

# Basic Botany

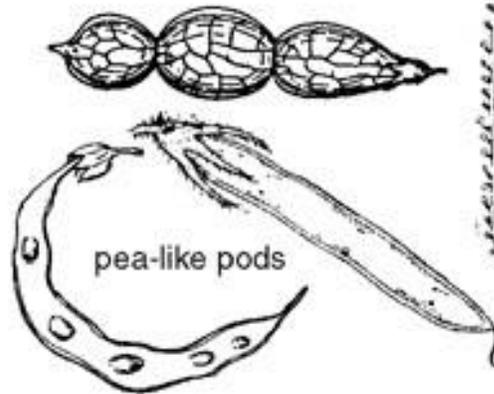
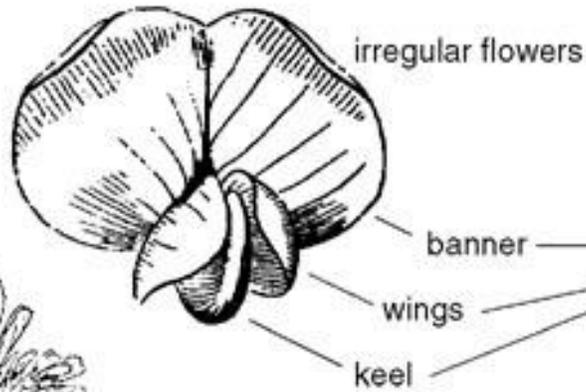
An Introduction to the Plant Sciences

*The earth is the Lord's and the fullness thereof,  
the world and those who dwell therein.*

**Psalm 24:1**

# Why Botany?

## Patterns of the Pea Family (Pea Subfamily)



Atlas of Florida Plants, Institute for Systematic Botany, University of South Florida. (<https://cdn.plantatlas.org/img/specimens/USF/238767.jpg>)

# Botany

*noun*

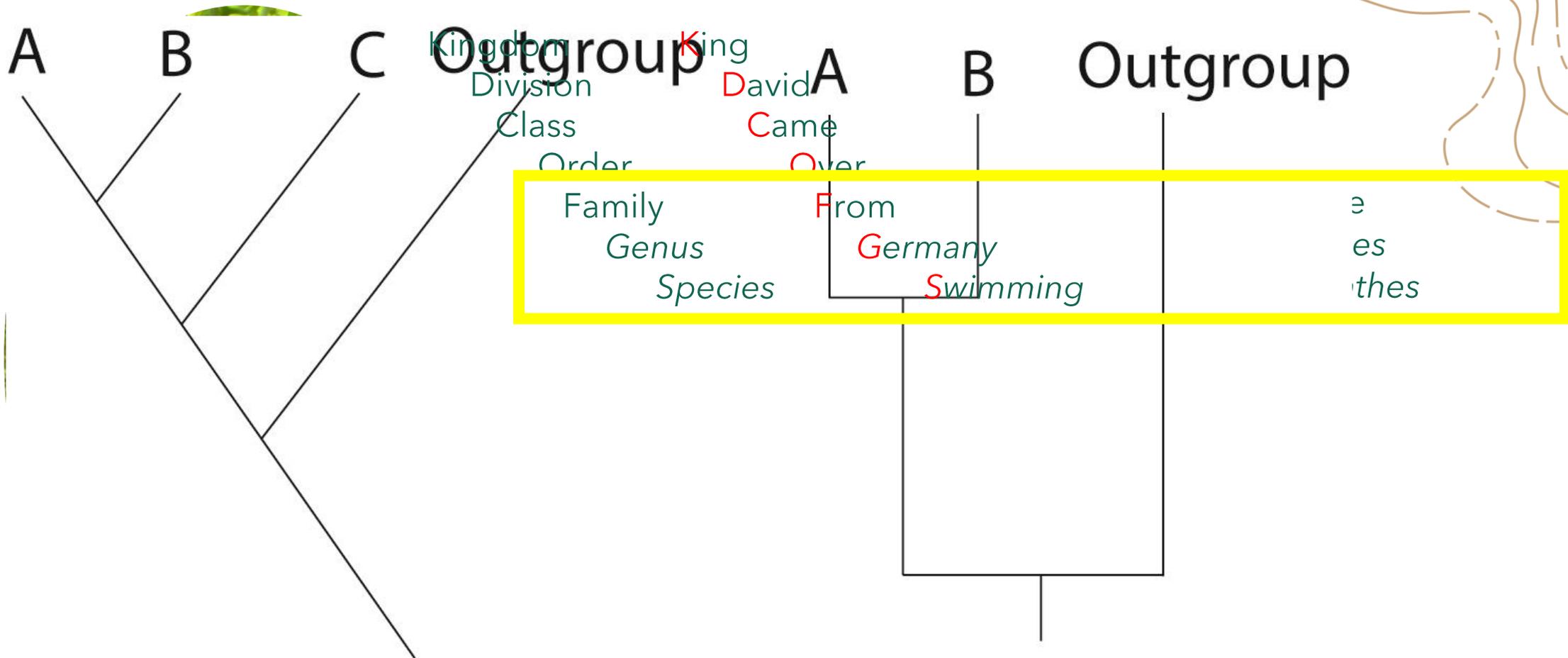
the scientific study of the physiology, structure, genetics, ecology, distribution, classification, and economic importance of plants



