
PLANTS

Characteristics of Plants

- All plants are many celled
- Almost all contain chlorophyll
- Have cell walls made of cellulose
- Have tissues
- Most held in place by roots or root like structures

*What are three characteristics of plants?**

What is a Plant?

- **Grass, Trees, Ferns, Mosses and Forbs 285,000 + species**

Adaptation of land plants

- **Protection and Support**
- **Support themselves by cellulose**
  - **Cellulose is an organic compound made of a chain of simple sugars**
- **Protect themselves from water loss by a waxy cuticle**
  - **The cuticle is a waxy layer on the stems and leaves**
- **Reproduction by methods that do not require water or only require water for a short time**

What are two adaptations that allow plants to live on land?*

What would happen if a plants waxy cuticle was destroyed?

Classification of plants

- **Classified into two groups**
  - **Seedless**
    - **Nonvascular**
    - **Vascular**
  - **Seed plants**
    - **Gymnosperm**
    - **Angiosperm**

What are the two main groups that plants are classified into?*

Nonvascular Plants

- **Phylum Bryophyta (Bryon means moss) (Phyta means plant)***
- **Includes mosses and liverworts**
- **They have no conductive tissue (vascular) for transporting food & water***

What are the two different nonvascular plants mentioned in this chapter?*

What does Bryophyte mean?*

Seedless nonvascular plants

- **Live in damp areas because they are nonvascular**
- **Do not have true roots stems and leaves**
  - **Do have root like, stem like, and leaf like structures**
- **Root like structures called rhizoids**
- **Liverwort – wort means herb**

