



Plants

What is a Plant?

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



Characteristics of plants

- **Sessile, nonmotile (they don't move)**
- **All plants are many celled**
- **Almost all contain chlorophyll**
- **Have cell walls made of cellulose**
- **Most held in place by root like structures**
- **Prevent water loss**
- **Obtain and distribute water and minerals to tissues**
- **Adaptation of land plants that allow them to live on land**
 - **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**

Classification of plants

- **Division Bryophyta (Bryon means moss) (Phyta means plant)**
 - Includes mosses and liverworts
 - They have no conductive tissue (vascular) for transporting food & water
 - Live in damp areas because they are nonvascular
- **Division Tracheophyta – vascular plants that do have vessels for conduction water and nutrients**

Two main groups of seedless plants

- **Seedless nonvascular plants**
 - Do not have true roots stems and leaves
 - Do have root like, stem like, and leaf like structures
 - Root like structures called rhizoids
 - They include mosses and liverworts
 - Spend most of their life in the gametophyte stage
- **Seedless vascular plants**

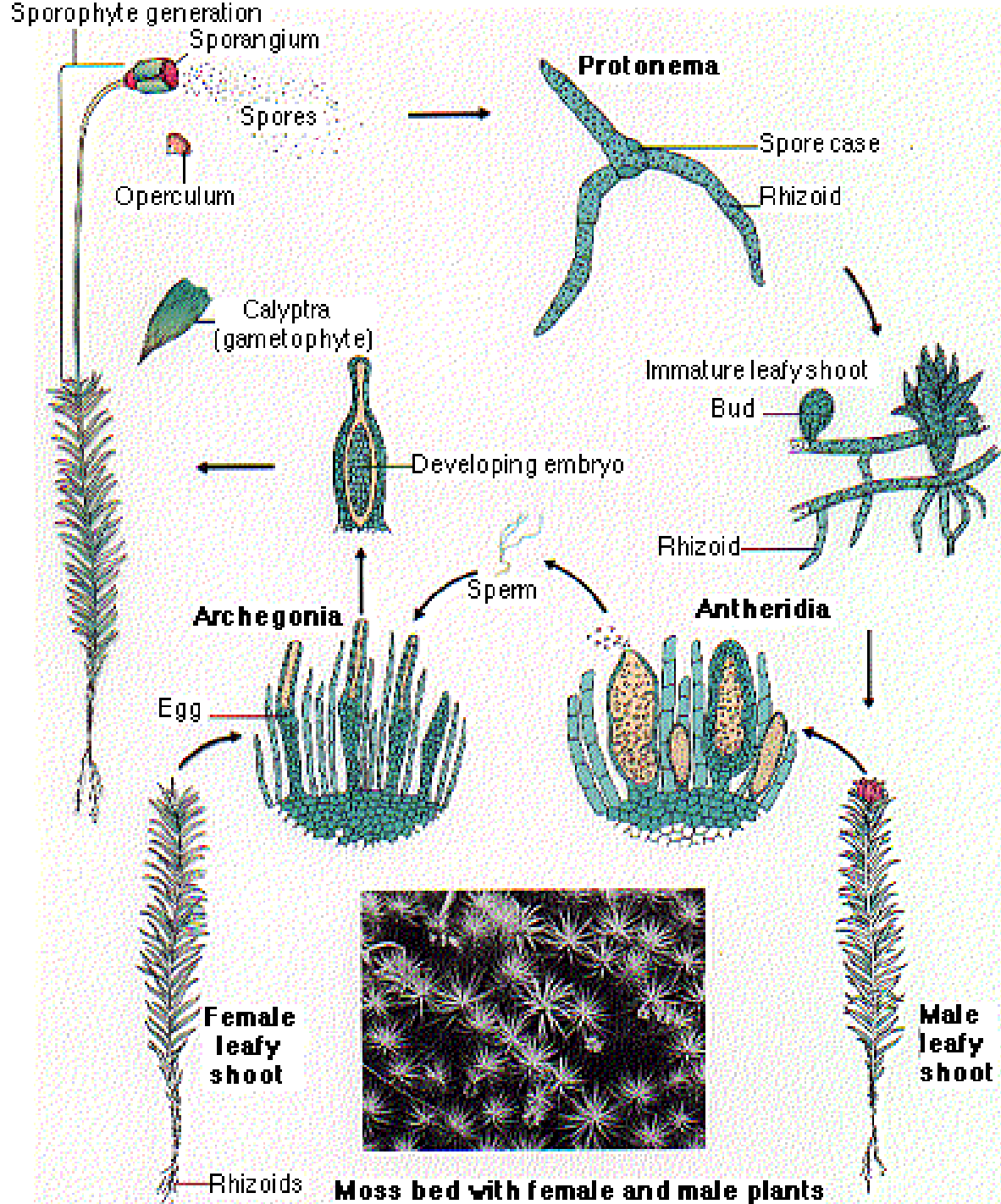


Bryophytes - Mosses & Liverworts

- **Liverwort – wort means herb**
 - **Have flat thin photosynthetic liver-shaped structures that are much like leaves**
- **Moss**
 - **Slightly more complex than liverworts**

Plant Life Cycles

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



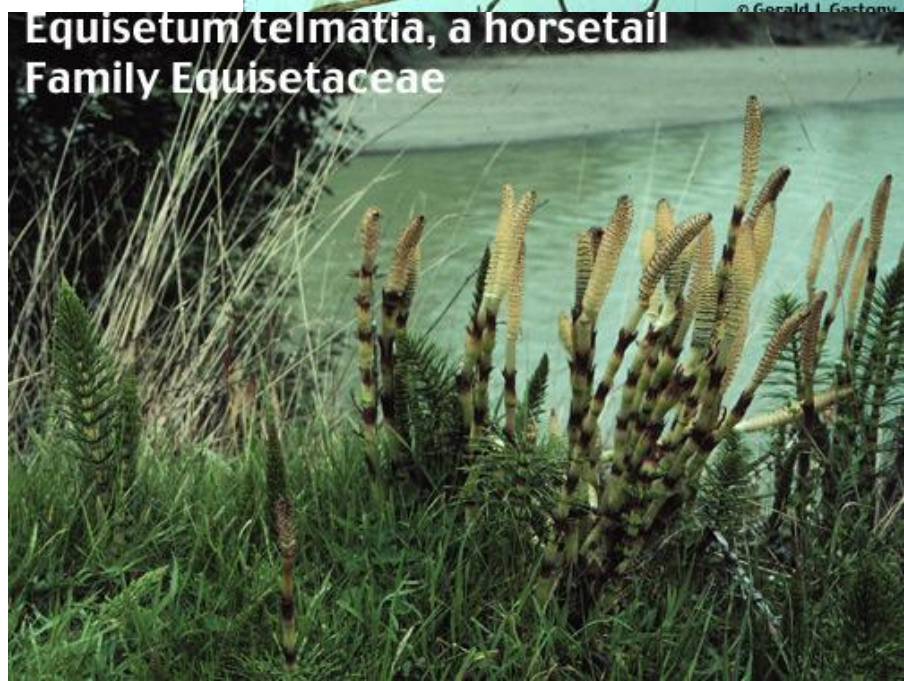
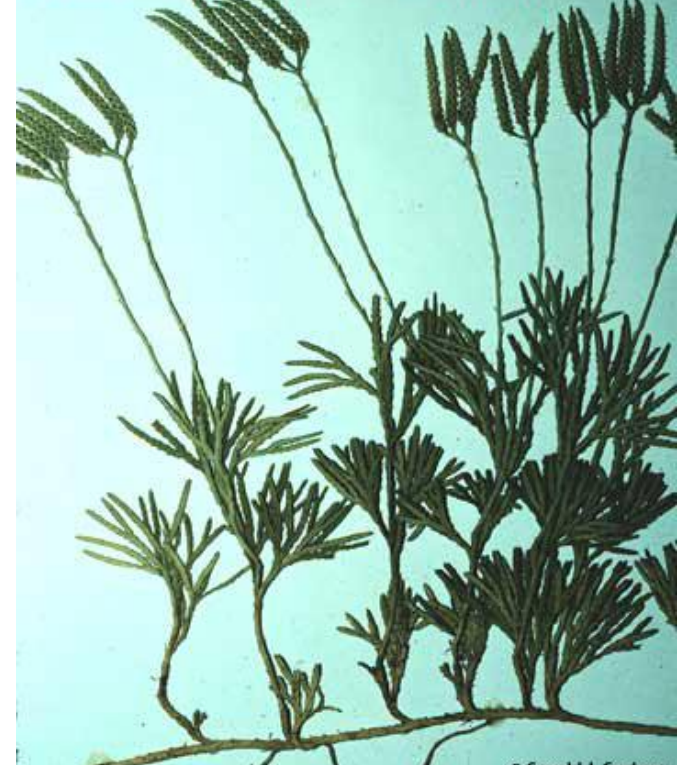
Importance of Mosses & Liverworts