# Classification



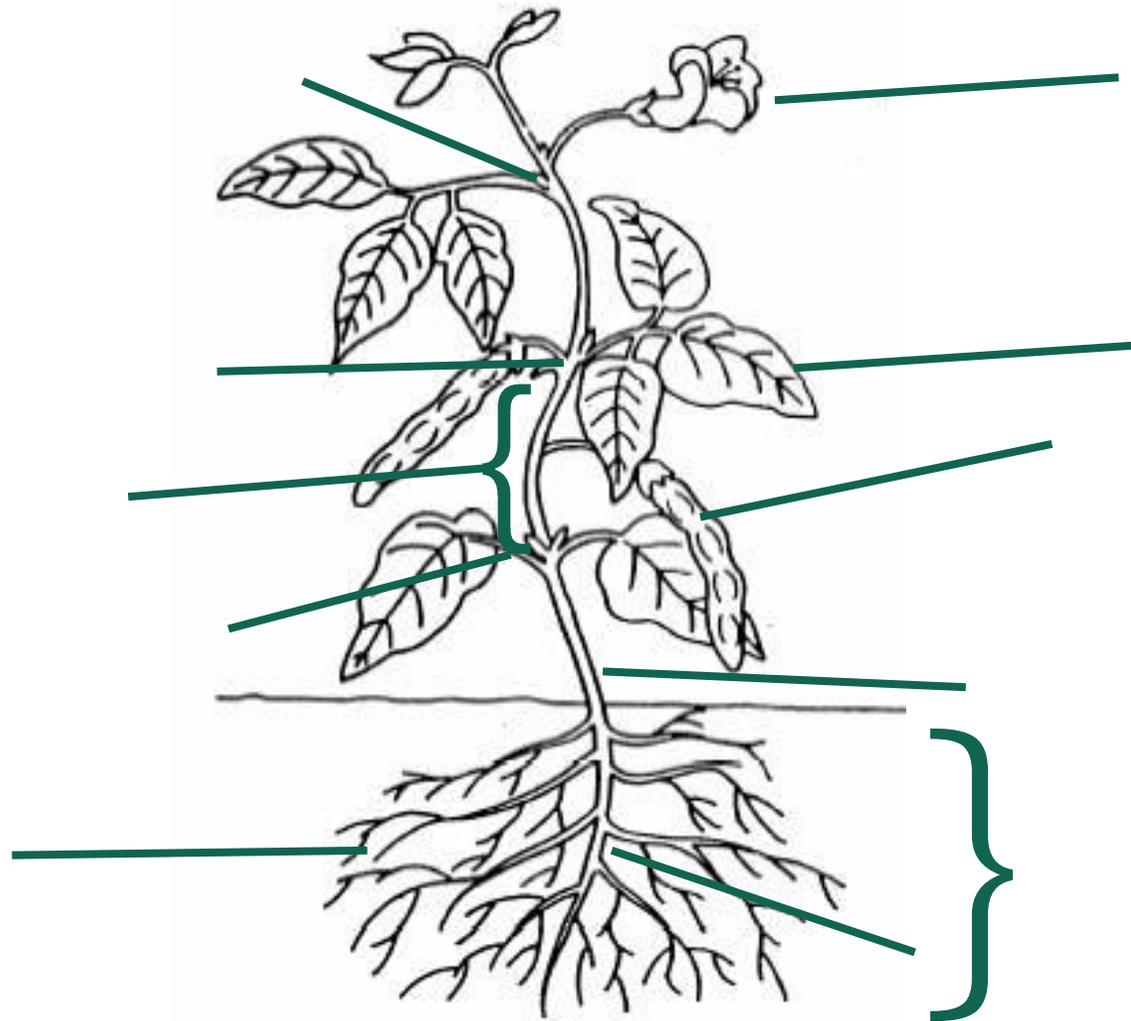
# Classifying using taxonomy



# Some Agriculturally-Important Plant Families

- Dioscoraceae (yams)
- Alliaceae (onions, garlic)
- Asparagaceae (asparagus)
- Liliaceae (lilies are edible!)
- Zingiberaceae (ginger)
- Musaceae (bananas)
- Poaceae (corn)
- Solanaceae (tomato)
- Fabaceae (legumes)
- Cucurbitaceae (squash)
- Brassicaceae (broccoli)
- Ipomaceae (sweet potato)