What does liverwort mean?*

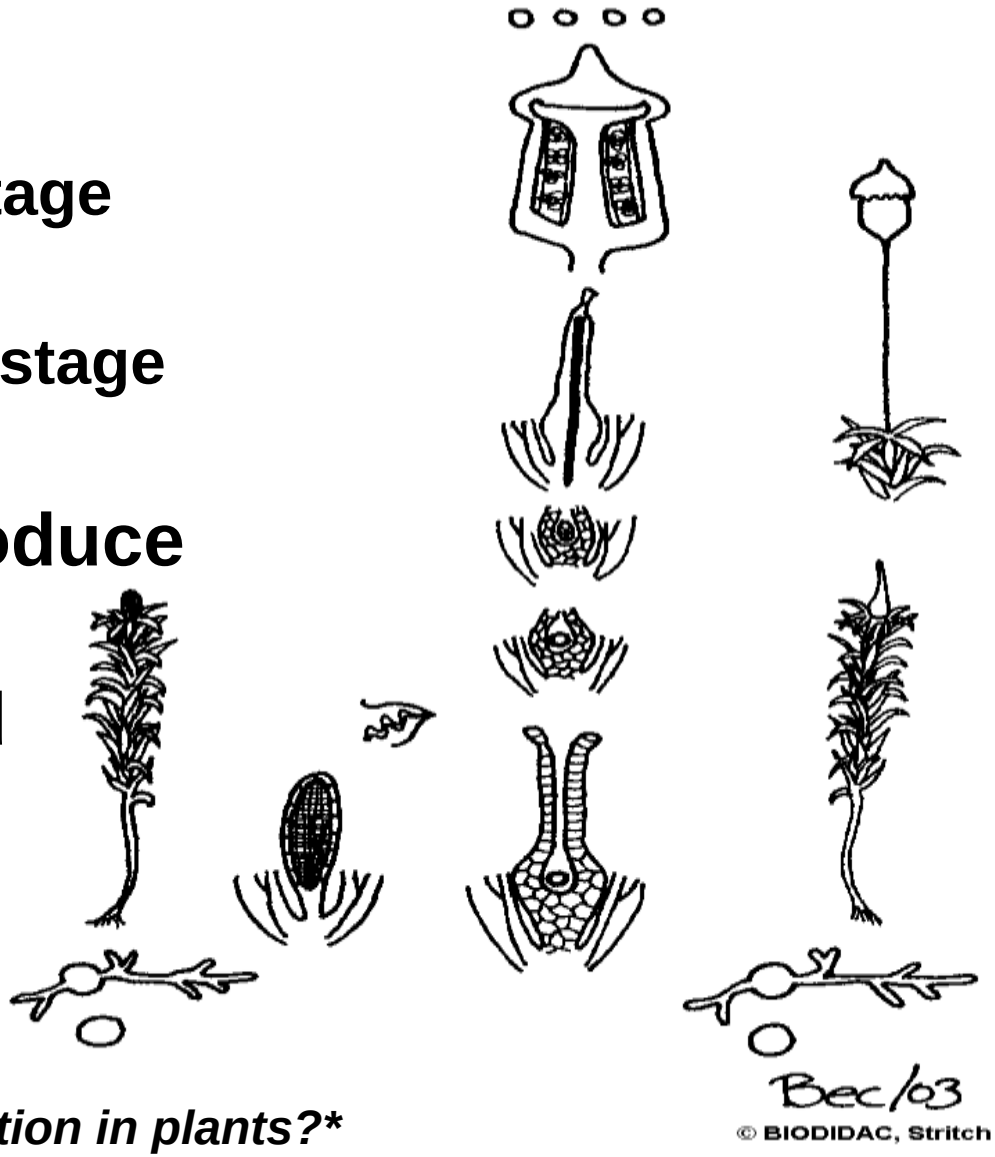
Liverwort

Quiz

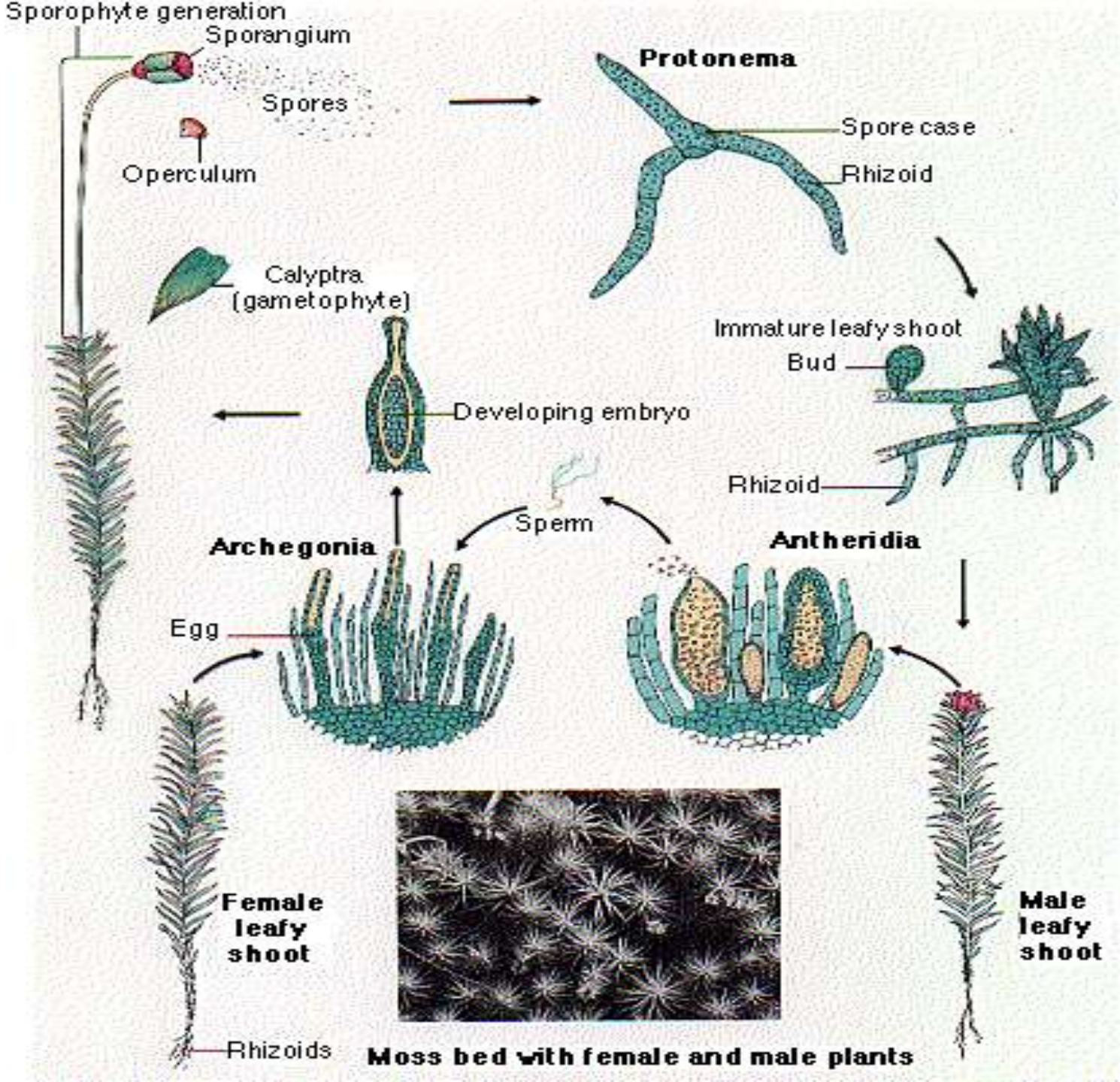
- ***What are two adaptations that allow plants to live on land?****
- ***What would happen if a plants waxy cuticle was destroyed?***
- ***What does liverwort mean?****
- ***are the two main groups that plants are classified into?****
- ***What are the two different nonvascular plants mentioned in this chapter?****
- ***What does Bryophyte mean?****

Moss life cycle

- **Alternation of generation**
  - **Sporophyte stage (diploid)**
  - **Gametophyte stage (haploid)**
- **Can also reproduce asexually by a process called vegetative propagation**



What is alternation of generation in plants?*


Sporophyte generation
Sporangium
Spores
Operculum
Protonema
Spore case
Rhizoid
Calyptra
(gametophyte)
Immature leafy shoot
Bud
Developing embryo
Rhizoid
Sperm
Archegonia
Antheridia
Egg
Female leafy shoot
Male leafy shoot
Rhizoids
Moss bed with female and male plants

Importance of mosses and Liverworts

- **Pioneer species (species that are first to get established on barren areas**
- **Begin the weathering of rocks to make soil**

Vascular Plants

- **Phylum Tracheophyta ***
- **vascular plants that do have vessels for conduction water and nutrients**
- **There is two groups of vascular plants**
  - **Seedless**
  - **Seed**

What are the two main groups of vascular plants?*

Seedless Vascular plants

- **(plants that have conductive tissue)**
- **Includes club mosses, spike mosses, horsetails, and ferns**
- **Club mosses and spike mosses Read p 274**
  - **Horsetails p. 274**
  - **Ferns Read p 275 together**

