



The University of Georgia

College of Agricultural & Environmental Sciences

A photograph of a field of Black-eyed Susan flowers (Rudbeckia hirta) with yellow petals and dark brown centers, growing among green foliage. The image is framed by an orange border with a torn paper effect.

Learning *for* Life

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The
University
of Georgia

Master Gardener

College of Agricultural & Environmental Sciences
and Cooperative Extension Service

Basic Botany

The Science of Understanding Plants Their Classification, Form and Function

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Learning objectives

- Basic plant parts -types of plant parts
- Vascular tissue & function
- Cambium & function
- Dicots & monocots
- Binomial nomenclature

Basic Botany Areas

- **Plant Taxonomy**

- Plant identification, naming and classification

- **Plant Morphology**

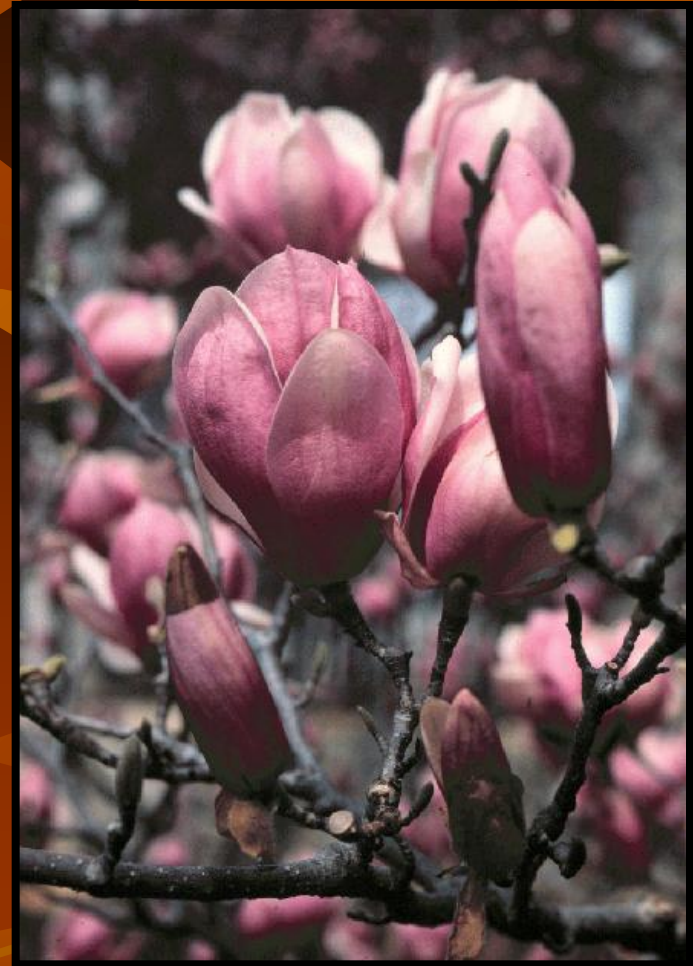
- Plant form and anatomy

- **Plant Physiology**

- Plant functions and reactions

Common Names - Nomenclature

- Common Names – Easy to use & remember
- Here is the Tulip Tree with flowers shaped like tulips
- Also called Saucer Magnolia and Japanese Magnolia
- There are several names for the same plant



Magnolia × soulangeana

Common Names - Nomenclature

- Here is another Tulip Tree with leaves shaped like tulips
- Other common names are Yellow Poplar & Tulip Poplar
- There are two different plants with the same common name
- There are no rules to determine which name is correct
- However, each has only one botanical name



Liriodendron tulipifera

Botanical Names - Nomenclature

- Botanical Names – Applied by botanist using the International Code of Botanical Nomenclature
- They seem difficult to learn & use since they are written in Latin
- They are precise – one name for each plant following the International Code
- The names also reflect the classification of the plants, or how they are related
- They follow the binomial system of nomenclature

Binomial System of Nomenclature

- Binomial – Two name system of naming plants
- Genus is first name
- Species is second name
- Botanical Name – *Fothergilla major*
- Based on Species Concept – Populations of interbreeding plants



Fothergilla major

Classification of Plants

- Families are made up of groups of related genera
- Each genus is made up of species
- Each species is a group of similar plants that are capable of interbreeding

Oak Family – Fagaceae

Includes

Quercus alba – White Oak

Quercus rubra – Red Oak

Fagus grandifolia – Beech

Castanea dentata –
American Chestnut

Hybrids & Their Nomenclature

- Inter-specific Hybrids – crosses between species
Example: (*Clematis lanuginosa* × *C. viticella*)
Cross Named: *Clematis* × *jackmanii*
Common Name: Jackman Clematis
- Inter-generic Hybrids – crosses between genera
Example: (*Cupressus macrocarpa* × *Chamaecyparis nootkatensis*)
Cross Named: × *Cupressocyparis leylandii*
Common Name: Leyland Cypress

Cultivars – Cultivated Plants

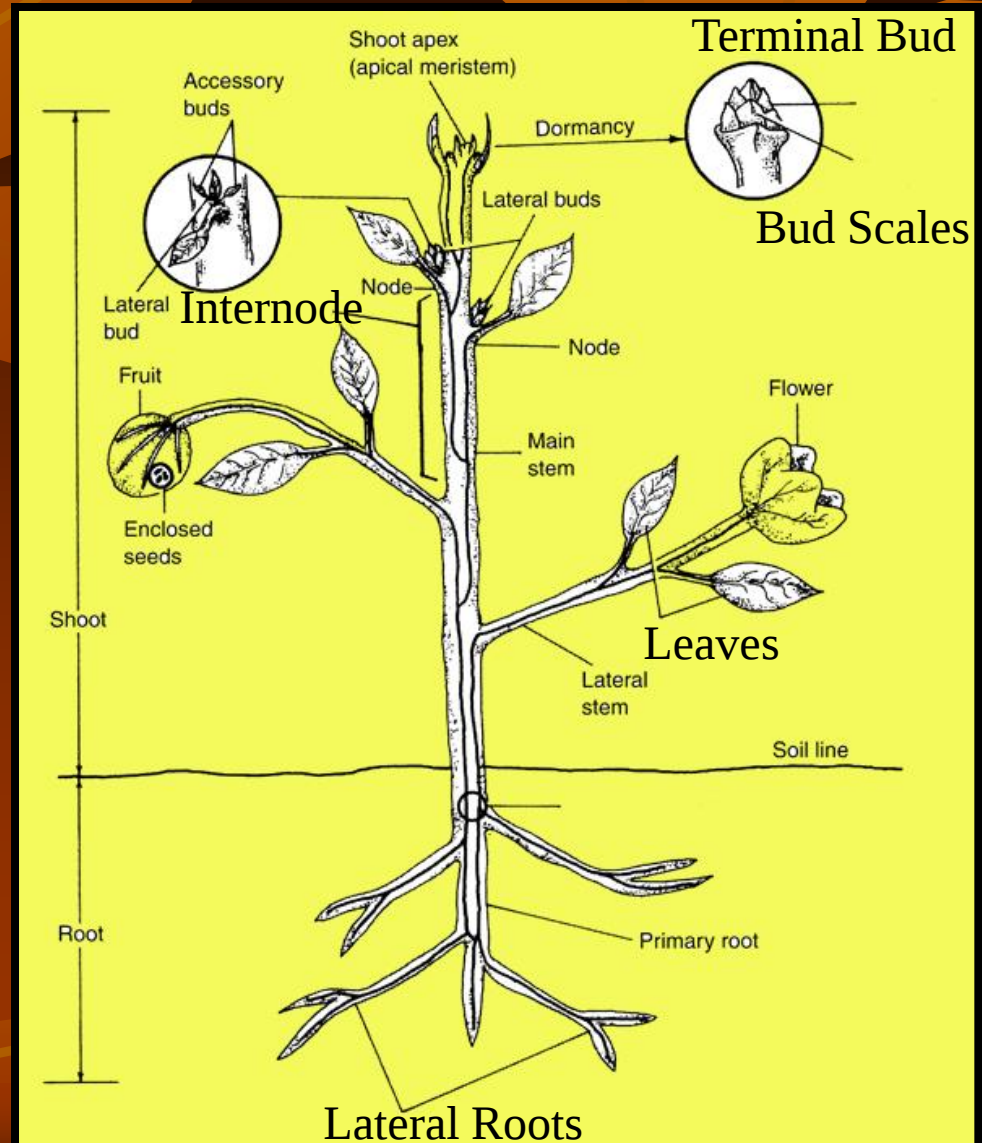
- Cultivars are developed, named & maintained by man
- Using the International Code of Botanical Nomenclature for Cultivated Plants
- Cultivar names are fancy names (non-Latin names)
- Made up of one, two or three words
- Cultivar plant names include genus, species & cultivar



