

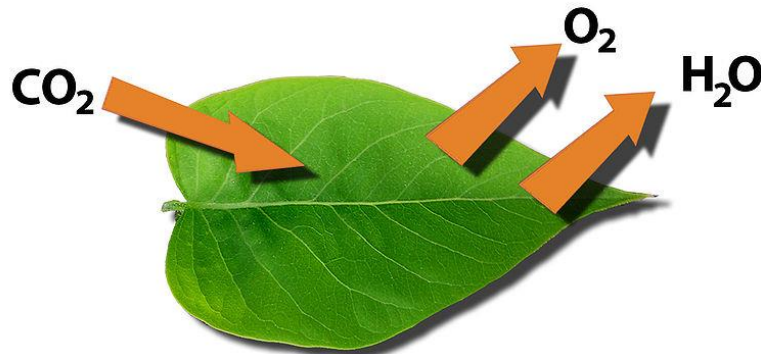
LEAVES



LEAF FUNCTIONS

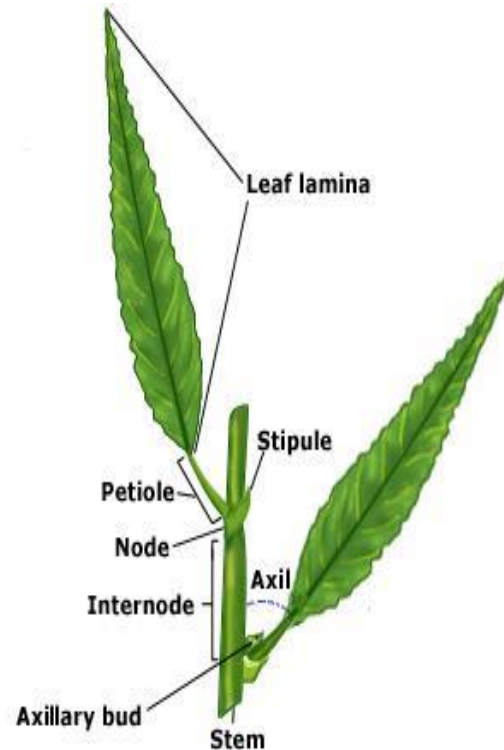
3 main functions:

- Move oxygen and carbon dioxide in and out of plant
- Evaporation of water to move more water up from roots
- Capture sunlight for photosynthesis



LEAF PARTS

- * Blade – flat, main body of the leaf
- * Petiole – supporting stalk, attaches leaf to stem
- * Veins – vascular bundles (xylem and phloem) that conduct food and water and also provide support
- * Node – attachment site of a leaf to a stem
- * Internode – space between 2 nodes



TYPES OF LEAVES

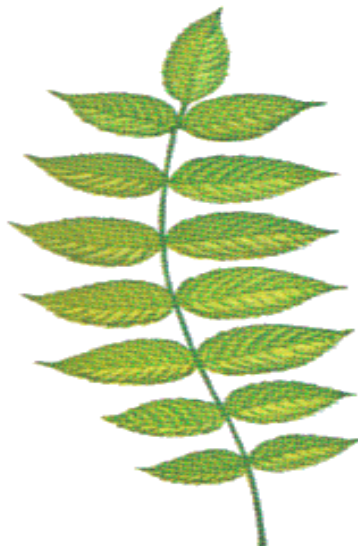
- * Simple:
 - One single continuous leaf, not divided into leaflets
- * Compound:
 - Leaf blade is divided into 2 or more leaflets



Simple Leaf
(cottonwood)



Palmately Compound Leaf
(white clover)



Pinnately Compound Leaf
(black walnut)



Double Compound Leaf
(honey locust)



TYPES OF LEAVES

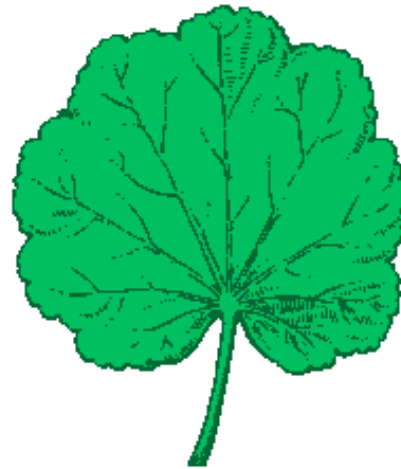
- Parallel:
 - Veins run in the same direction as central vein
- Pinnate:
 - Veins branch off the central vein
- Palmate:
 - Veins branch off from a common point