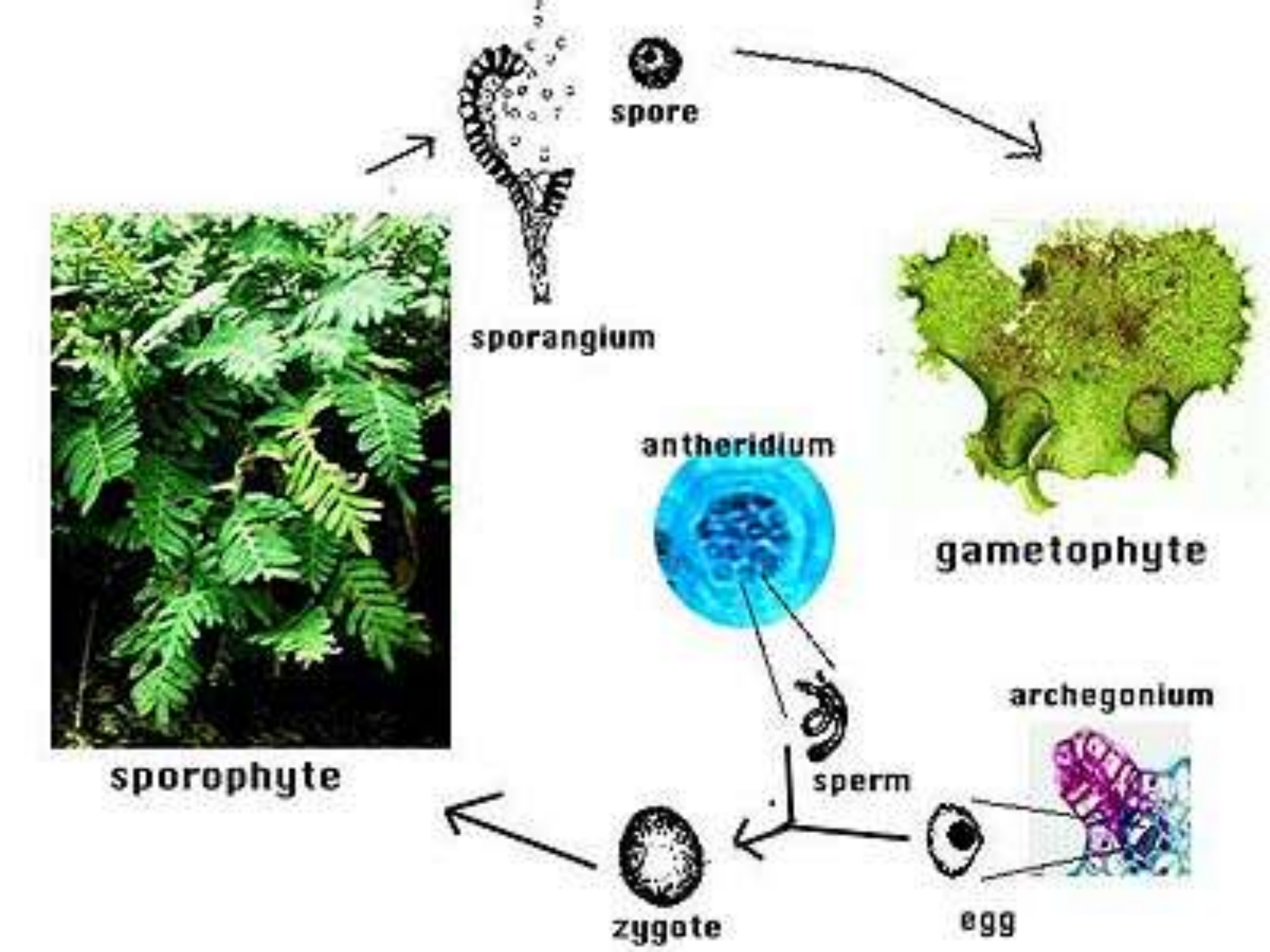
What seedless plant has unique jointed stem structures?*

Equisetum hyemale
Equisetaceae

The Fern life cycle

- **Fern anchored by a rhizome**
- **Fern leaf is called a frond**
  - **On the underside of the leaf spores are produced by sori**
  - **Haploid spores produced in sori**
- **Spores that land on moist area grow into a heart shaped plant called the <u>prothallus</u>**
  - **Prothallus produces egg and sperm**
- **The sperm swims to the egg**
- **After fertilization the zygote develops into a mature fern plant**