Acer rubrum 'October Glory'

Plant Form & Functions

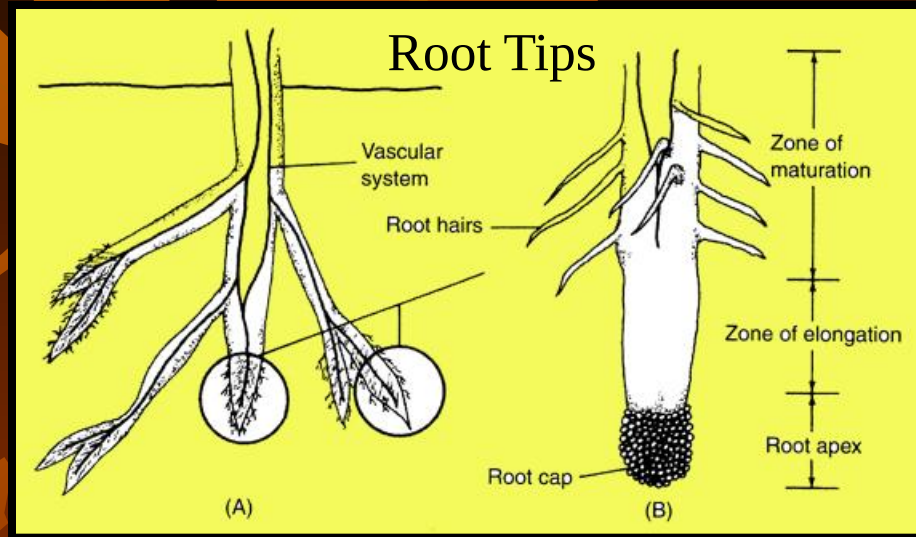
- Identify the plant parts from the illustration
- Terminal Bud
- Bud Scales
- Internode
- Leaves
- Lateral Roots



Stem & Root Form & Function

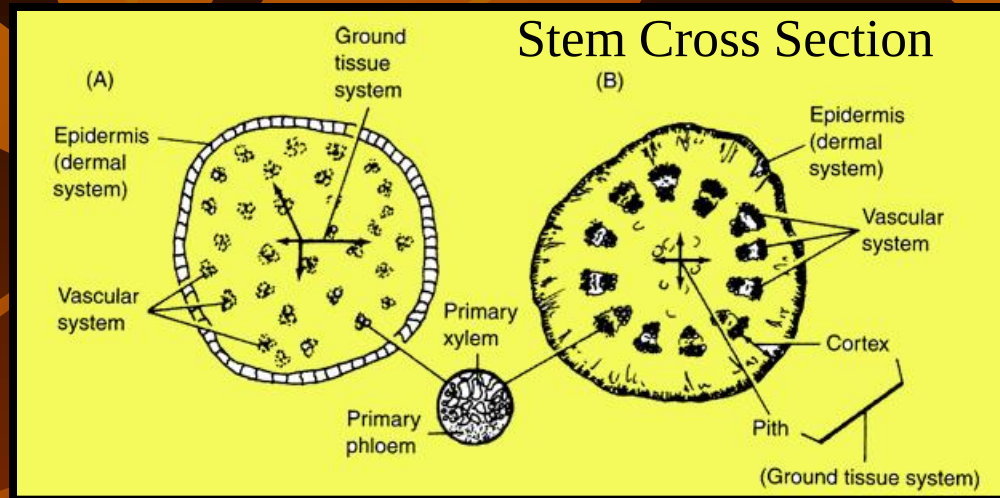
- Stems support leaves, flowers and fruits; transports food, water and nutrients
- Leaves make food and transpire water
- Buds produce new stems, leaves and flowers
- Flowers produce fruits and seeds
- Roots adsorb nutrients and water, anchor the plant, and can store food

Root Form & Function



- The root cap protects the meristem, the area of cell division at the root tips
- Root hairs absorb most of the water and are concentrated in the maturation zone
- Roots transport water & nutrients in their vascular system

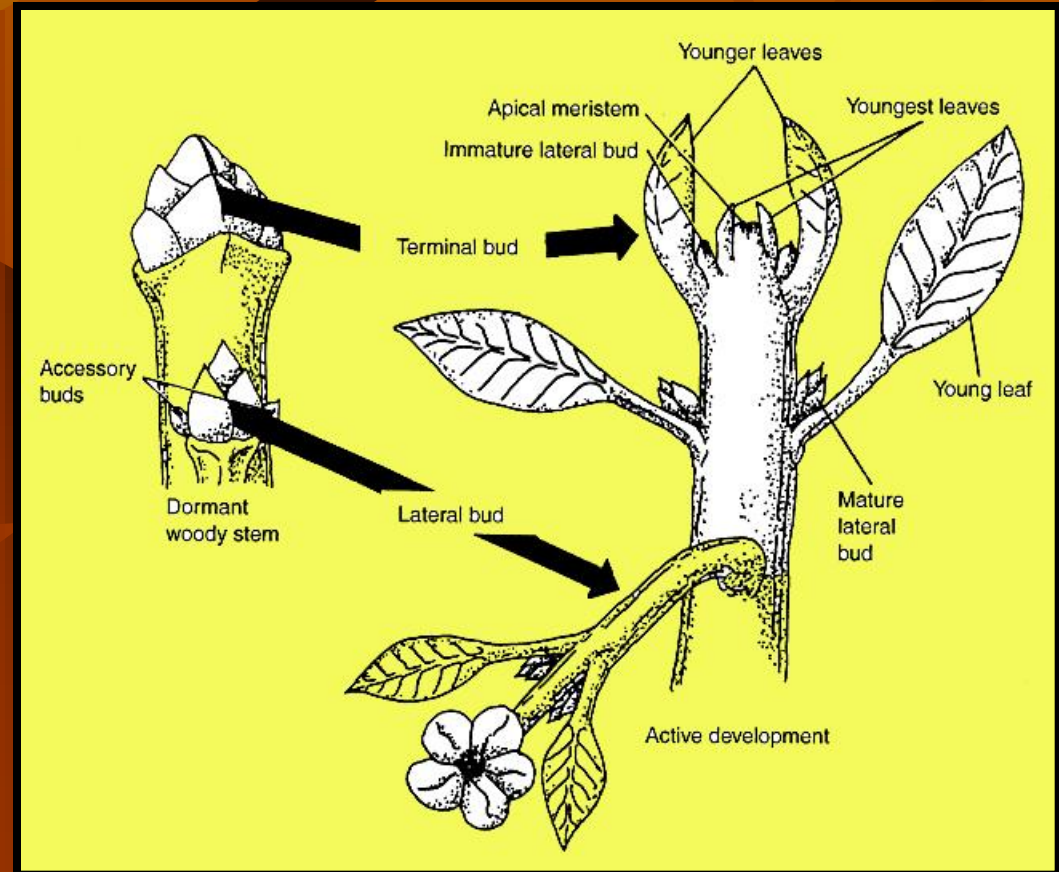
Vascular Tissue Form & Function



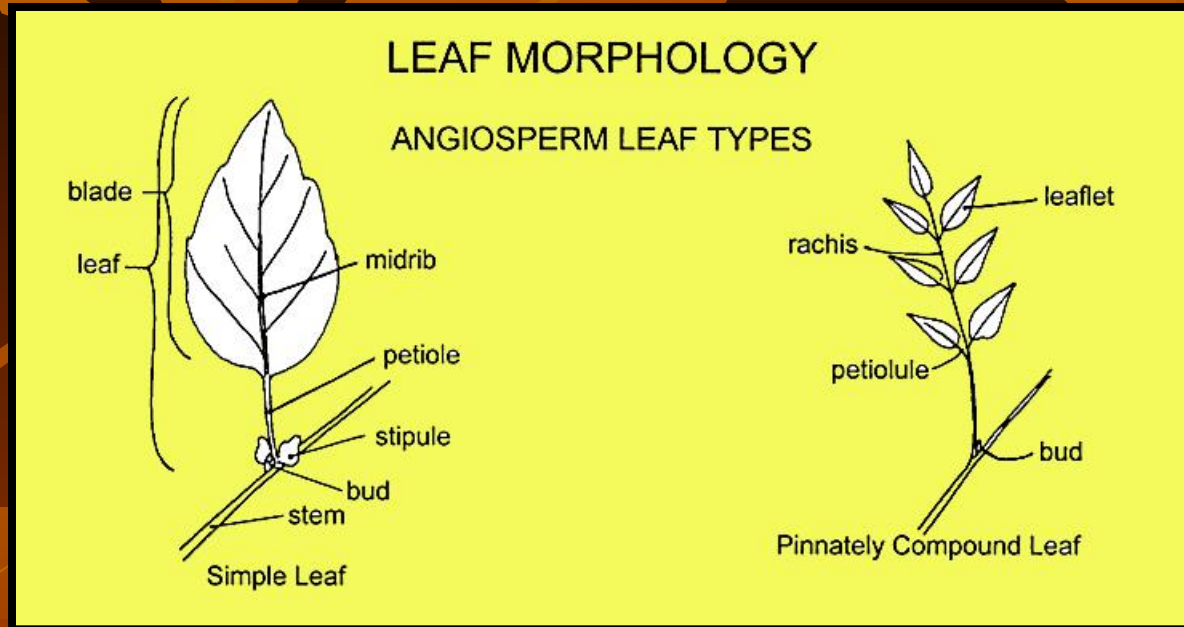
- Vascular tissue in monocots (grasses) are scattered in the stem (A), on left.
- Vascular tissue in dicots (broad leafed plants) are arranged in a circle inside the stem (B), on right
- The xylem tissue conducts water upward while the phloem conducts food from the leaves downward.

Bud Form & Function

- Terminal buds develop into terminal shoots, leaves & buds
- Lateral buds develop into lateral shoots, leaves & buds
- Flowers may be produced by both

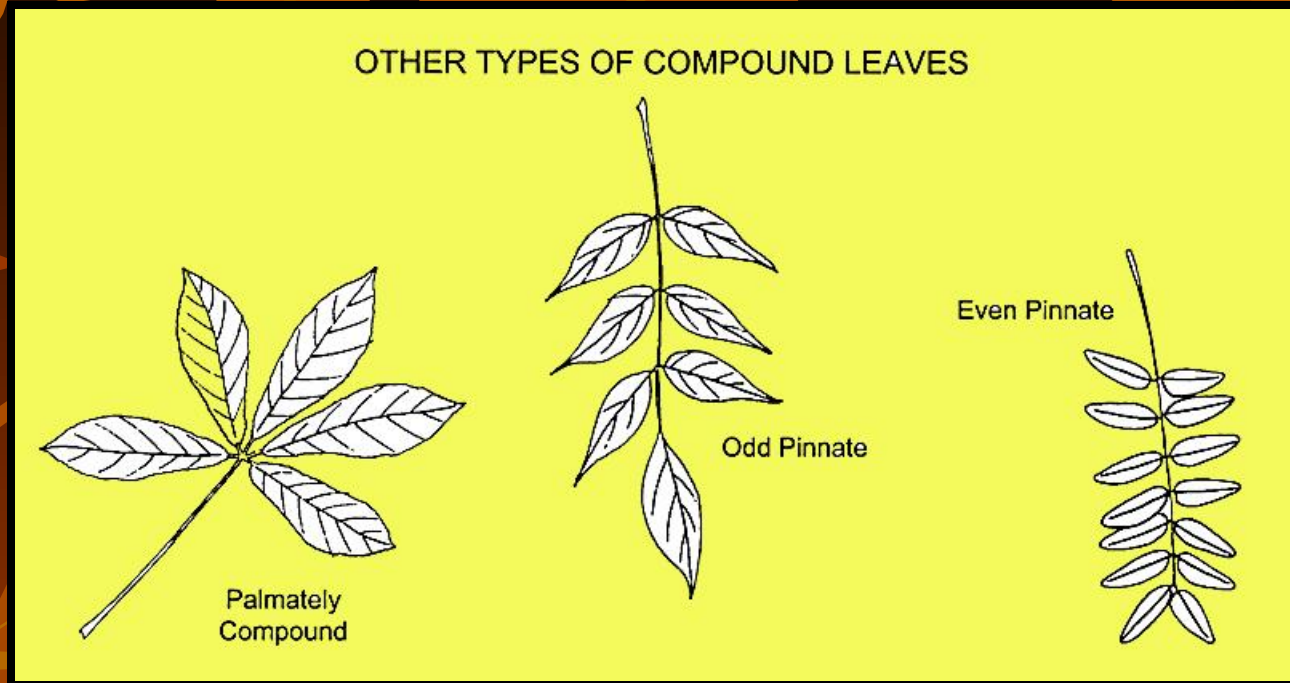


Leaf Form & Function



- A simple leaf is made up of the petiole and blade. Stipules are leafy appendages at the base of the petiole
- A compound leaf has many leaflets & a central rachis. Each leaflet can have a short petiolule

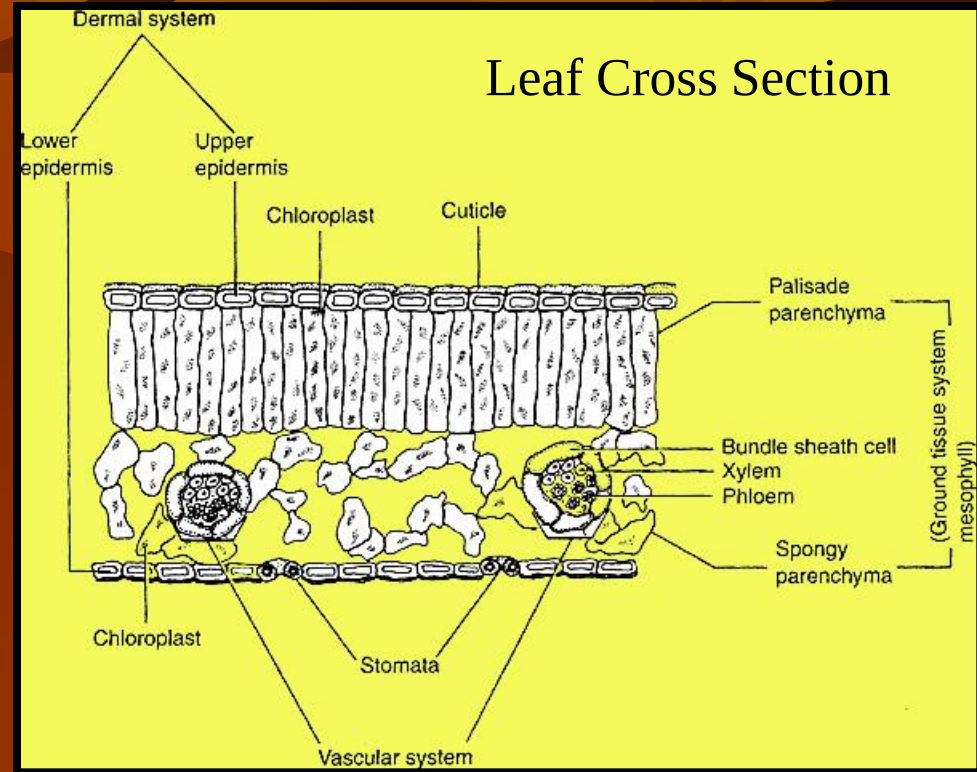
Leaf Form & Function



- Pinnately compound leaves have opposite leaflets, they are even or odd in number
- Palmately compound leaves have leaflets meeting at the top of the petiole

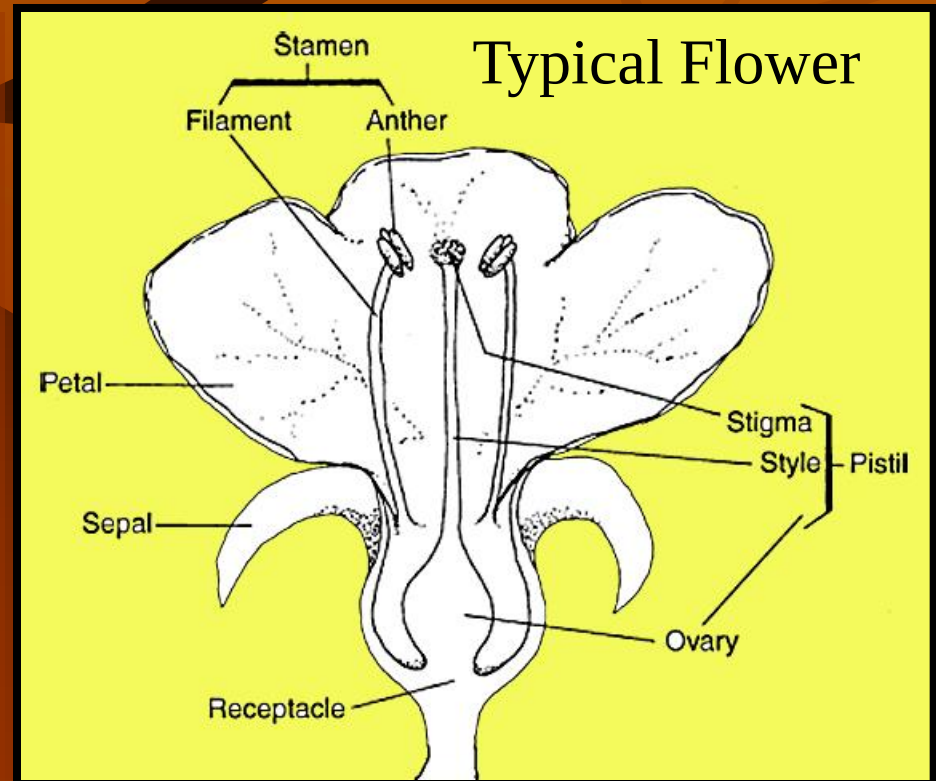
Leaf Form & Function

- Cuticle is waxy & holds moisture in
- Chloroplasts intercept light and make plant food
- Stomata open to let oxygen out and CO₂ in
- Vascular system moves food & water