- Apiaceae (celery, carrots)
- Lamiaceae (mints)
- Asteraceae (lettuce, herbs)

# Structure & Function





# Photosynthesis

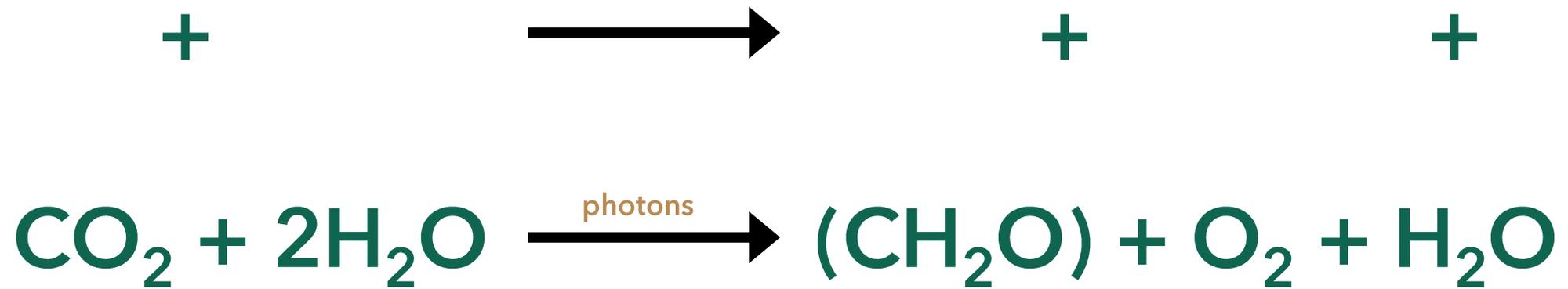
“light” – “to put together”

# Autotrophs

- Most plants are *autotrophic*
- Food production is dependent on:
  - Light energy (photons)
  - Carbon dioxide (CO<sub>2</sub>)
  - Water (H<sub>2</sub>O)
  - Chloroplasts
- (Also necessary: macro- and micronutrients)