What is the name of the fern anchor?*


spore
sporangium
sporophyte
gametophyte
antheridium
archegonium
sperm
egg
zygote

Seed Plants

- Plant that reproduces and store embryo in a seed

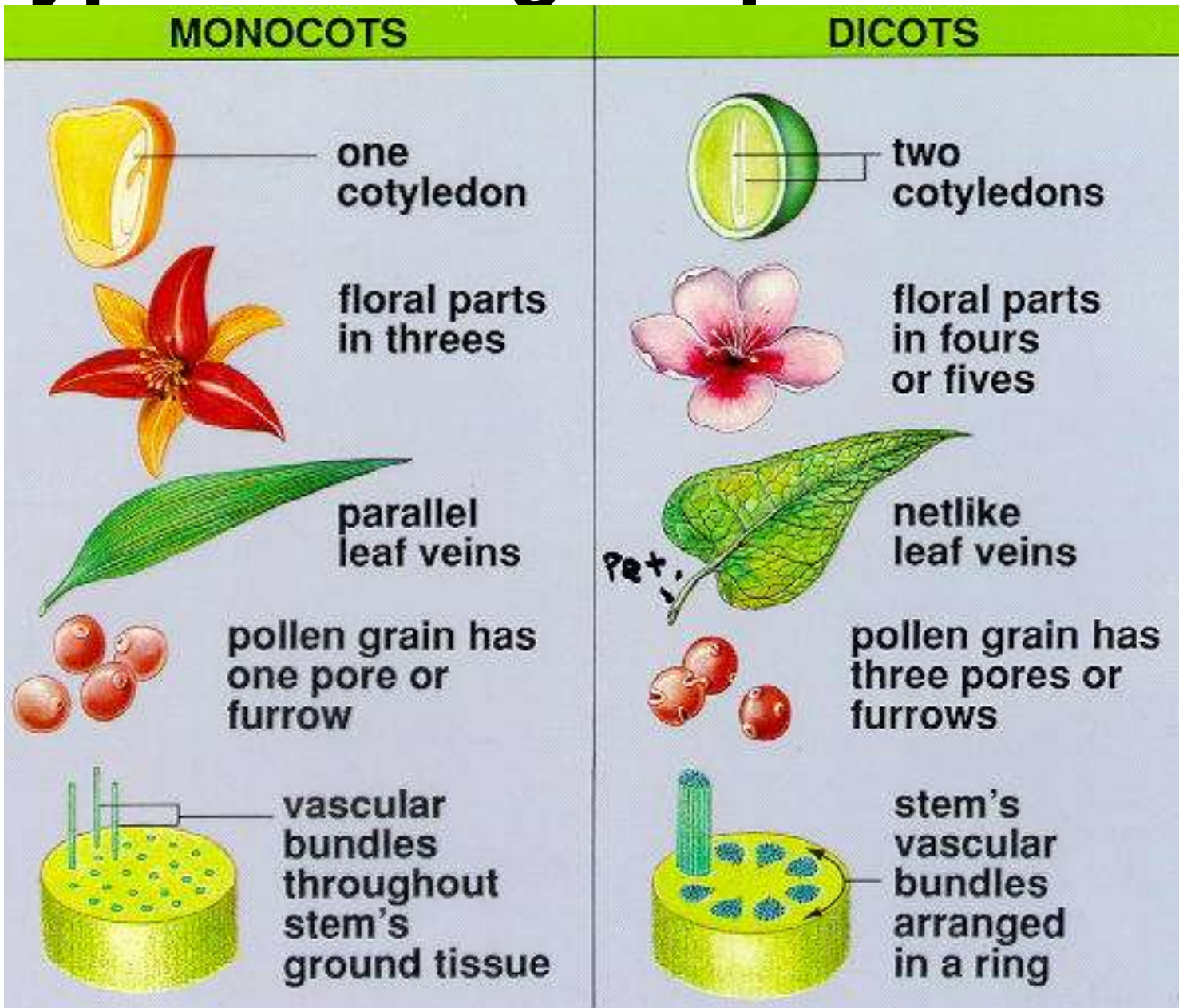
Two Types of Seed Plants

- **Gymnosperms - unprotected seed example: conifers, ginkgoes, cycads**
- **Angiosperm – vesseled seed (seed is protected)**

- ***What are the two main groups of seed plants and what is the difference between them?****
- ***Give an examples of each type of seed plant.****

Two types of Angio Sperms

- **Monocots**
- **Dicots**



Monocots

- **One seed leaf**
- **Parallel veins in leaf**
- **Flower and fruit parts in threes or multiples of three**
- **Vascular bundle is a group of vascular tissue together**

Dicots

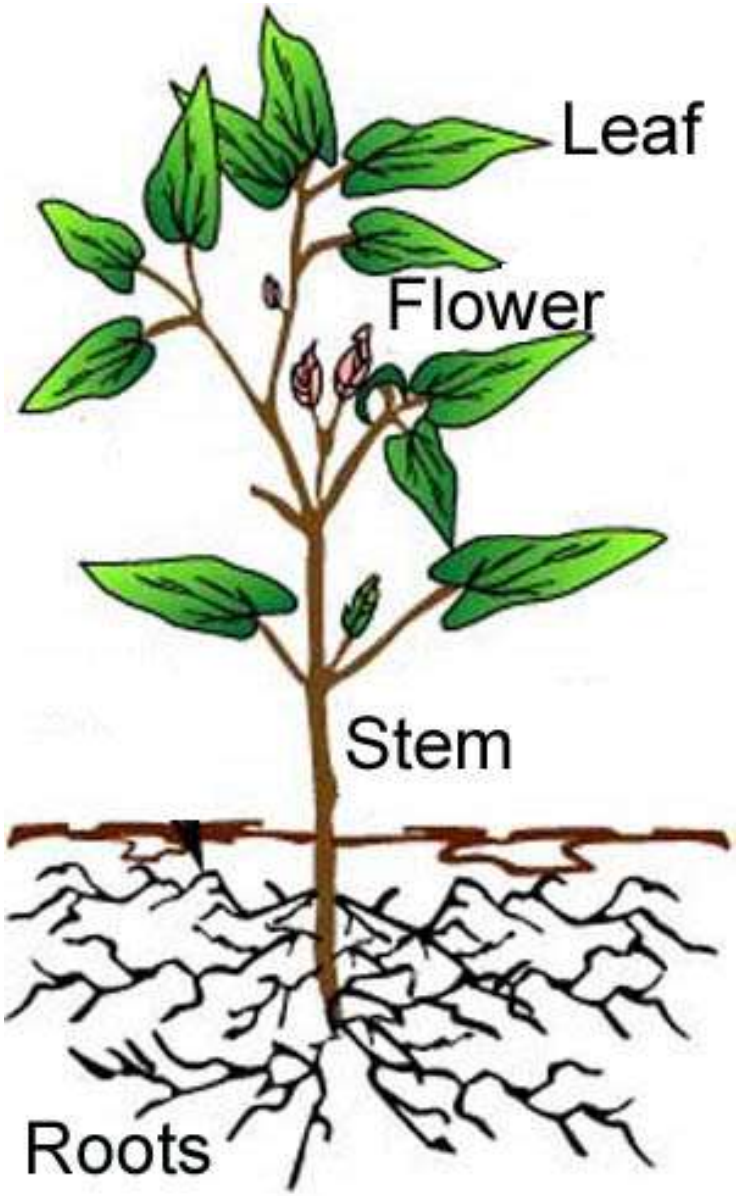
- **Two seed leaves**
- **Netted veins on leaf**
- **Flowers and fruits are in fours or fives or multiples of 4 or 5**
- **Vascular bundles occur in rings inside the stem**