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



Seedless Trachophytes

- (Vascular plants)
- (plants that have conductive tissue)
- Includes club mosses, spike mosses, horsetails, and ferns
- True roots stems and leaves
- Vascular tissue allows water and minerals to move up and down through out the plant



Equisetum telmateia, a horsetail
Family Equisetaceae

Seedless Tracheophytes

- **Club mosses and spike mosses**
- **Simple tracheophytes that resemble true mosses**
- **Reproduce spores in cone-like structures called strobili**



Seedless Tracheophytes

- **Horsetails**
 - Only one genus alive today
 - Slender stem and small wedge shaped leaves



Ferns

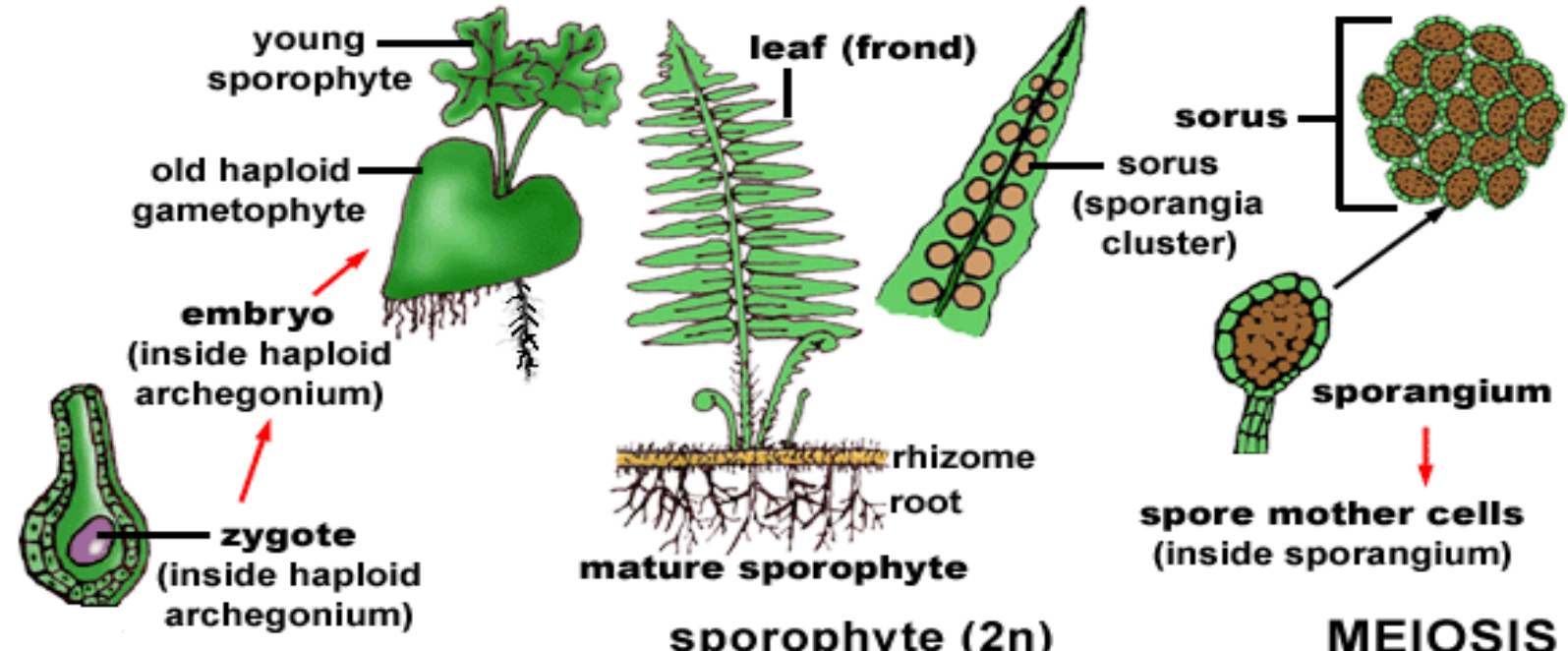
- **Range in size from small to large as trees 15m**
- **Grow in moist areas**
- **Moisture is necessary for part of their reproductive life cycle**
- **Leaves are branched and have a lacy appearance**
- **Leaves are sometimes called fronds**
- **Ferns underground stems are called rhizomes**
- **Ferns grow as a tightly coiled fiddle head**



The Fern life cycle

- Fern leaf is called a frond
- On the underside of the leaf spores are produced by sori
- Gametophyte stage
 - Haploid spores produced in sori
 - Sori fling spores away from plant
 - Spores that land on moist area grow into a heart shaped plant called the prothallus
 - Prothallus produces egg and sperm
 - The sperm swims to the egg
- Sporophyte stage
 - After fertilization the zygote develops into a mature fern plant

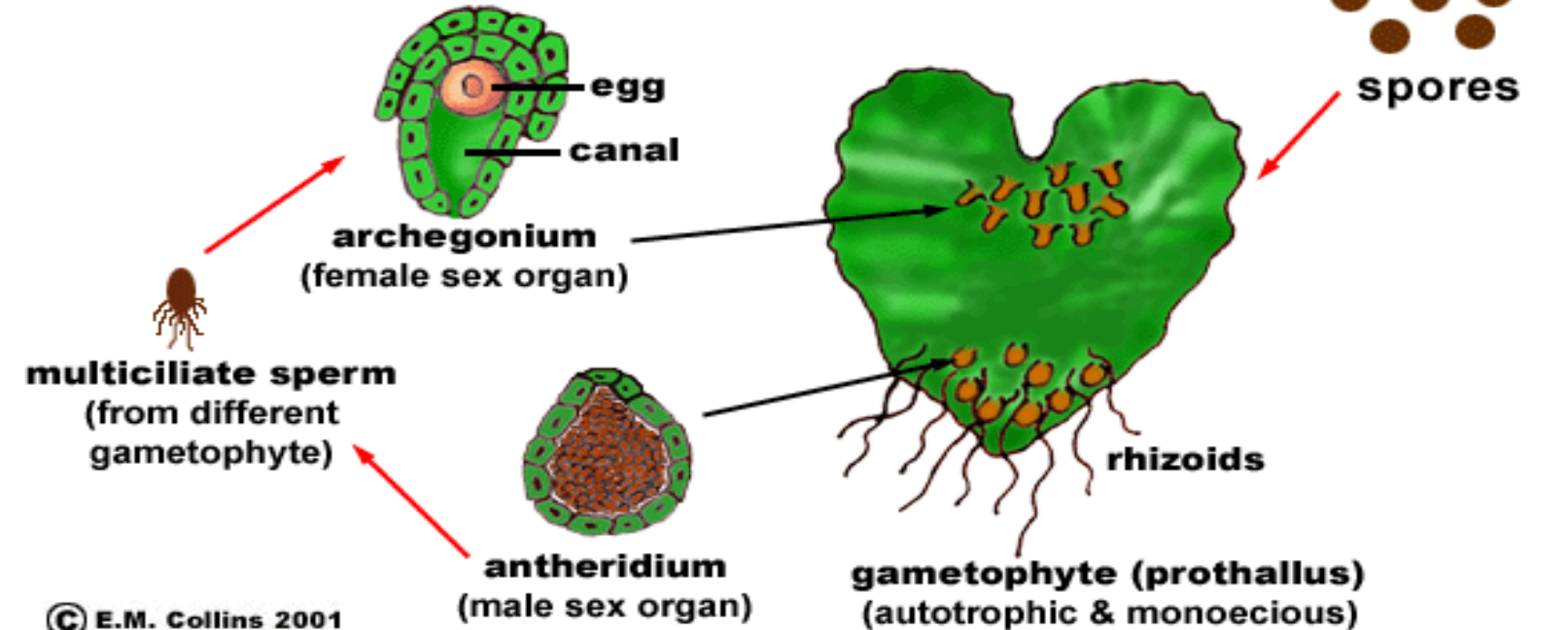




FERTILIZATION

gametophyte (n)

MEIOSIS



Quiz

1. What are three characteristics of plants?
2. Give three characteristics of plants that allow them to live out of water.
3. Plants are divided into two divisions. What are the two divisions of plants?
4. Give two examples of nonvascular plants.
5. Give two examples of seedless vascular plants.
6. What is the difference between a gametophyte plant and a sporophyte plant?
7. What is alternation of generation?



Seed plants (*Vascular Plants*)

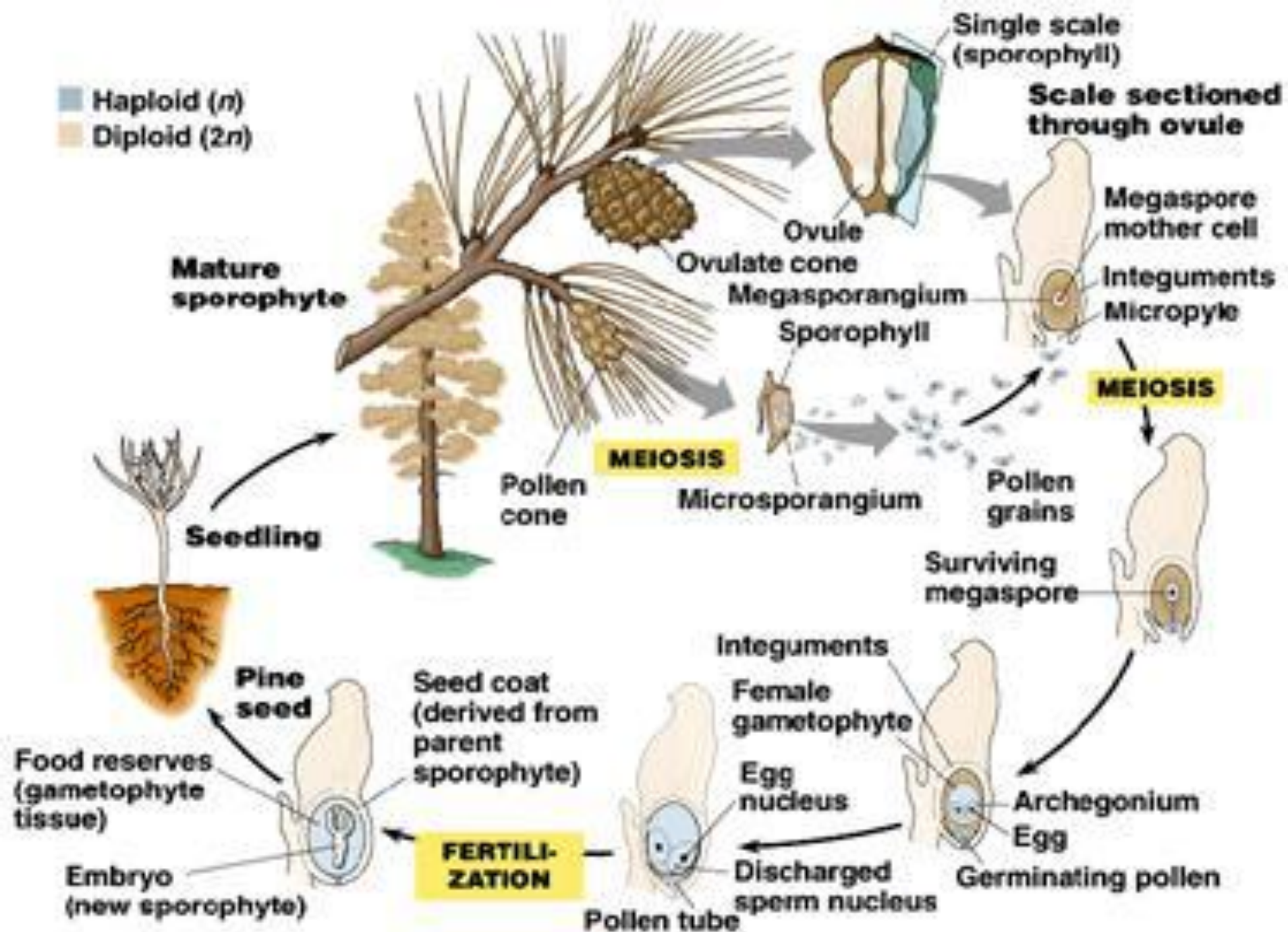
Most abundant plants on earth

Two types of seed plants

- Gymnosperms - Naked Seed
- Angiosperm - Vesseled Seed

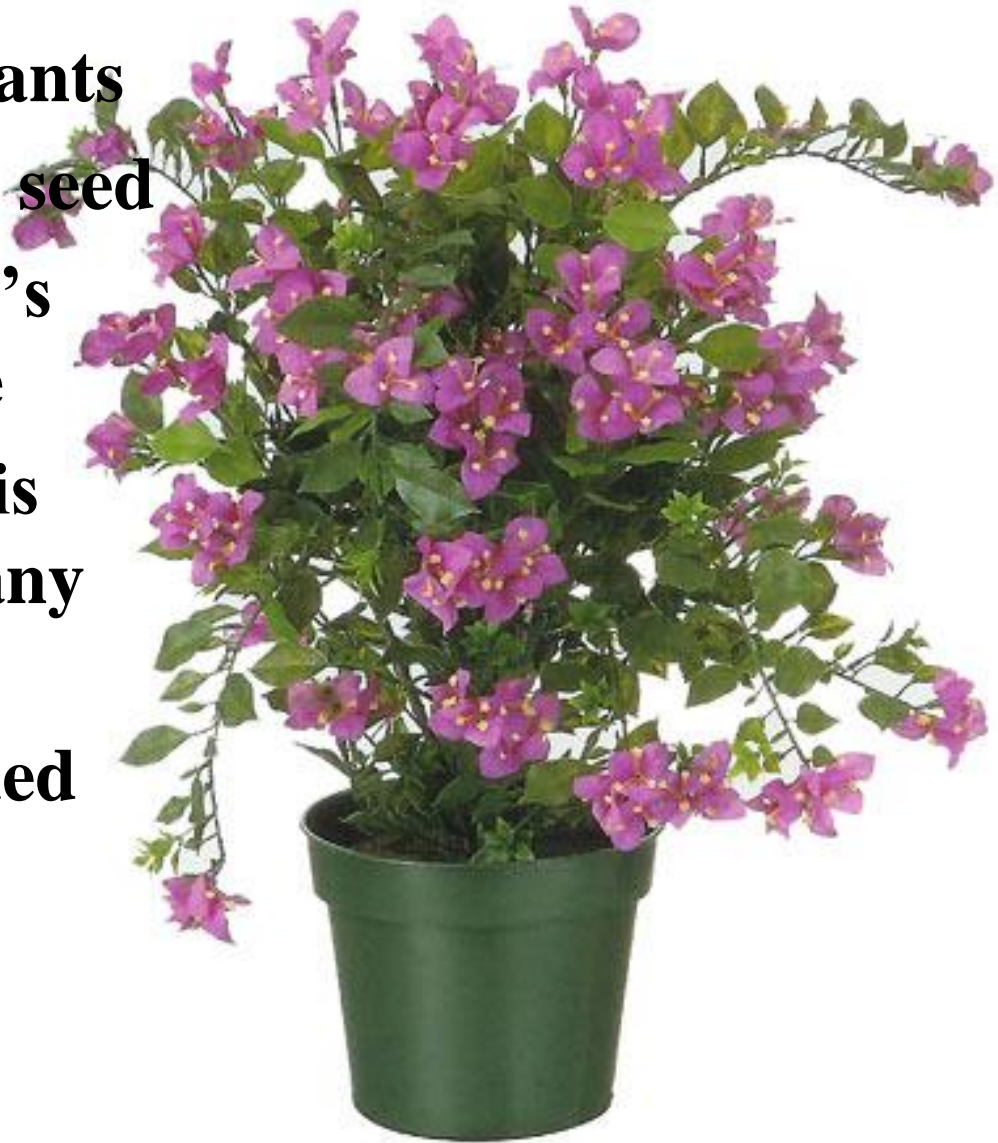
Gymnosperms

- Gymnosperms are many times thought of synonymously with conifers or evergreens
- Diploid phase is dominant part of life cycle
- Seeds develop uncovered on a cone
- Have separate male and female cones that produce gametes
- Male gametes are fused in pollen grains
- Examples: Pine, Cedar, Redwood, Cycads, Ginkgoes, Sequoia



Angiosperms

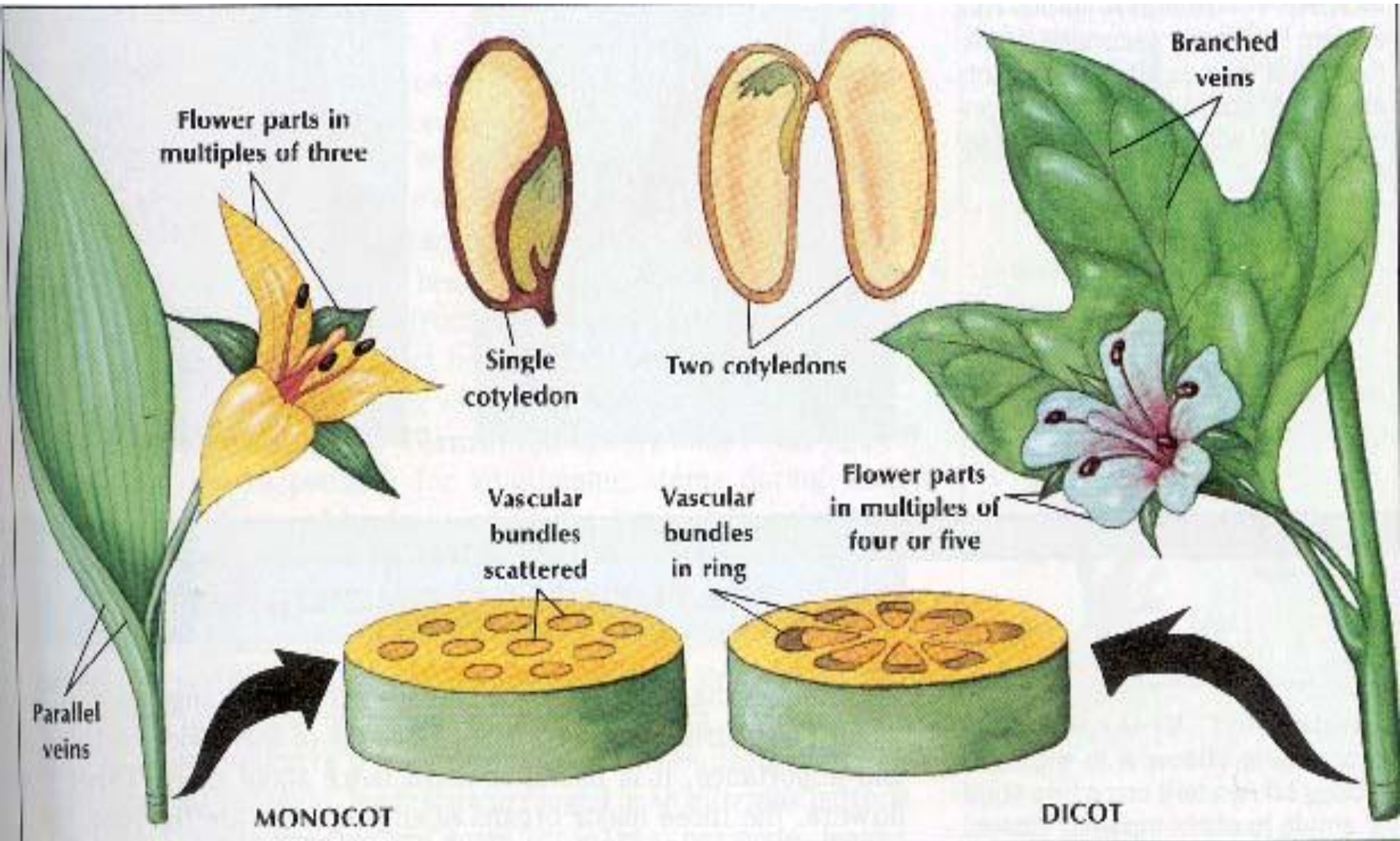
- **250,000 species**
- **These are flowering plants**
- **The ovary encloses the seed**
- **The flower is the plant's reproductive structure**
- **Angiosperms' success is largely due to their many ways of pollination**
- **Angiosperms are divided into two groups.**
 - **Monocots & Dicots**



Monocots

- **Have one food storing leaf (cotyledon) and is observed when it germinates**
- **Short for monocotyledon**
- **Leaves of monocots show parallel veins**
- **In monocots the vascular bundles are scattered throughout the stem**
- **Common monocots are, bananas, corn, barley, wheat, rice, orchids, tulips, iris and lilies**
- **Flowers of monocots are in threes or multiples of three**





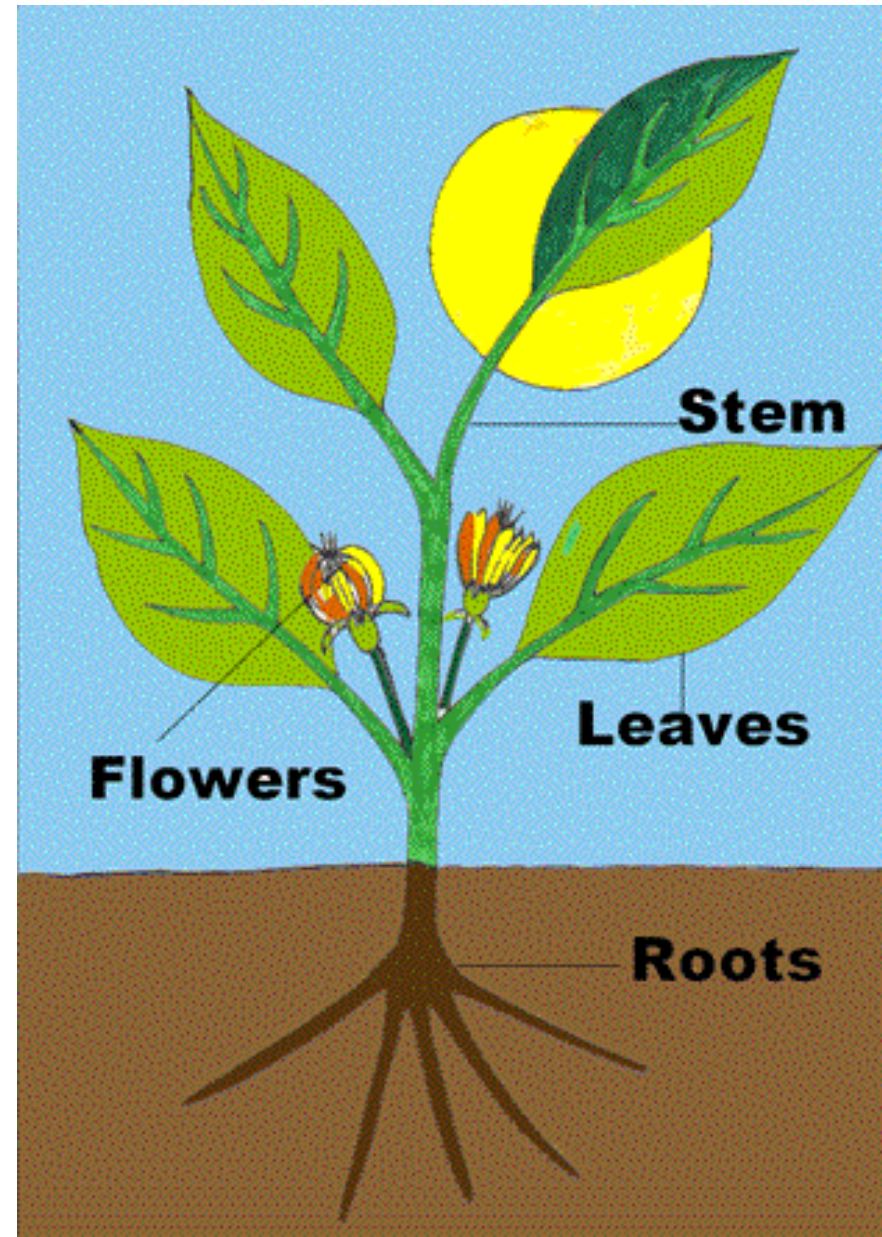
Dicots

- **Have two food storing leaves that are evident when they emerge from the ground**
- **Short for dicotyledon**
- **Leaves of dicots show netted venation**
- **In dicots vascular bundles are in rings**
- **Common dicots are most of your fruits, legumes, forbs & trees**
- **Flowers of dicots are in fours or fives or multiples of fours or fives**



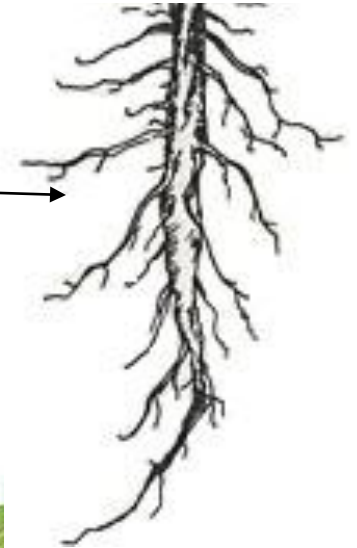
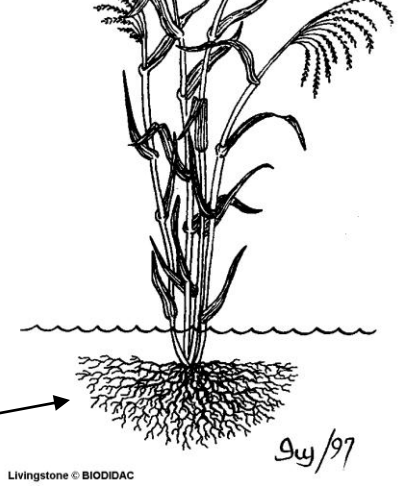
Angiosperm Organs

- Roots
- Stems
- Leaves



Roots

- Anchorage, storage, & water and mineral absorption
- Types of roots
 - Fibrous
 - Tap
 - Adventitious



Stems

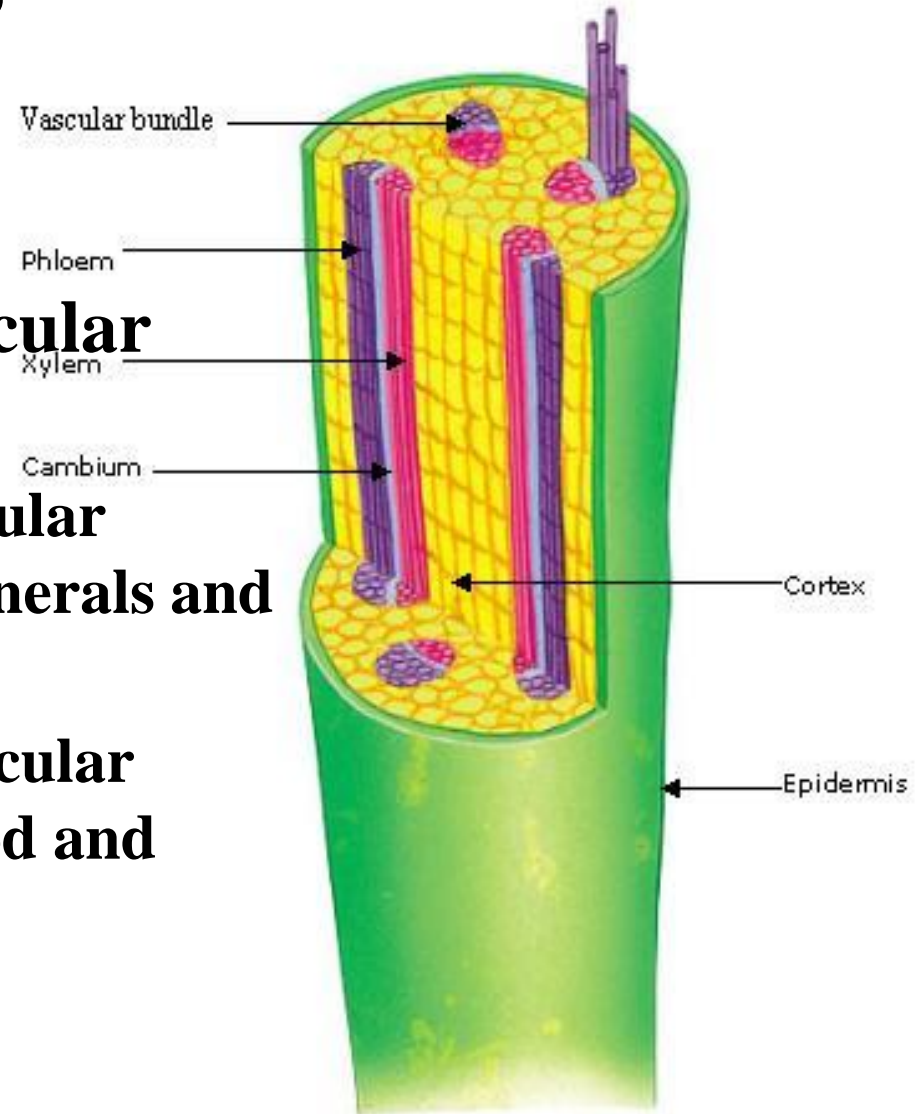
- **Stems are the link between the roots and the leaves**
- **Stems are either herbaceous or woody**
- **Herbaceous stems are soft green with little or no woody tissue**
- **Herbaceous plants come up annually**
- **Herbaceous plants support the upper of plant by fluid pressure in the stem called turgidity**
- **Loss of turgidity causes herbaceous plants to wilt**
- **Woody stems are stems supported by tough, dead xylem cells**

Stems have two main types of vascular tissue

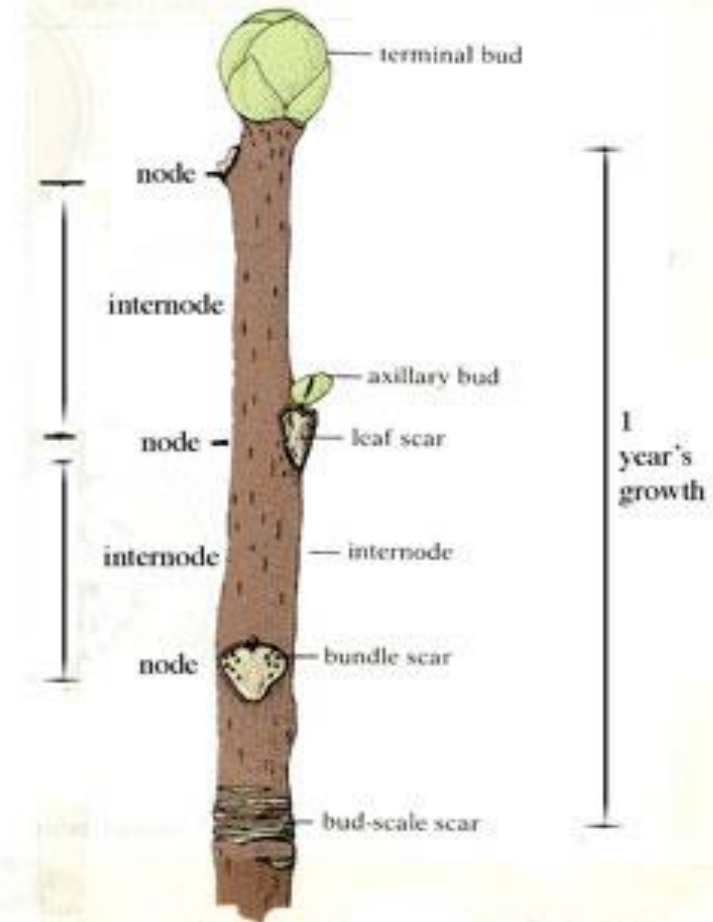
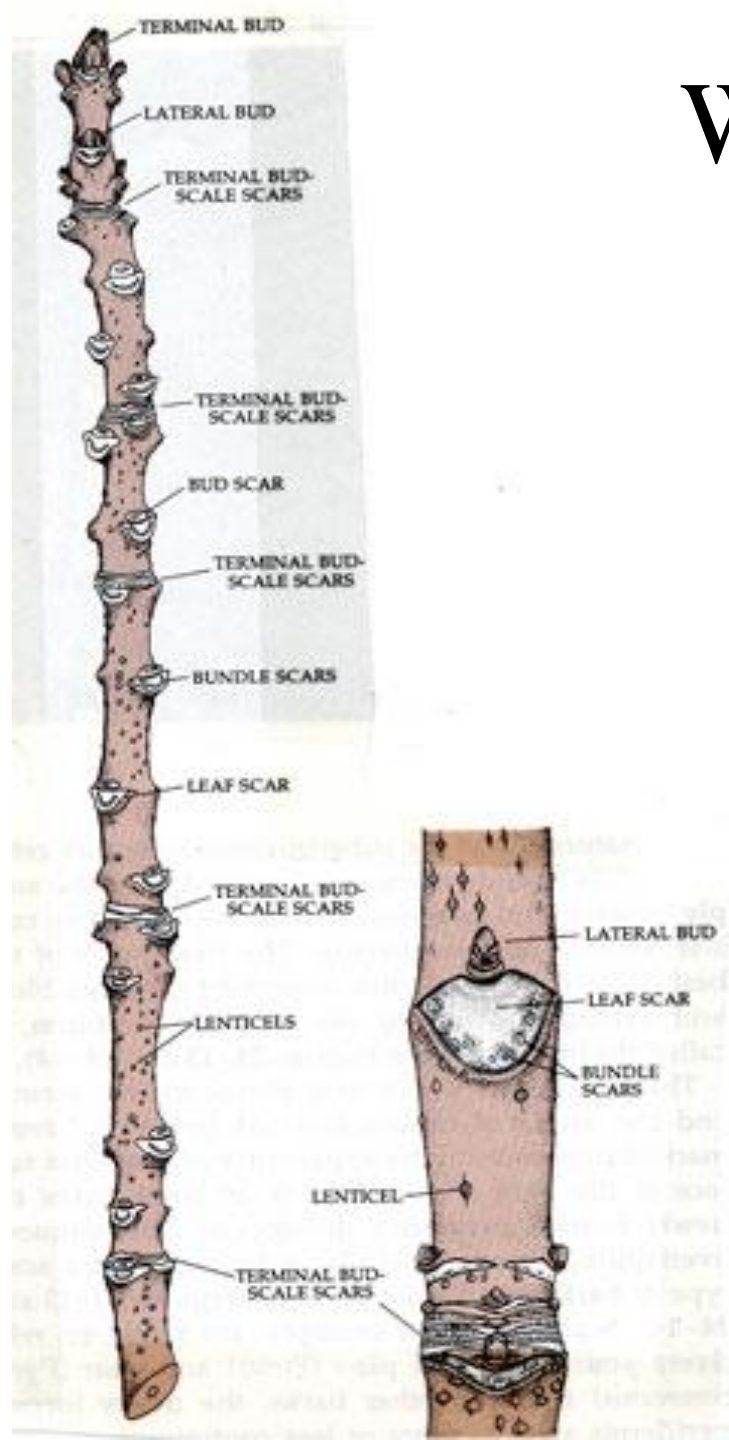
- **Xylem is the inner vascular cambium that takes minerals and water up the tree**
- **Phloem is the outer vascular cambium that takes food and minerals down the tree**

Stems

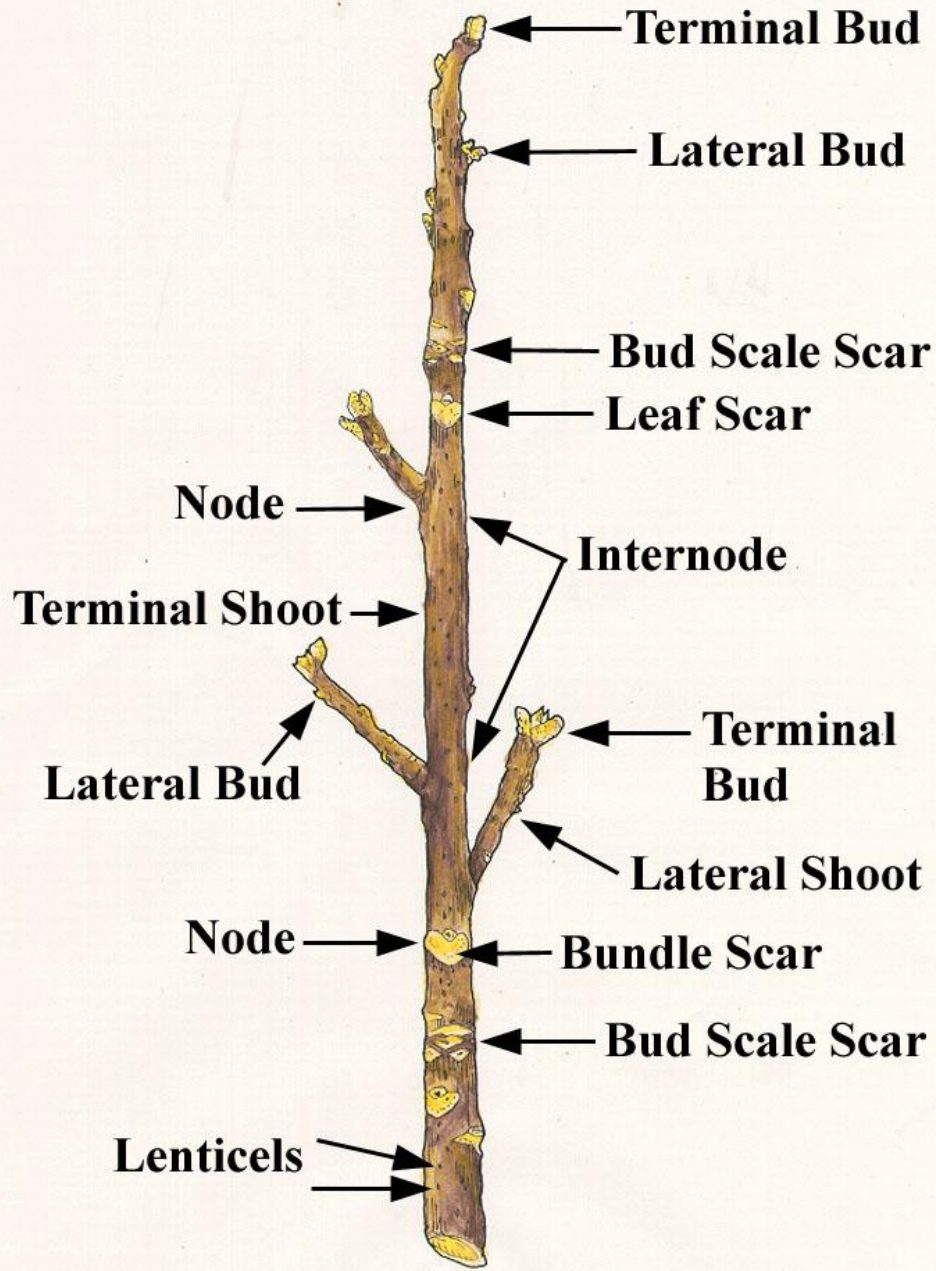
- **Two main types of vascular tissue**
 - **Xylem is the inner vascular cambium that takes minerals and water up the tree**
 - **Phloem is the outer vascular cambium that takes food and minerals down the tree**



