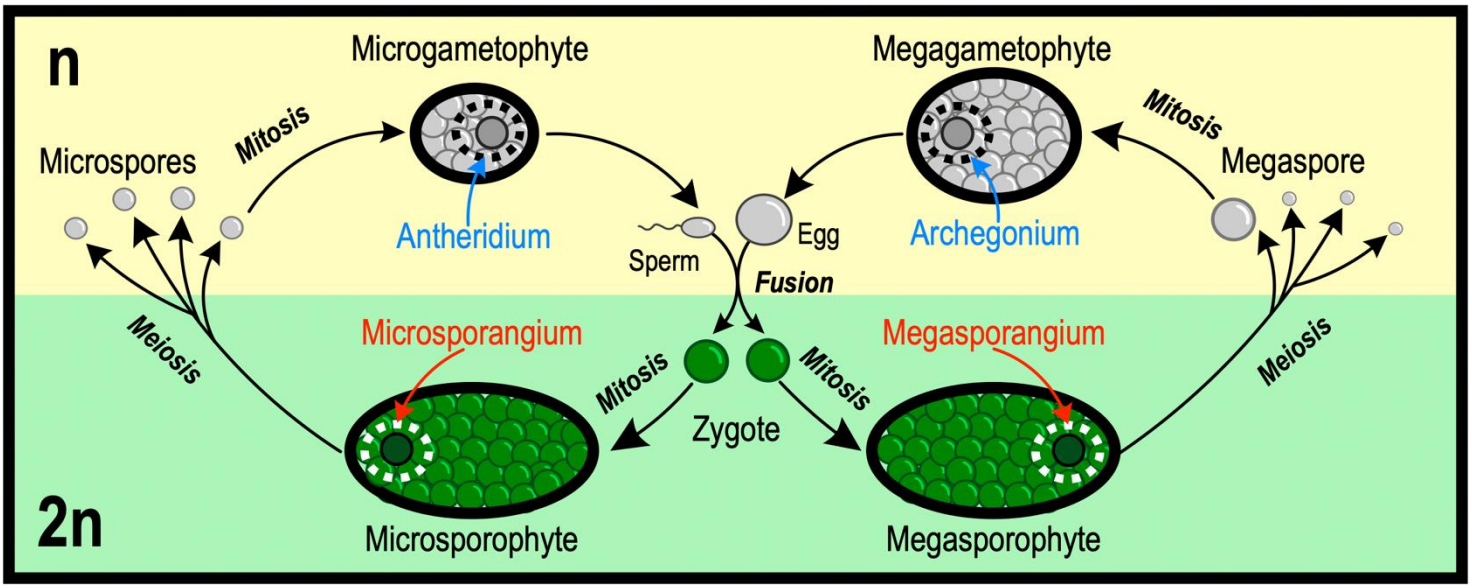
EXAMPLE:



CONCEPT: LAND PLANTS

- ***Homospory*** – only one type of spore is produced
- ***Heterospory*** – two distinct types of spores are produced
    - □ ***Microsporangia*** (microsporophyll) – produce microspores that develop into male gametophytes
    - □ ***Megasporangia*** (megasporophyll) – produce megaspores that develop into female gametophytes

EXAMPLE:



- ***Pollen*** – male gametophyte surrounded by a sporopollenin coating, germinates from a microspore
- ***Seeds*** – embryo and food supply surrounded by tough coating, form from fertilization by pollen
- ***Flowers*** – reproductive structures of angiosperms

EXAMPLE: