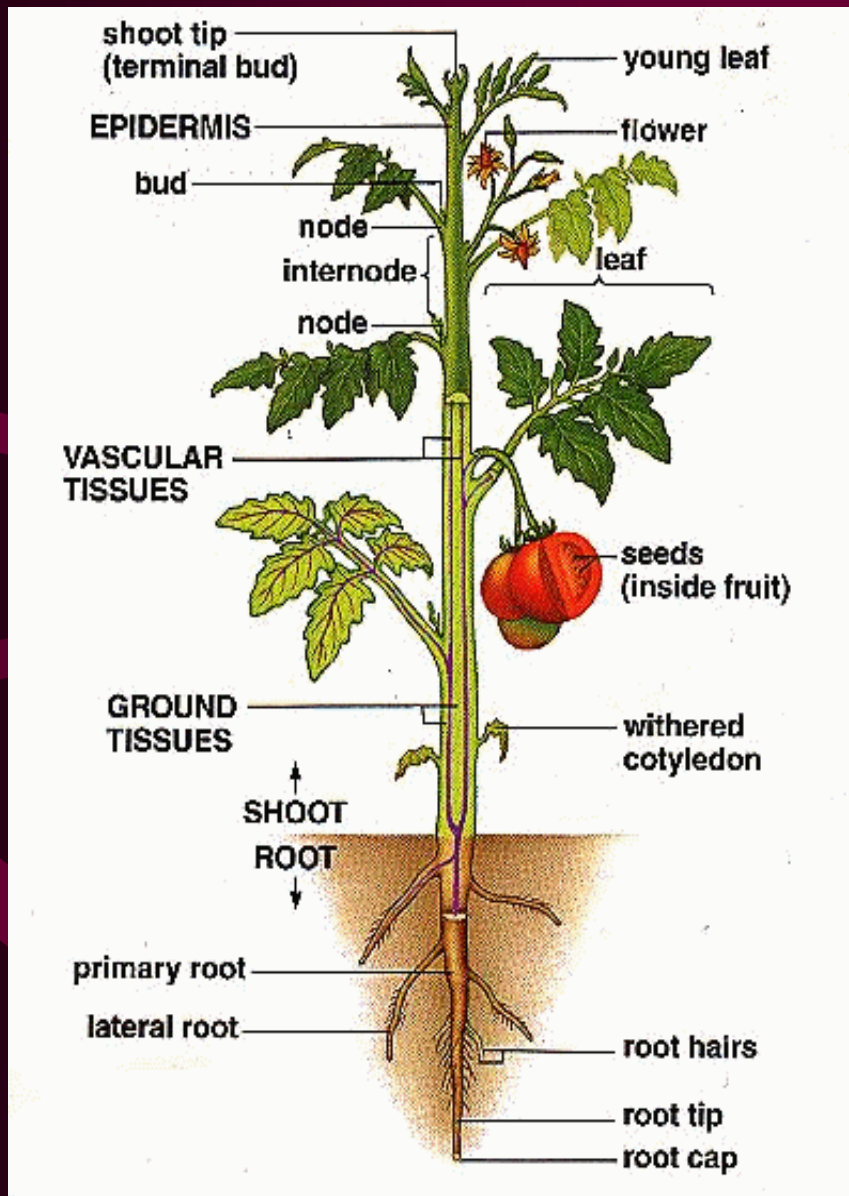


# Basic Botany & Plant Physiology

Tony A. Glover  
Regional Extension Agent

# Plant Parts & Functions



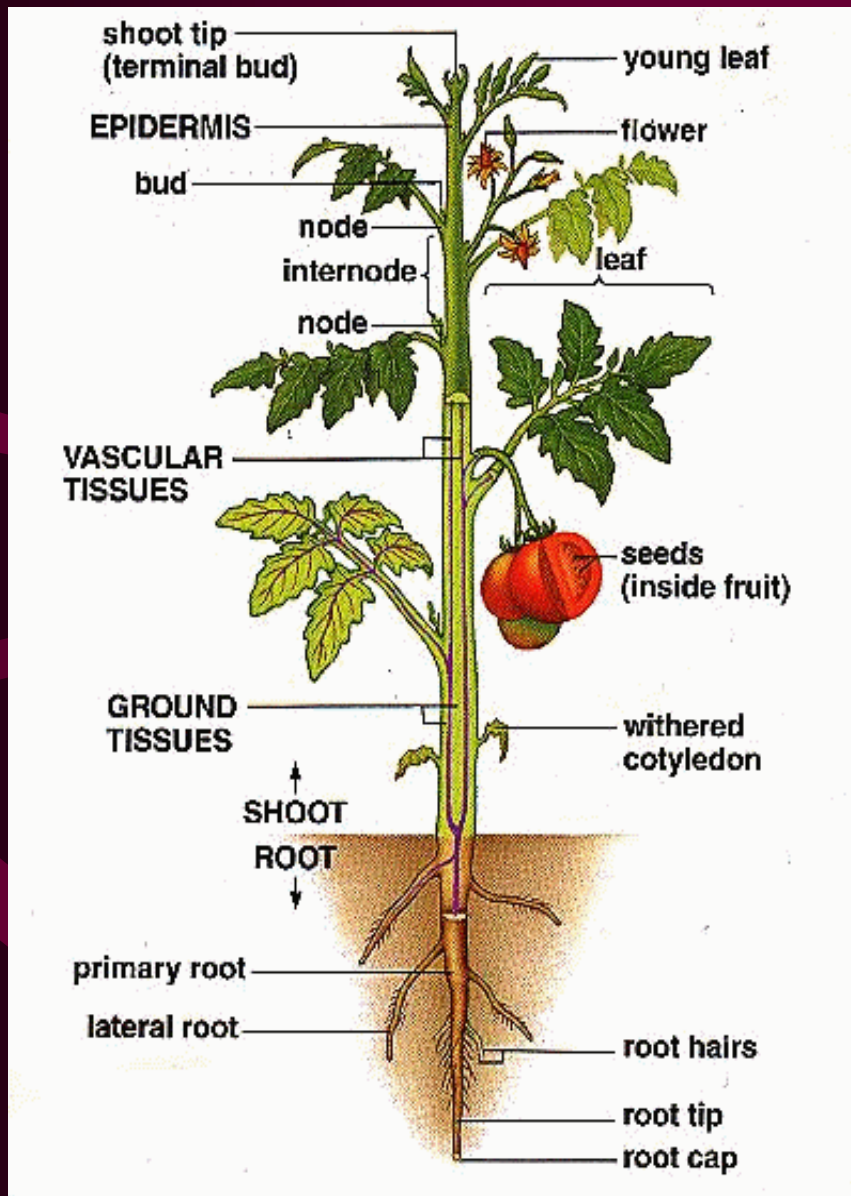
## ❖ Vegetative

- Shoot, roots