Parallel



Pinnate

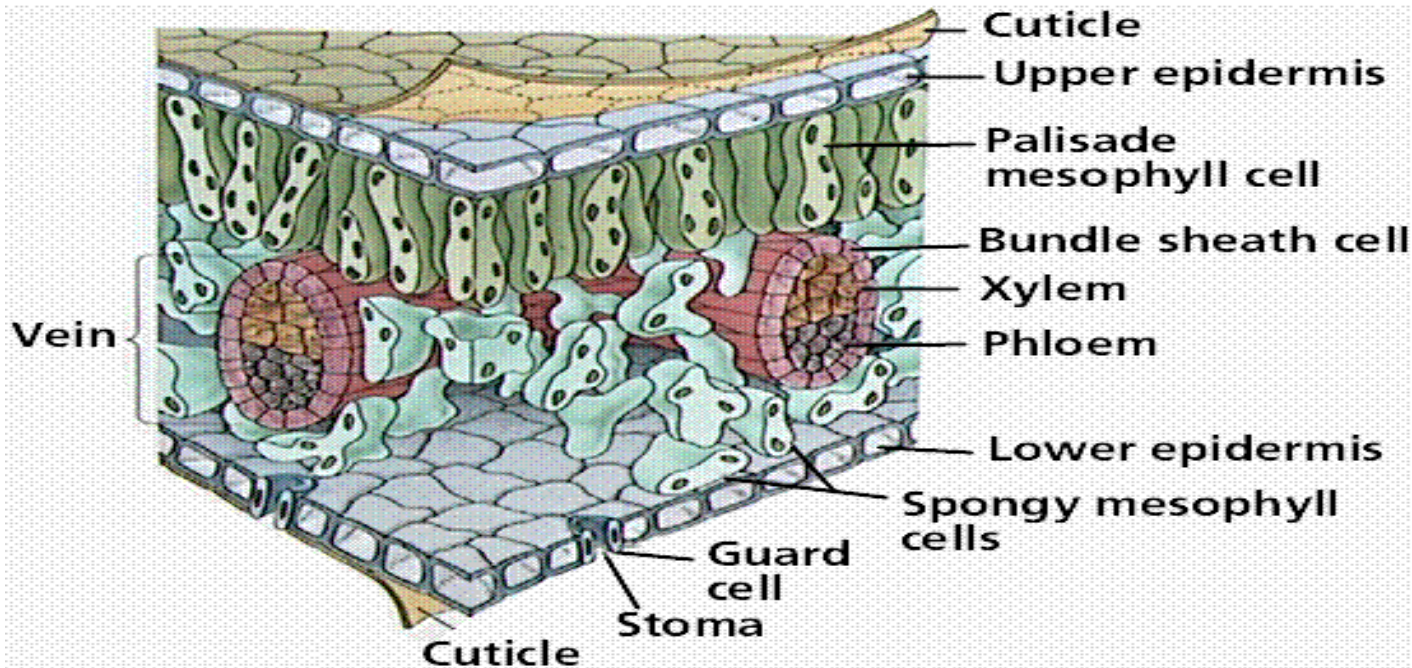


Palmate



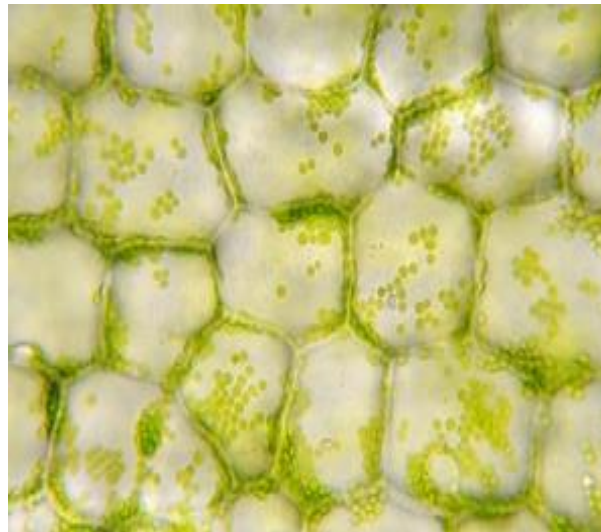
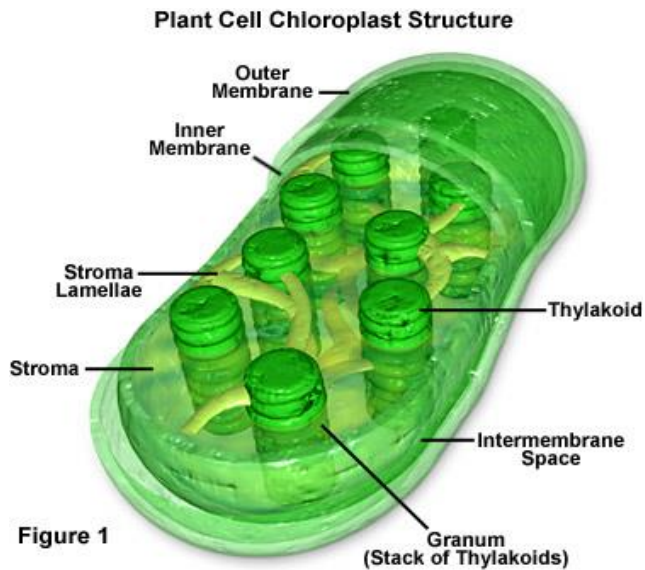
LEAF STRUCTURE