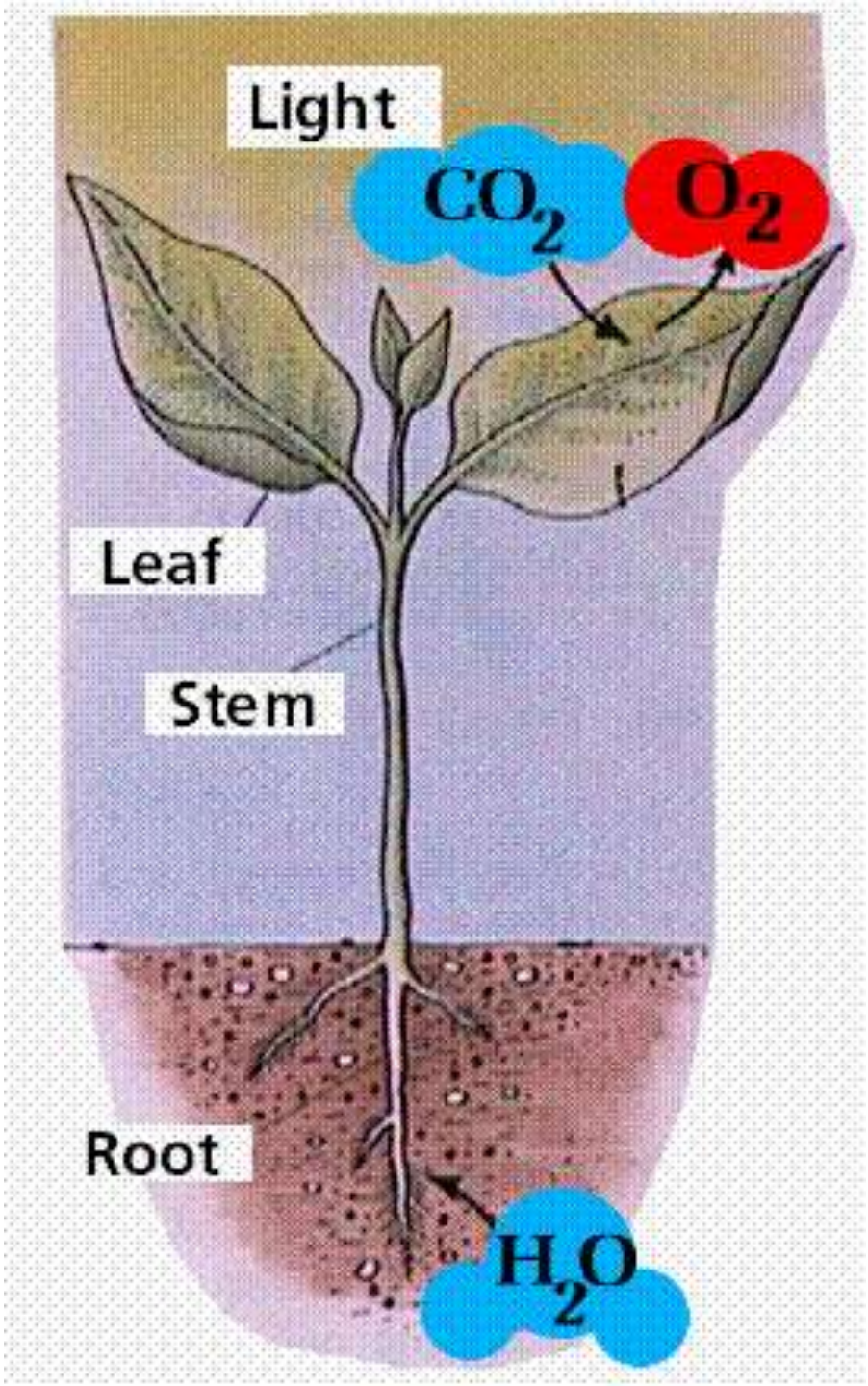
- ***What are the two types of angiosperms and what is the difference between them?****
- ***Give an examples of each type of seed plant.****

Parts of plants

- **Plant organs**
  - **Roots**
    - **Anchoring plant**
    - **Conduct water minerals**
    - **Absorb water and minerals**
    - **Store food**
  - **Stems – above ground portion of plant**
    - **Support leaves, flowers and fruit**
    - **Conduct food and water between roots and leaves**
  - **Leaves**
    - **Photosynthesis**
    - **Storage**

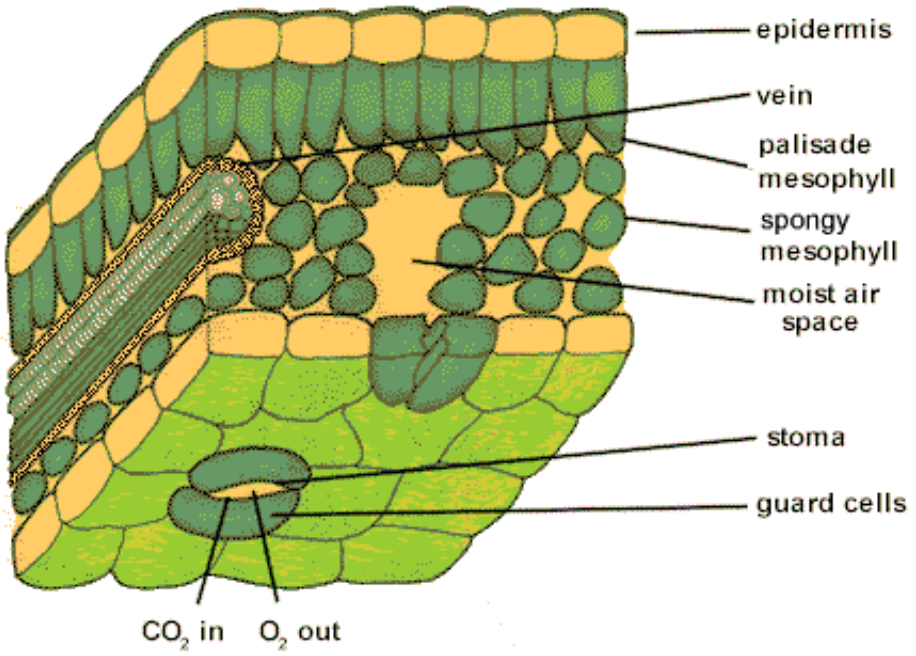
List at least two functions of the roots stems and leaves.*