## ❖ Sexual reproduction

- Flower, fruit, seed

# Shoot



## ❖ Stem

- Nodes

- Internodes

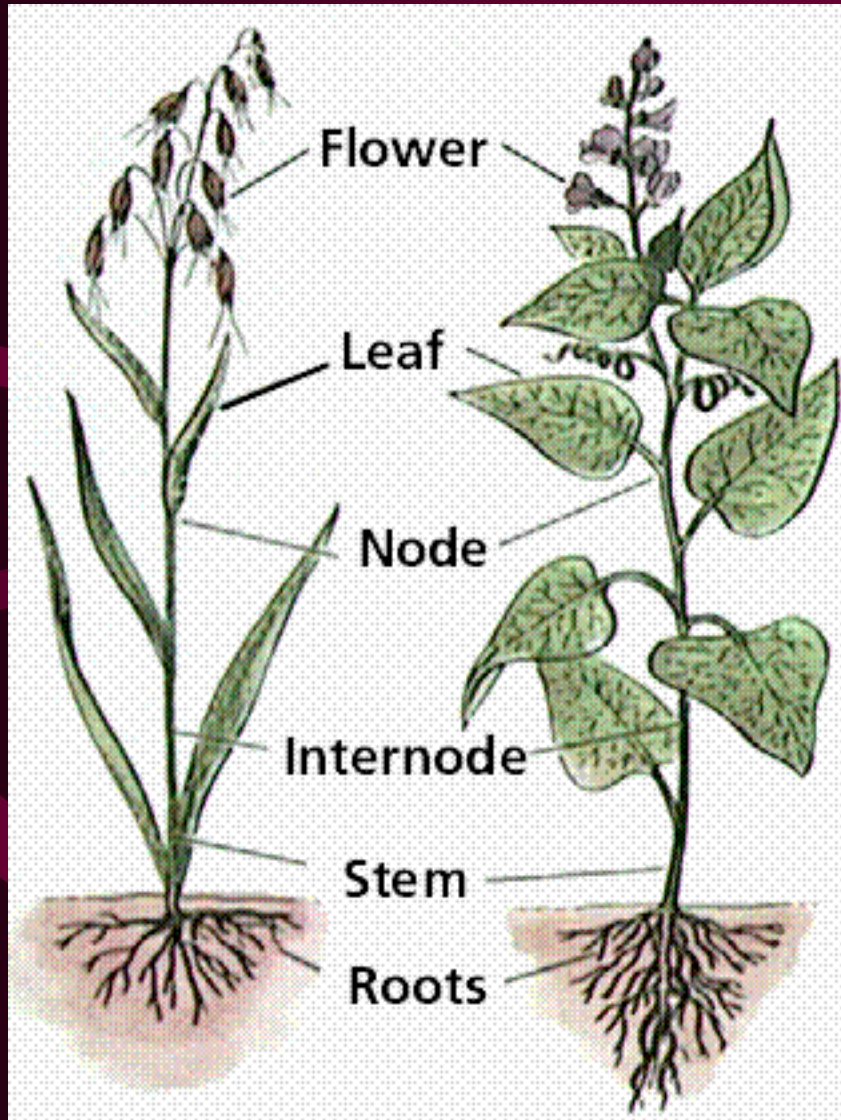
## ❖ Leaves

## ❖ Buds

# Stem

- ❖ Holds leaves
- ❖ Transports & stores water & nutrients
- ❖ Sometimes photosynthetic (green stem indicates it is)

# Nodes & Internodes



## ❖ Node

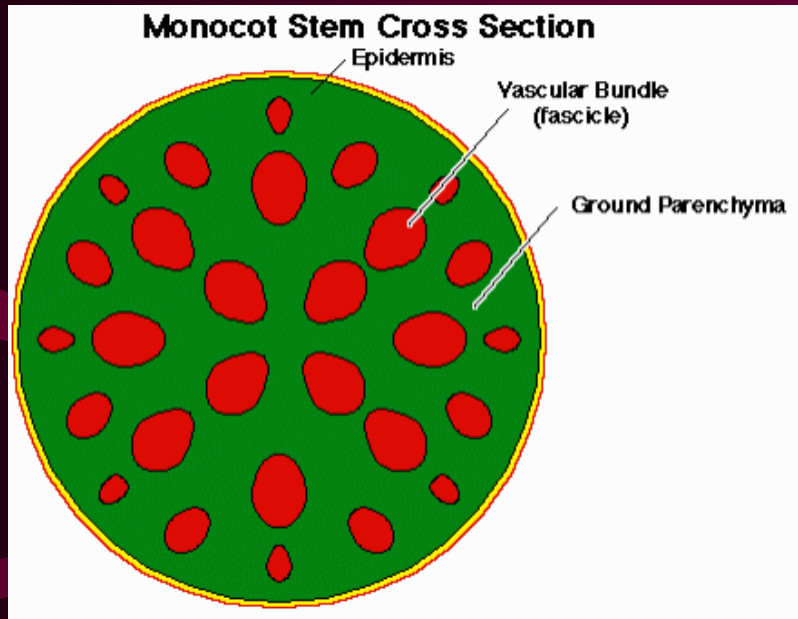
- Place on the stem where the leaf is attached

## ❖ Internode

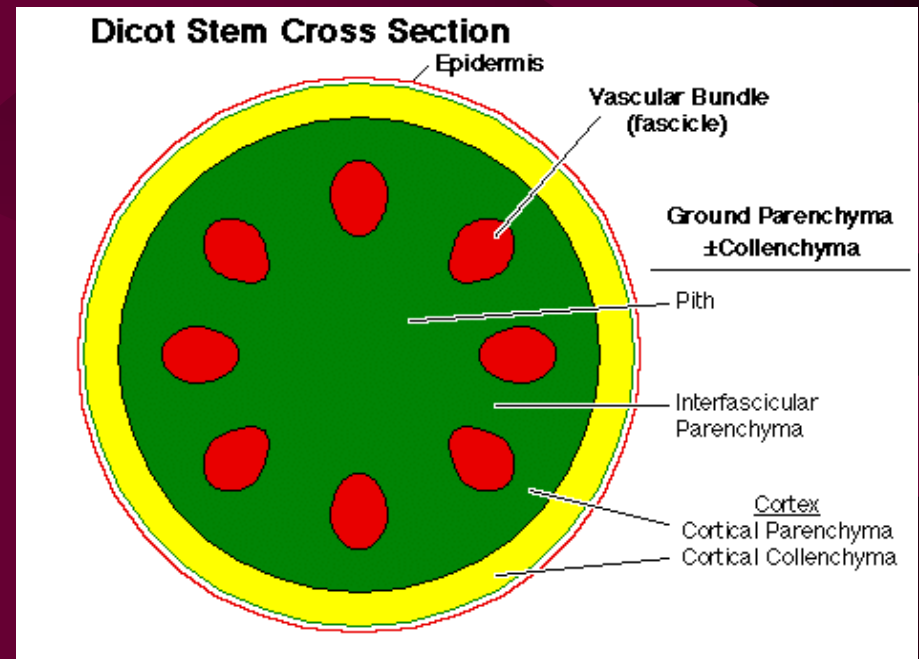
- Space on stem between two nodes

# Here is the "Stem Types"

## Monocot Stems vascular bundles



## Dicot Stems vascular rings





# Stem Modifications

## ❖ Above ground

- Crown (ie: strawberry plant)
- Spur (ie: fruit spur)
- Stolon (ie: bermudagrass runner)

## ❖ Below ground

- Rhizome (ie: underground runner)
- Tuber (ie: irish potato)
- Corm (ie: crocus, gladiolas)
- Bulb (ie: onion, tulip)



**Corm**

## Bulbs & Corms



**Bulb**

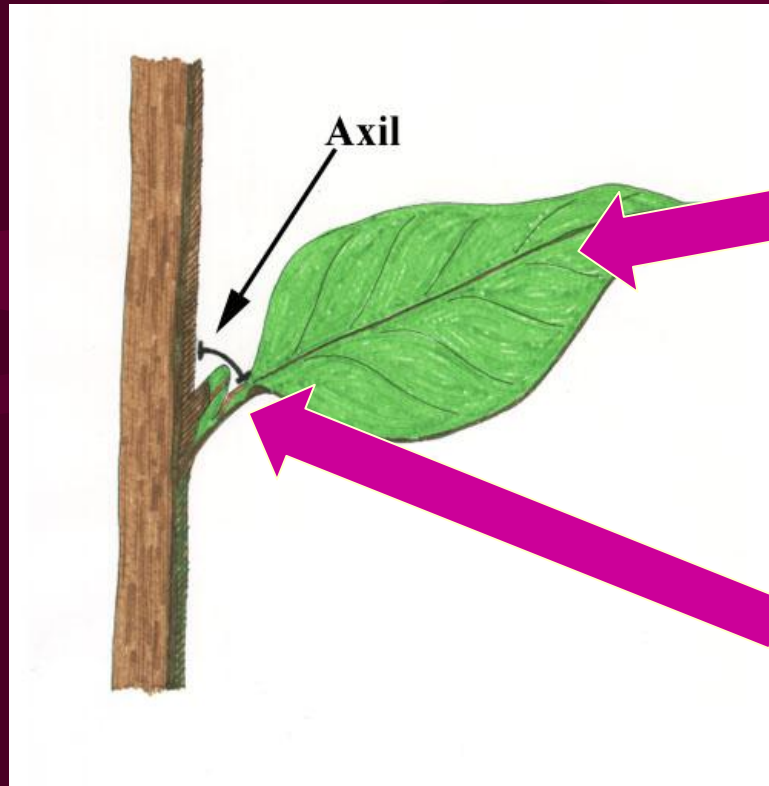
Corms are stems that are internally structured with solid tissues, which distinguishes them from bulbs, which are mostly made up of layered fleshy scales that are modified leaves. As a result, when a corm is cut in half it is solid, but when a true bulb is cut in half it is made up of layers



# Leaves

- ❖ Primary site of photosynthesis

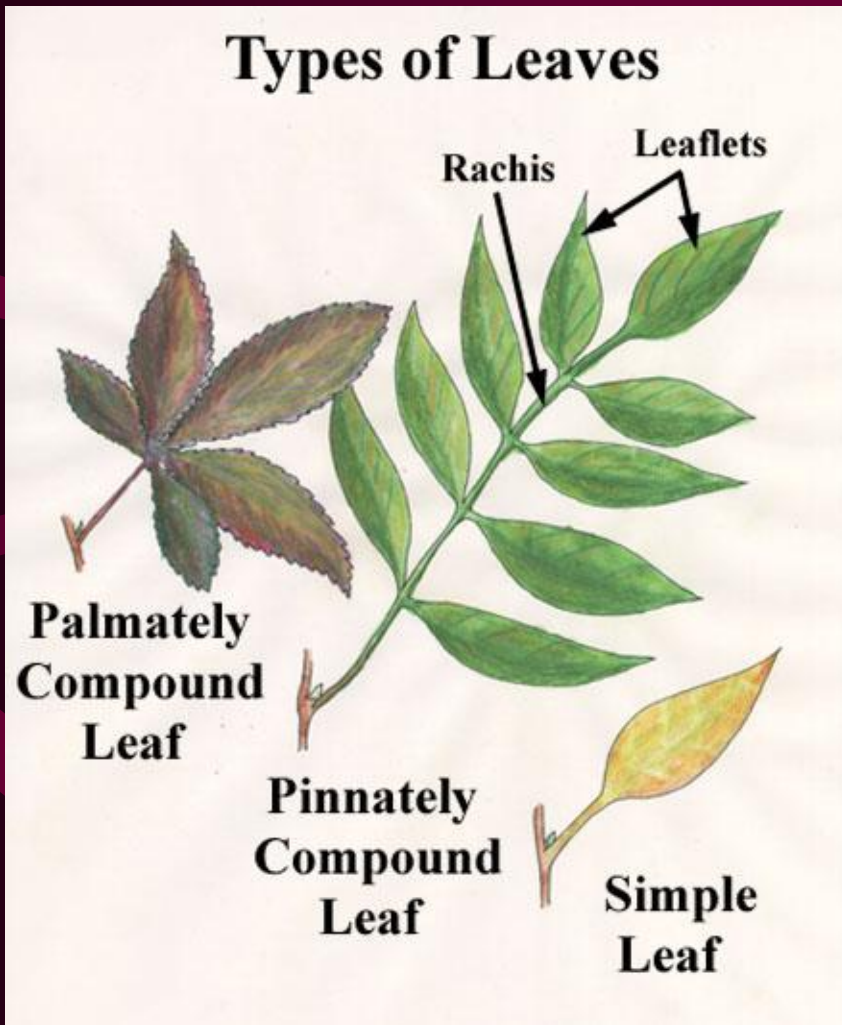
# Leaf Parts



Blade

Petiole

# Leaf Types



- ❖ Simple
- ❖ Compound
  - Palmately
  - Pinnately

# Venation

## Leaf Venation



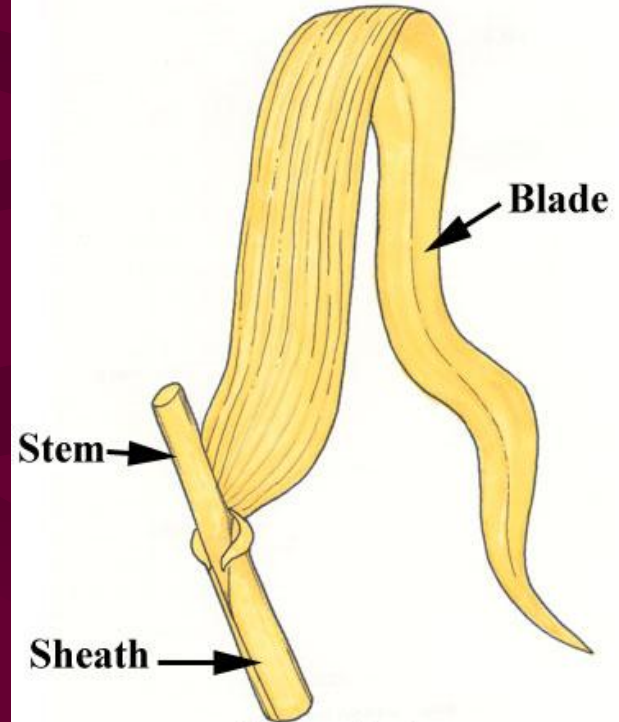
Net-Veined



Palmately Veined



Pinnately Veined



Parallel  
Monocotyledon Leaf  
Grass Leaf

# Buds

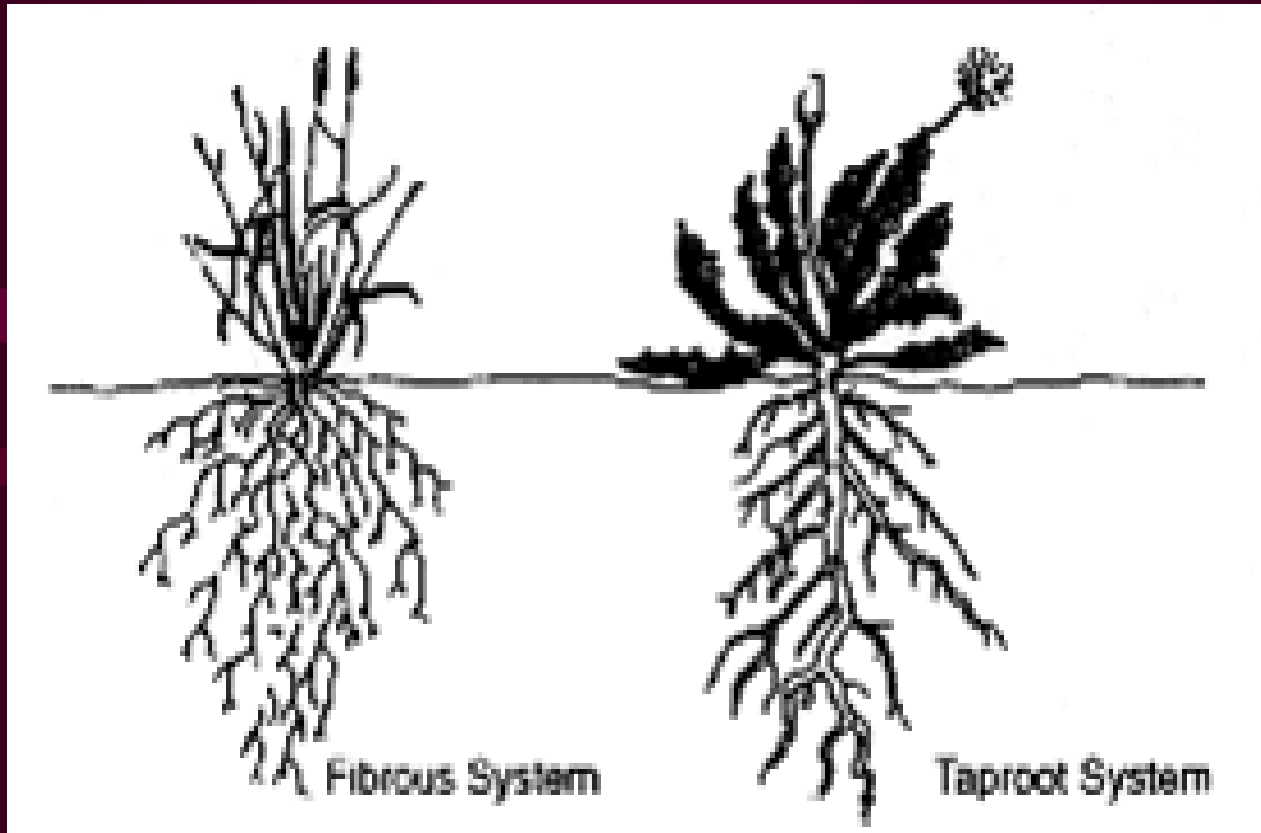
- ❖ Can develop into new shoots
  - Named for where they occur on the stem
    - Apical bud - tip of shoot
    - Axillary bud - in angle between the leaf and the stem
    - Adventitious bud - arise elsewhere

# Roots

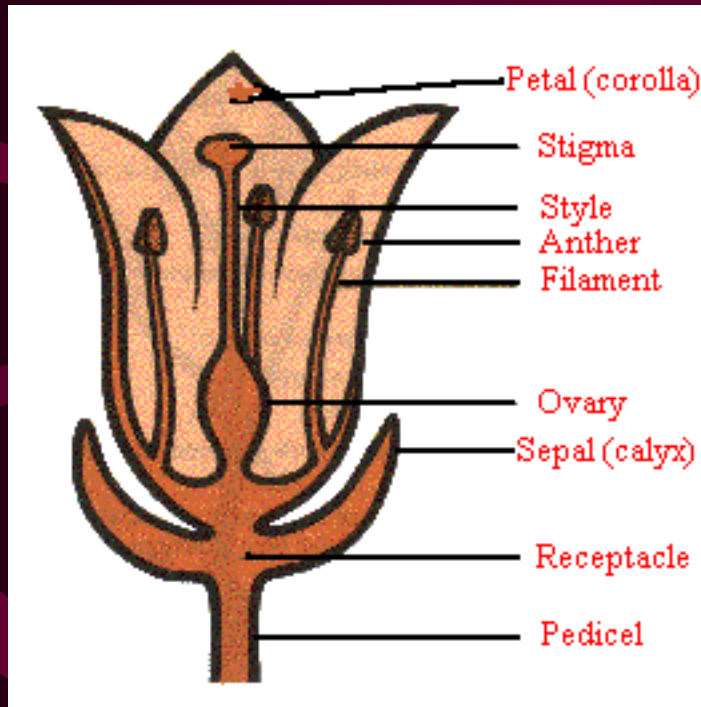
- ❖ Anchor the plant
- ❖ Absorb nutrients & water
- ❖ Physical support for the stem
- ❖ Food storage organs
  - Sweet potato



# Roots



# The Flower



- ❖ Complete
  - All parts
- ❖ Incomplete
  - Missing parts
- ❖ Perfect
  - Male + Female
- ❖ Imperfect
  - Male or female

# Flowering Systems

## ❖ Monoecious

- Male & female flowers on same plant
  - Corn, squash, cantaloupe, and pumpkins

## ❖ Dioecious

- Male & female flowers on different plants
  - Hollies, asparagus, willow

# Pollination

- ❖ Insects/animals

- ❖ Wind

- ❖ Water

# The Seed

## ❖ Seed Coat

- The "skin" of the seed. Thickness and hardness determine how fast water can penetrate.
- Some seeds require **scarification** to germinate.
- Some seeds require **stratification** to germinate.