- ★ Epidermal cells:
 - One layer
 - On upper and lower surface of leaf
 - Produce waxy cuticle to protect leaf



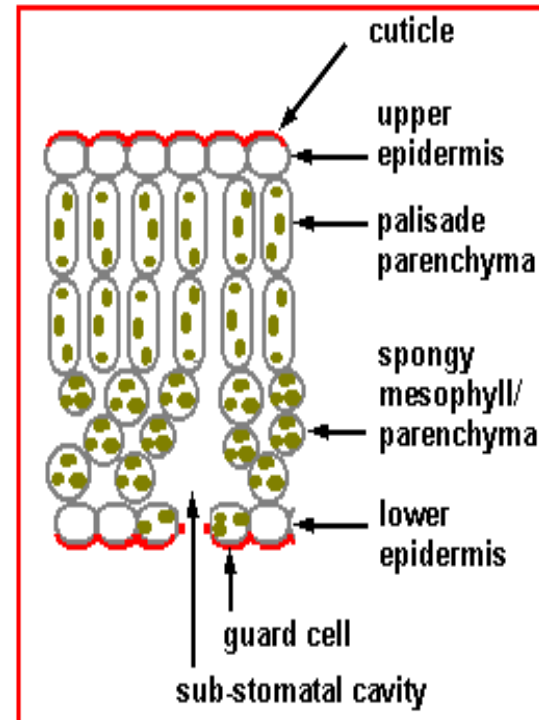
LEAF STRUCTURE

- * Mesophyll cells:
 - Photosynthetic cells
 - Contain chloroplasts which have chlorophyll
 - Chlorophyll is a green pigment that captures the light energy for photosynthesis



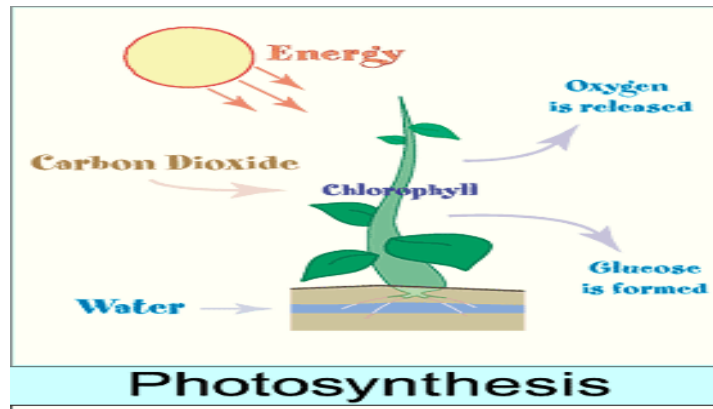
LEAF STRUCTURE

- * **Palisade mesophyll:**
 - Below upper epidermis
 - Closely packed mesophyll cells
 - Fairly large air spaces are present
- * **Spongy Mesophyll:**
 - Beneath palisade layer
 - Loosely packed
- * Air spaces in the mesophyll layer allow oxygen out and carbon dioxide in

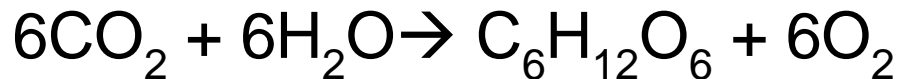


PHOTOSYNTHESIS

- * Light energy penetrates through the epidermis into the mesophyll cells
- * Chlorophyll molecules in chloroplasts in the mesophyll cells absorb light energy
- * Light energy is used to convert water and carbon dioxide into glucose and oxygen



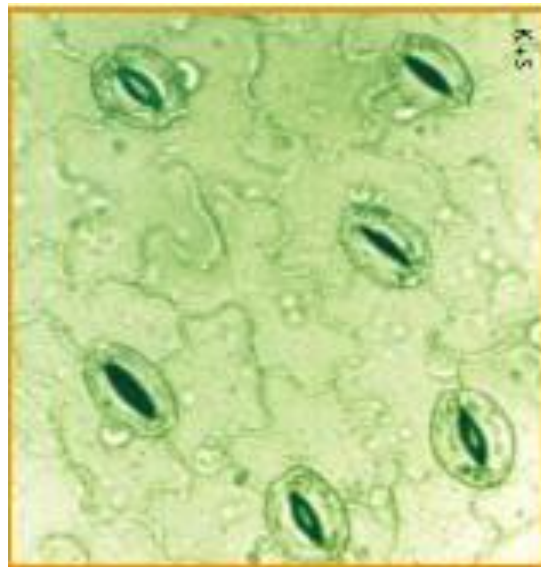
- * Equation:



Carbon dioxide + water \rightarrow glucose + oxygen

STOMATA

- ★ Stomata are small openings on the surface of the leaf
- ★ Allow for gas exchange (including water vapour)
- ★ They open and close to allow gases in and out
- ★ Generally more stomata on the bottom of the leaf



WATER MOVEMENT

- * Transpiration: water loss from plants due to evaporation, occurs when stomata are open
- * Stomata regulate transpiration by opening and closing
- * Guard cells surround stomata and control their opening and closing

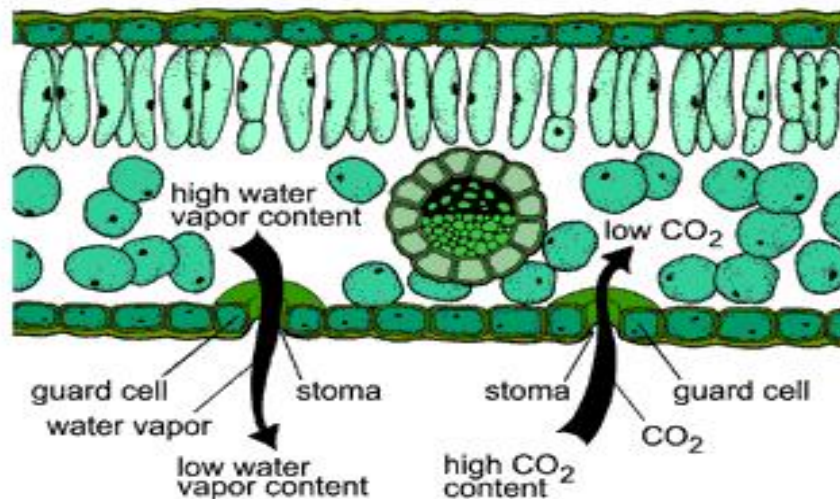
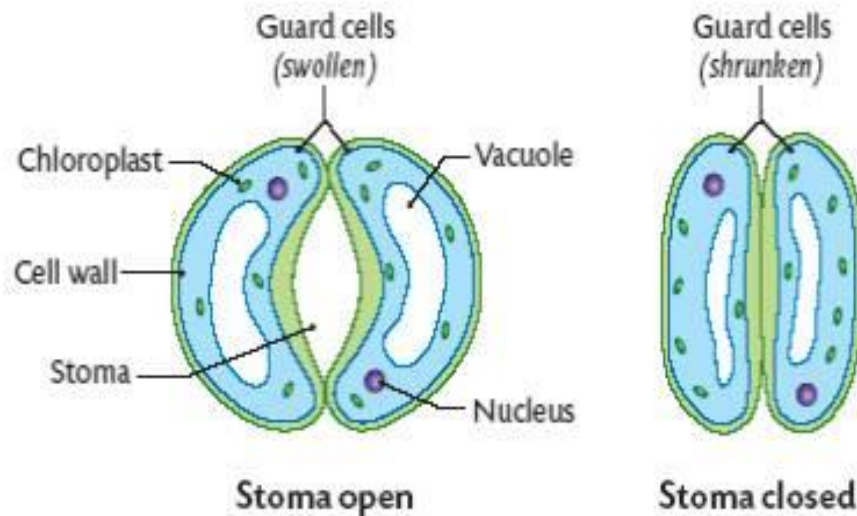


Figure 25. Stomata open to allow carbon dioxide (CO₂) to enter a leaf and water vapor to leave.



GUARD CELLS

- ✦ When guard cells absorb water, they swell and open the stomata
- ✦ When guard cells lose water, they shrink and close the stomata
- ✦ Allow stomata to be closed when there is little water and open when there is lots



LEAF ADAPTATIONS

- * Conifer leaves are needles or scales to help plants survive cold, dry conditions
- * Layers of an onion are leaves modified for food storage
- * Shade plants have thinner, broader, greener leaves to capture more sunlight



USES OF LEAVES

- * Tea, lettuce, onion are used as food
- * Hay is used to feed livestock
- * Herbs are used for seasoning
- * Drugs
 - Digoxin (heart medication) from foxglove
 - Nicotine produced from tobacco leaves

Natural
leaf tea