Light
CO_2
O_2
Leaf
Stem
Root
H_2O

Leaf structure

- **Epidermis outer layer covered with a waxy cuticle**
- **Stomata pore for CO_2, O_2, and H_2O**
- **Guard cells regulate the stomata**
- **Palisade layer Cells packed with chloroplasts for photosynthesis**
- **Spongy layer - spongy layer with conductive tissue xylem and phloem**



Know the parts of a leaf.*

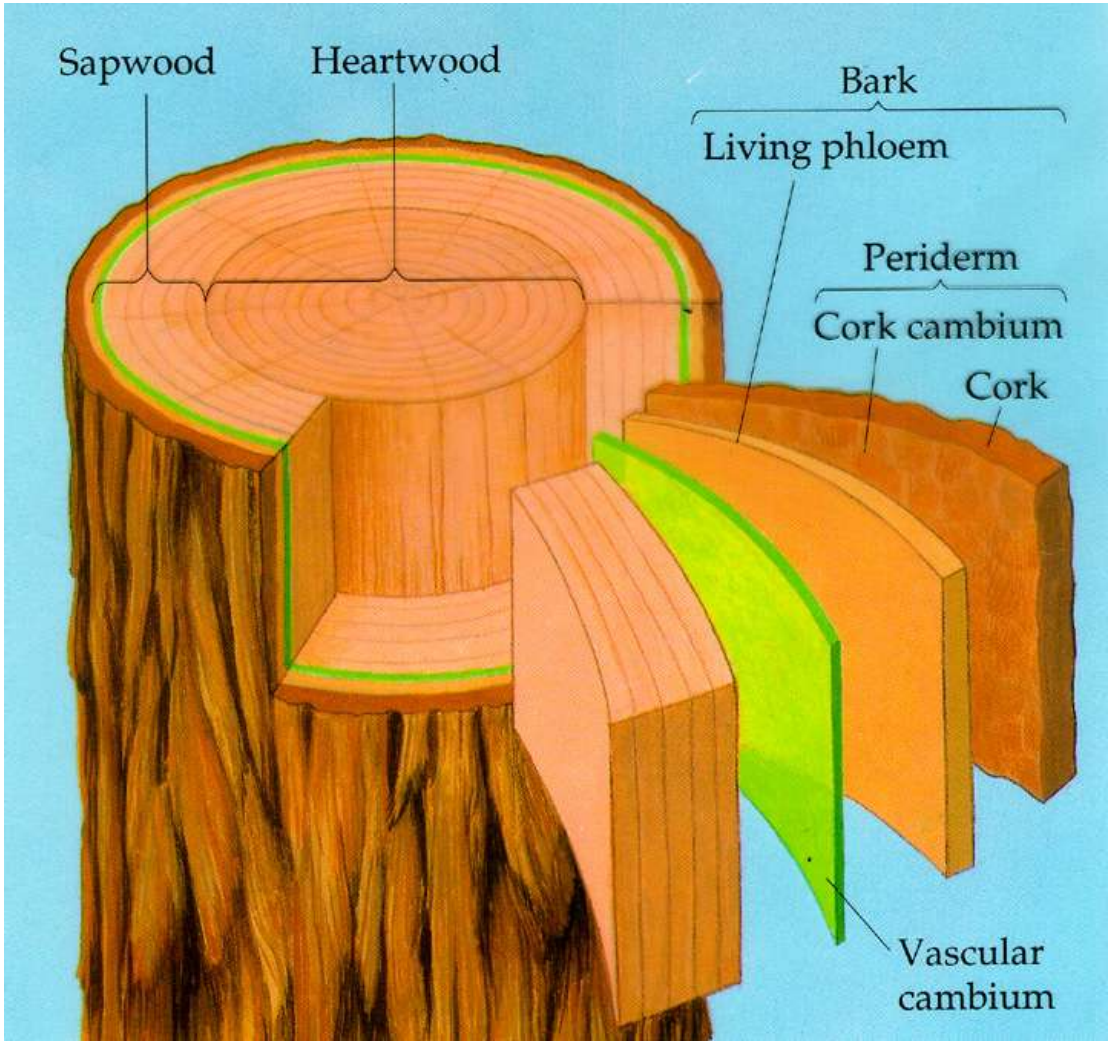
What is the difference between xylem and phloem?*

Quiz

- 1. What are the two groups of seed plants?
- 2. What are the two groups of angiosperms?
- 3. How do most gymnosperms reproduce?
- 4. What are the three main organs of a plant?
- 5. What is the difference between Xylem and Phloem?