# The Seed

## ❖ Cotyledons

### - Food storage structures

- Monocots - one cotyledon

- Grasses: cereal grains, sugar cane, bamboo, palms, iris, lilies, and orchids

- Dicots - two cotyledons

- Most trees, shrubs, perennials, etc.



# Flowering Plants - Monocots



- ❖ The largest family in this group by number of species are the orchids but the economically most important family in this group (and in all plant families) are the grasses, family Poacea (Gramineae). Seed have one embryonic leaf - hence monocot

# Flowering Plants - Dicots



❖ Dicotyledons, or "dicots", is a name for a group of flowering plants whose seed typically has two embryonic leaves or cotyledons. All other plants other than monocots

# Monocots vs. Dicots

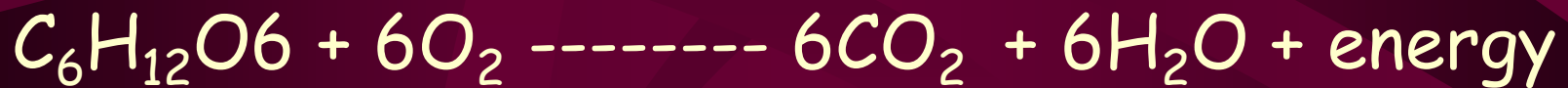
- ❖ Parallel venation
- ❖ Vascular bundles
- ❖ Fibrous root system
- ❖ Floral parts in 3's
- ❖ Netlike venation
- ❖ Vascular rings
- ❖ Taproot or fibrous root
- ❖ Floral parts in 4's & 5's

# Physiology: Plant Growth & Development

## ❖ Photosynthesis



## ❖ Respiration



## Photosynthesis

- ❖ Produces food
- ❖ Stores energy
- ❖ Occurs in cells with chloroplasts
- ❖ Releases oxygen
- ❖ Uses water
- ❖ Uses carbon dioxide
- ❖ Occurs in sunlight

## Respiration

- ❖ Uses food for plant growth (energy)
- ❖ Releases energy
- ❖ Occurs in all cells
- ❖ Uses oxygen
- ❖ Produces water
- ❖ Produces carbon dioxide
- ❖ Occurs in darkness and light

## ❖ Transpiration

- Mineral transport
- Cooling of plant
- Move sugars & plant chemicals
- Maintain turgor pressure



# Environmental Factors that Affect Plant Growth

## ❖ Light

- Quantity
- Quality
- Duration

## ❖ Temperature

- Photosynthesis increases with temp
- Respiration rapidly increases
- Transpiration increases
- Flowering may be partially triggered
- Low temps reduce energy use, increases sugar storage
- Warm after cool breaks dormancy

## ❖ Water

- Used in photosynthesis
- Dissolves/transports nutrients & sugars
- Maintains turgor
- Cools plant parts

## ❖ Nutrition

- Needs and uses of basic chemical elements
- Fertilization
- 17 elements necessary for normal growth
- Water and oxygen must be available
- Covered in detail in soils lecture

# Classification & Nomenclature of Plants

## ❖ Use:

- Edible
- Drugs or spices
- Ornamental
- Timber

## ❖ Growth habit or physiological

- Herbaceous, woody
- Deciduous, evergreen, semievergreen
- Annual, biennial, perennial
- Hardy, tender

## ❖ Descriptive system

- Early scientific method, cumbersome

## ❖ Common names

- Confusing and inaccurate



# ❖ Scientific names - binomial nomenclature

- Latinized name

- Generic term
- Specific epithet
- Author citation

*Acer palmatum* Thunb.

Author citation

←  
Swedish botanist Thunberg  
(1743-1822)

↑            ↑  
genus    specific epithet

⏟  
species

- ❖ Kingdom, division, class, order
- ❖ Family - characterized by reproductive structures
- ❖ Genus - similarity of flowers & fruits (roots, stems, buds, leaves)
- ❖ Species = Genus plus specific epithet
- ❖ Variety, subspecies, cultivar

# Review Material

- ❖ Chapter 1 and 6
- ❖ Prepare for quiz on lecture and reading
- ❖ Next weeks lecture: CSI - Garden - Review Ch 9