Flower Form & Function

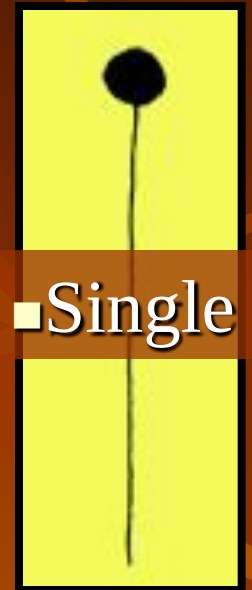
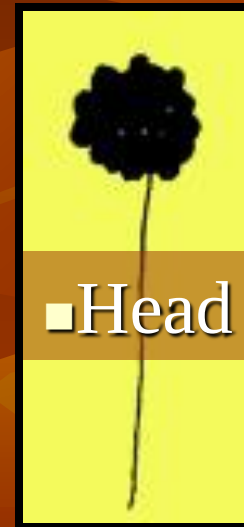
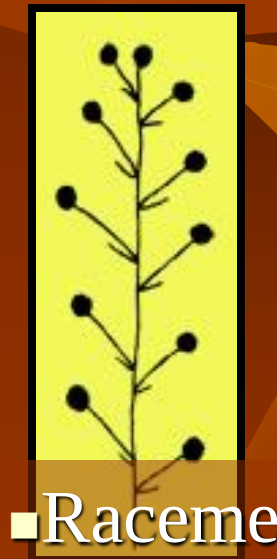
- The male stamen is made up of the anther and filament
- The female pistil is made up of the stigma, style and ovary
- A perfect flower has both, a functional pistil and stamens



Flower Form & Function

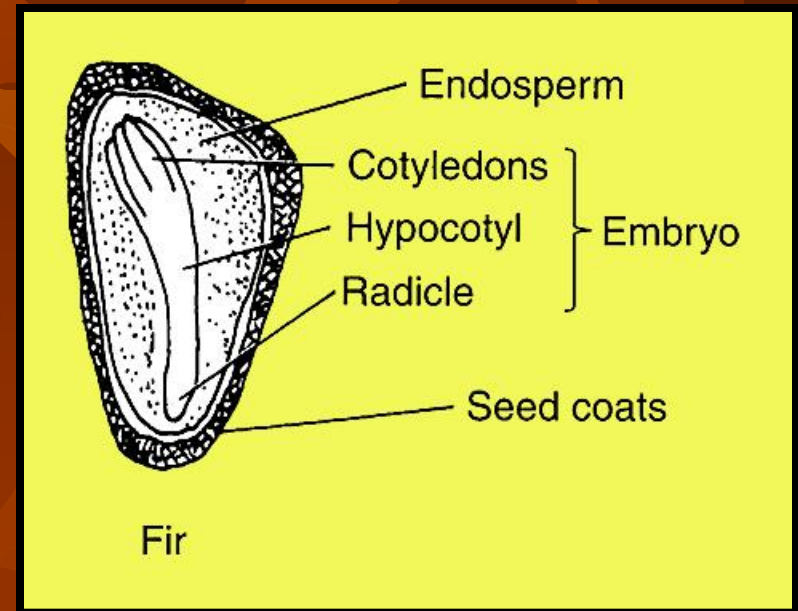
- Identify these flower inflorescence types

- Single
- Head
- Spike
- Raceme
- Panicle



Seed Form & Function

- Seeds develop to allow reproduction
- Identify the function of these seed parts
- Endosperm – Energy
- Embryo - New Plant
- Cotyledons - Seed Leaves
- Hypocotyl - Transition
- Radicle - Root
- Seed Coats - Protection



Review Basic Botany

- Plant Taxonomy deals with (1) identification, (2) naming & (3) classification
- Problems with common names - not precise and no rules for naming
- Botanical names are precise and reflect classification
- Inter-specific and inter-generic hybrids are designated with a multiplication sign (×)

Review Basic Botany

- Cultivars are selected, named and maintained by man
- The chloroplasts in the leaves make the food necessary for plant cell survival
- The vascular tissues move the water, nutrients and plant food through out the entire plant
- A perfect flower contains a pistil & stamens
- The embryo of the seed grows to produce an entirely new plant