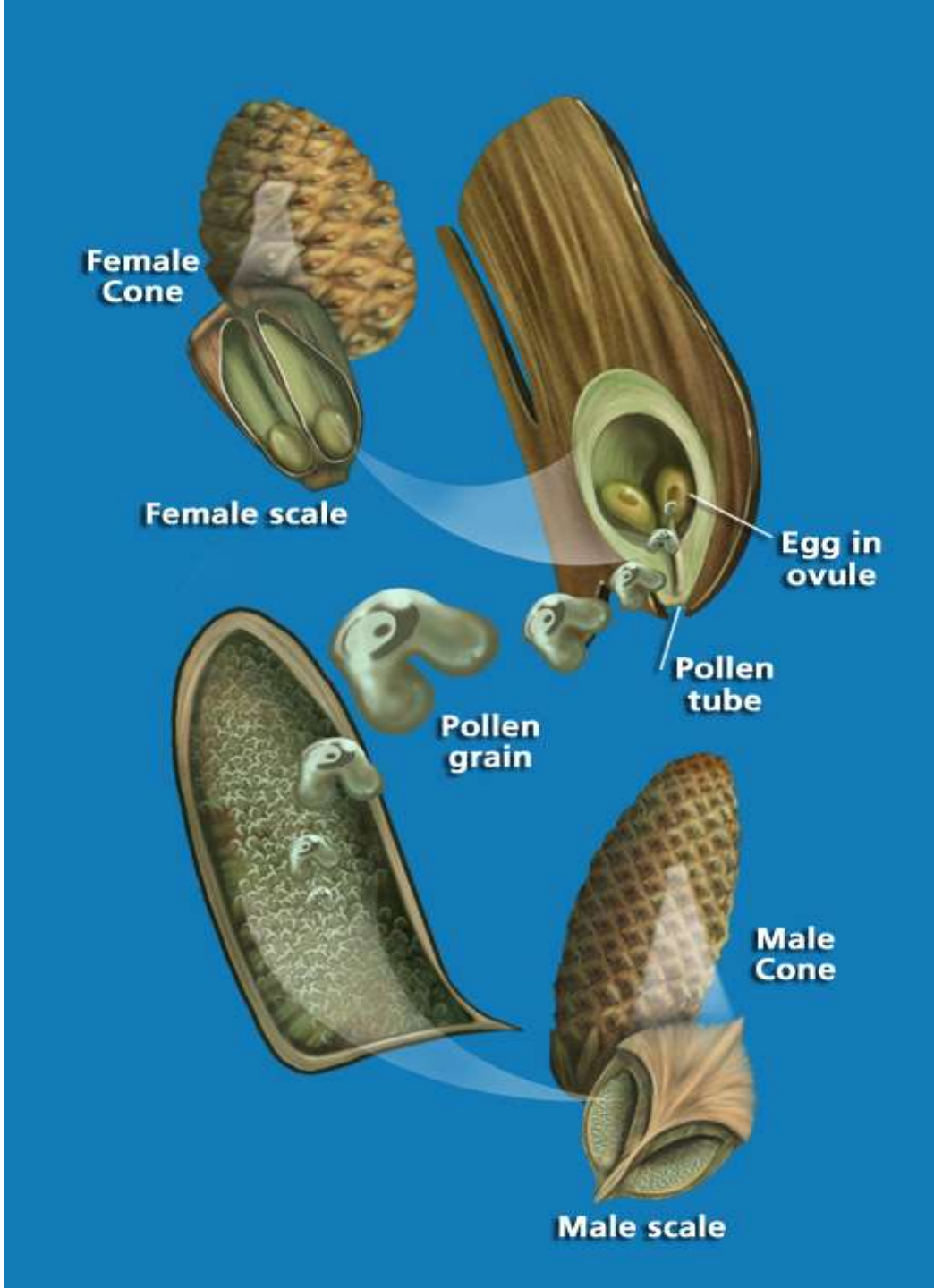
Vascular tissue

- **Xylem - transport water and minerals up the plant**
- **Phloem – moves food down the plant Cambium separates vascular tissue and produces new vascular tissue**



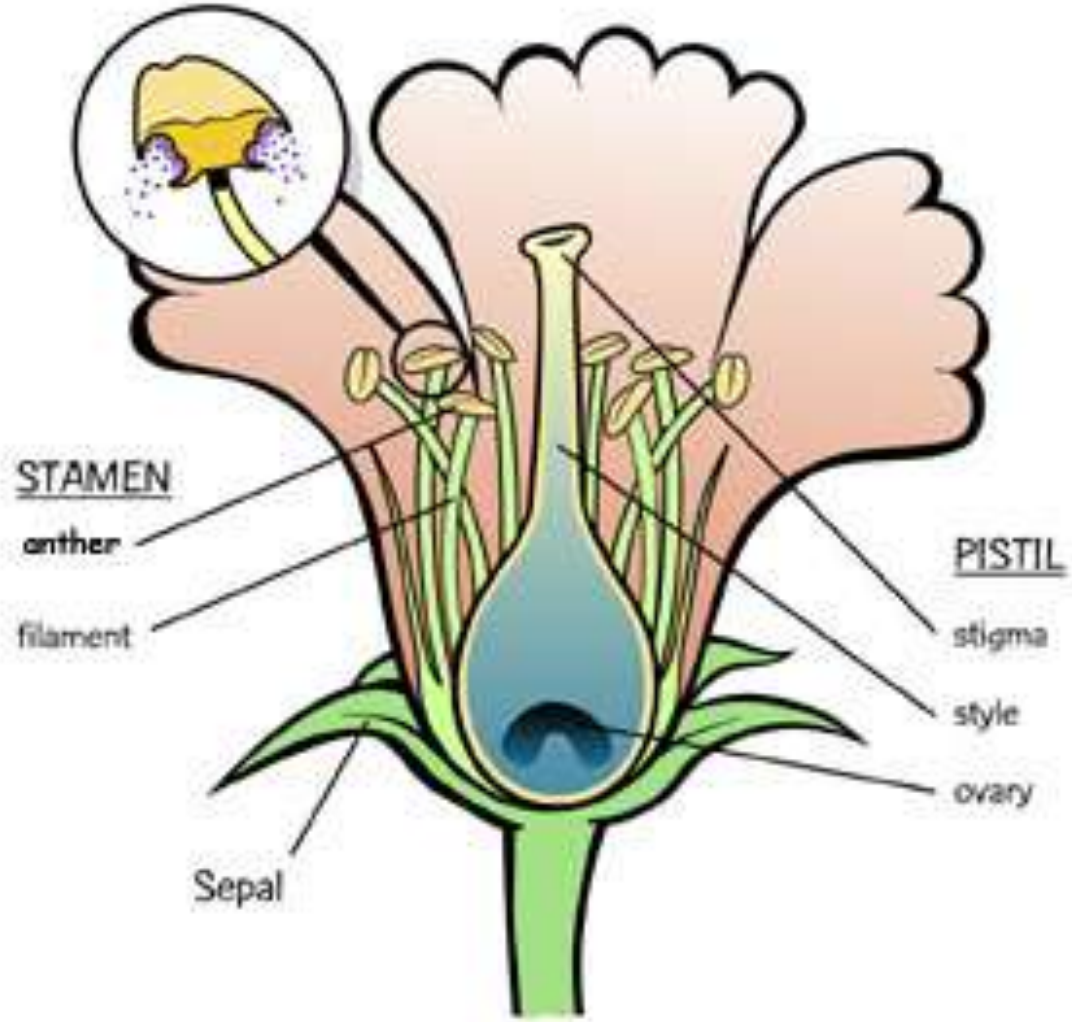
Plant Reproduction

- **Gymnosperm Reproduction**
  - **Male and female cones**
  - **Pollen blows from male cones to female cones**
  - **Fertilization takes place in the female cones**
  - **Seeds develop in the female cones**