Woody Stem

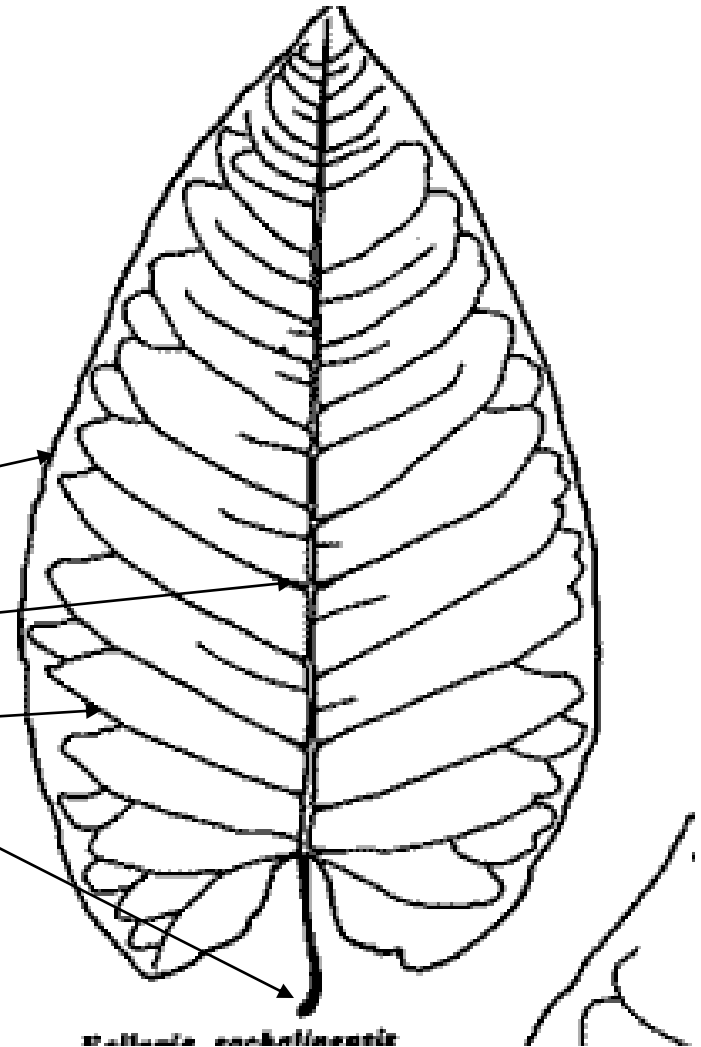


3 Year Old Shoot



Leaves

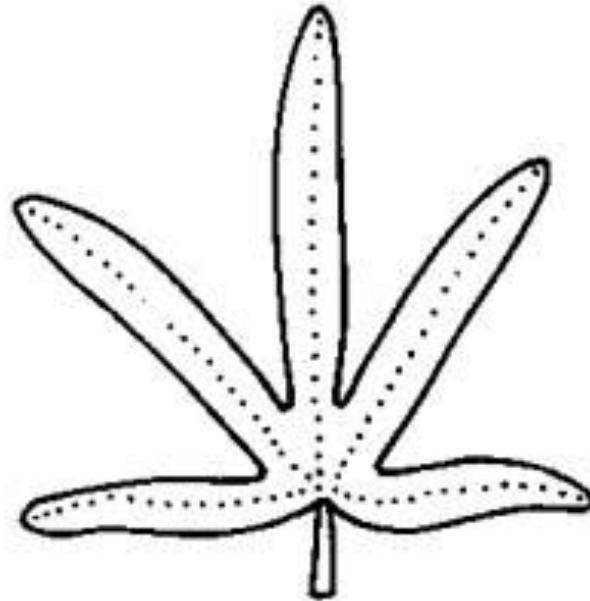
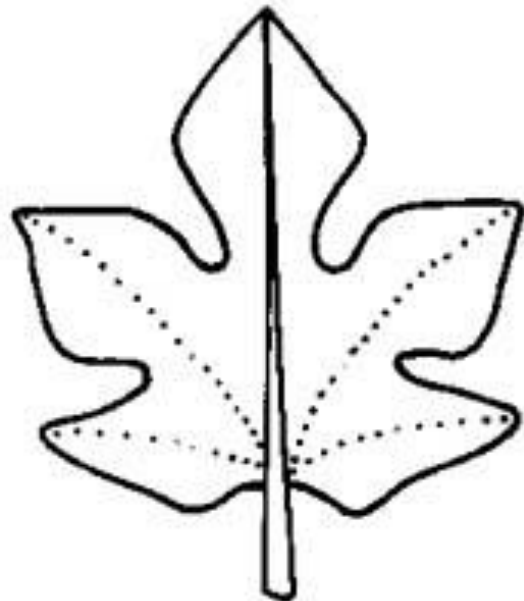
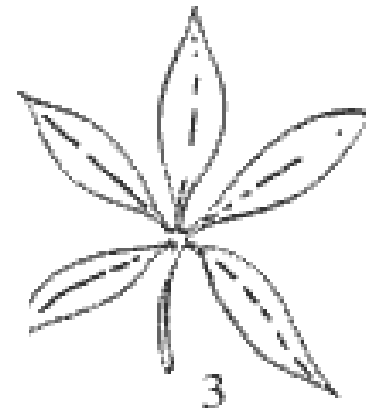
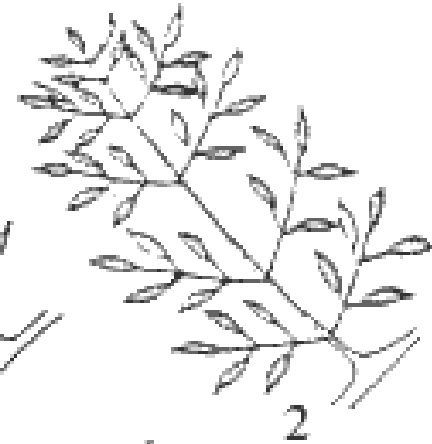
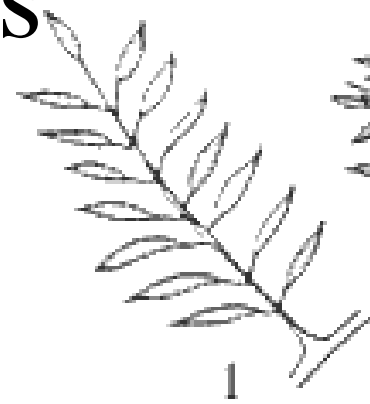
- **Functions of the leaf is an increased area for photosynthesis**
- **Parts of a leaf**
 - **Petiole**
 - **Blade**
 - **Midrib**
 - **Vein**



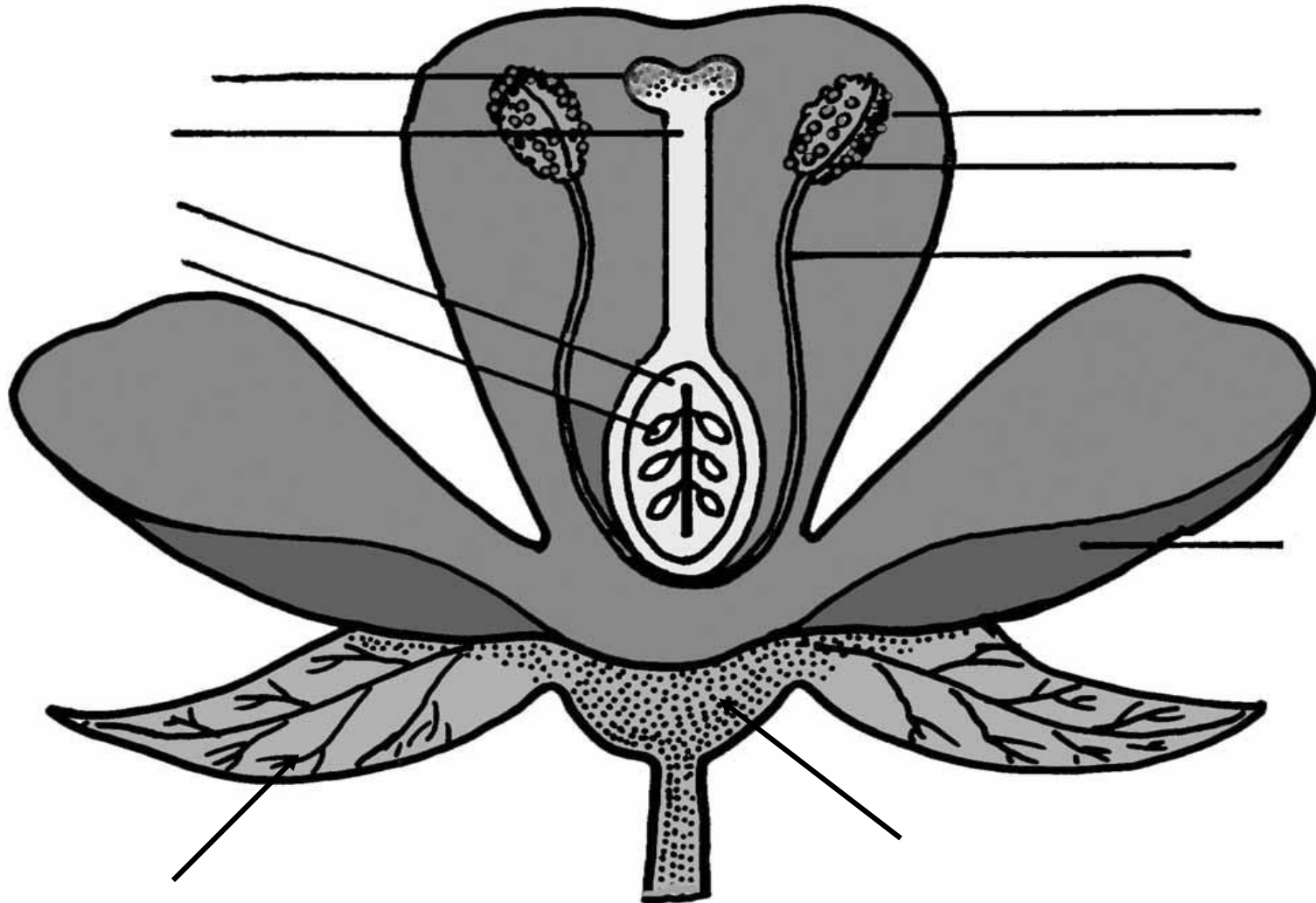
Types of leaves

- **Simple**
- **Pinnate**
- **Palmate**
- **Compound leaf**
- **Palmately compound**
- **Pinnately compound**

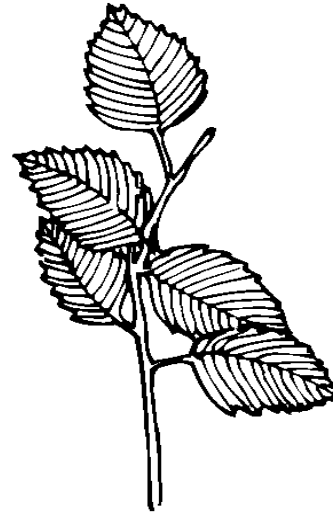
Leaf types



Flower Parts

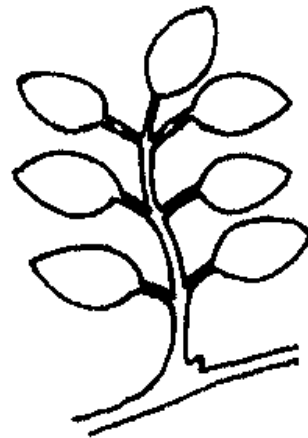
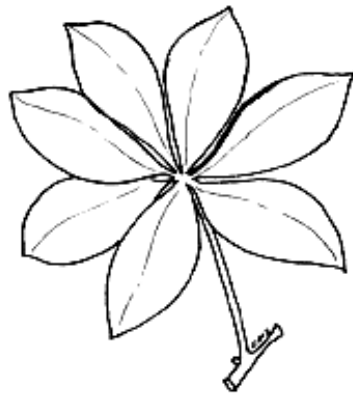


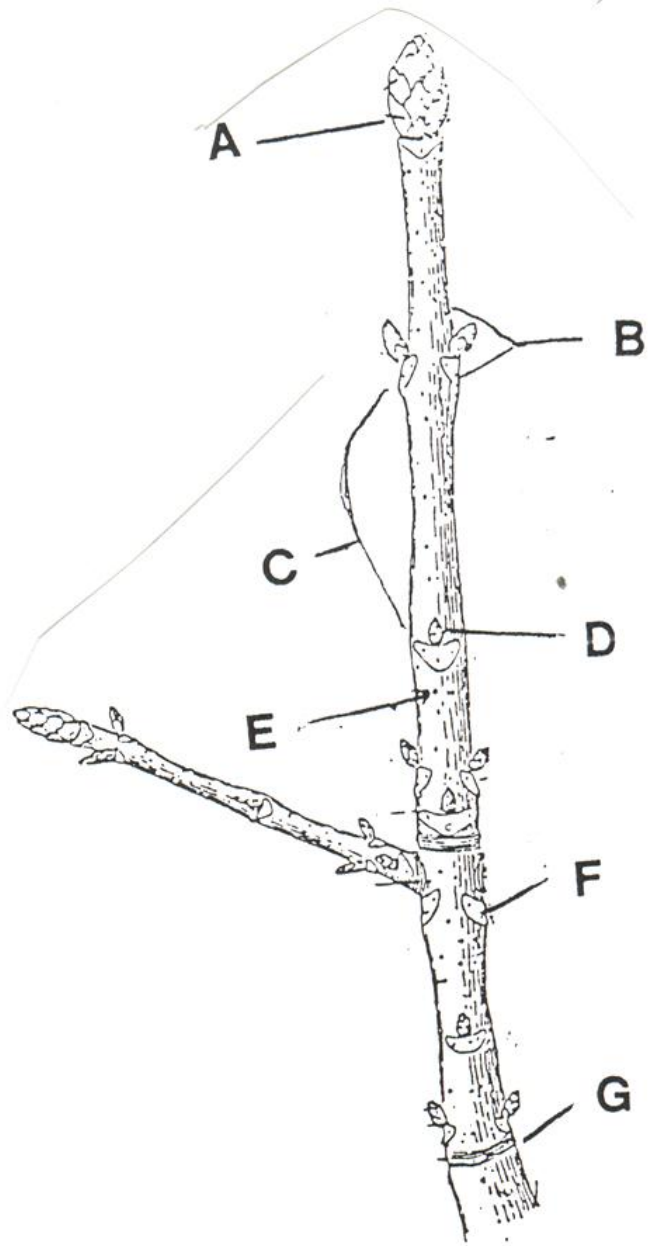
Monocot or Dicot?





LEAF





Quiz

1. What are the two divisions of seed plants?
2. Give two examples of gymnosperms.
3. What two groups are angiosperms divided into and what is a distinguishing characteristic of each?
4. What are the three main organs of an angiosperm?
5. Draw a simple pinnate leaf.
6. Draw a simple palmate leaf.
7. Draw a palmate compound leaf.
8. Draw a pinnate compound leaf.