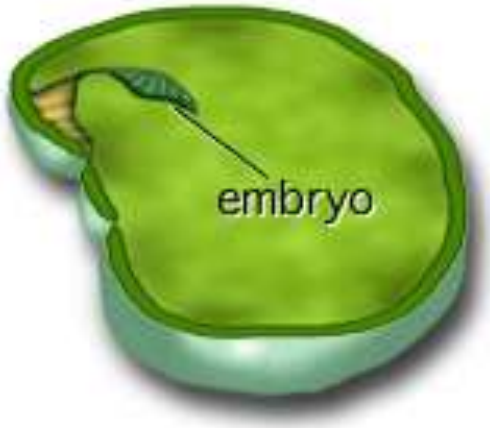
Angiosperm Reproduction

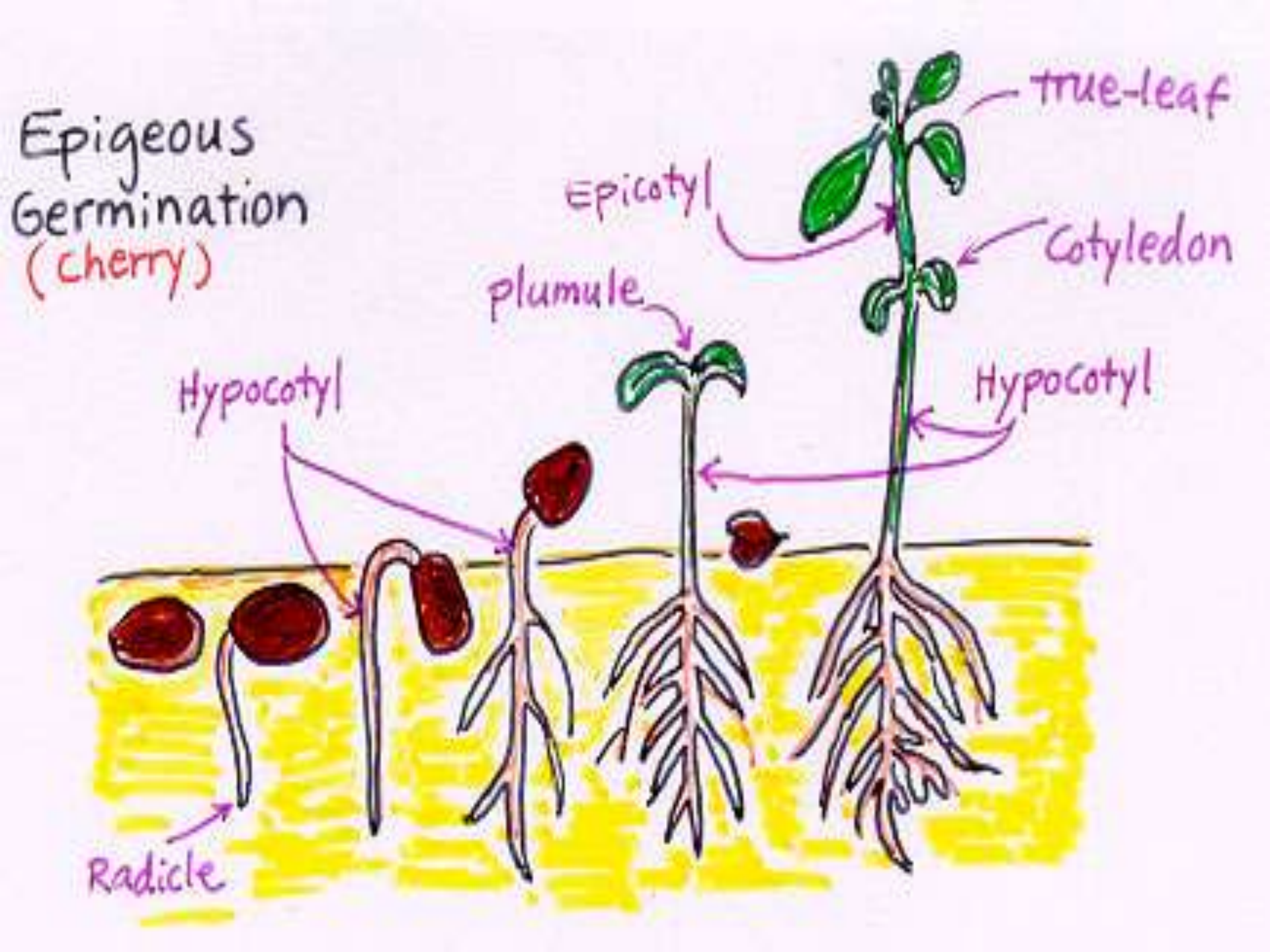
- **The flower**
  - **Female- pistil**
    - **Stigma**
    - **Style**
    - **Ovary**
  - **Male portion- stamen**
    - **Anther**
    - **Filament**
    - **Seed development**



Pollination

- **is when the pollen grain from the male containing the sperm is placed on the stigma of the female**
- **An embryo is the result of pollination**
  - **Stem**
  - **Root**
  - **Cotyledons**




Epigeous
Germination
(cherry)
true-leaf
Epicotyl
Cotyledon
plumule
Hypocotyl
Hypocotyl
Radicle

Seed dispersal and germination

- **Dispersal**
  - **Animals**
    - **Fruit**
    - **For food**
    - **In coat**
  - **Wind**
  - **Water**
  - **Germination - is when the seed begins to grow**