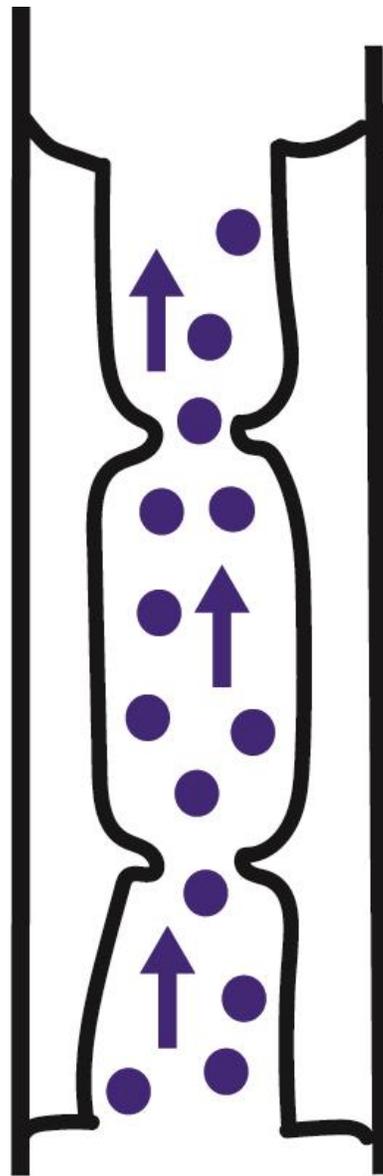
# Photosynthesis equation



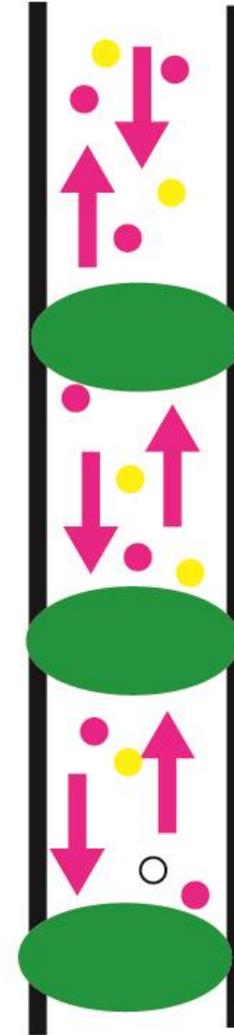


# Water and Nutrient Movement

- Water and minerals
- One-way movement
- No end walls



**Xylem**



**Phloem**

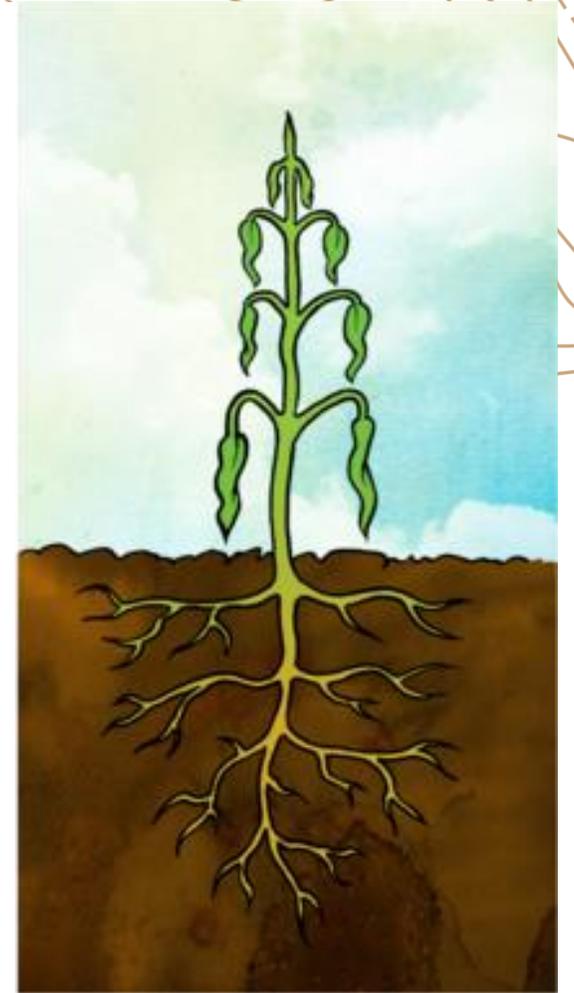
- Organic molecules
  - Water and Plant food
- Two-way movement
- Has end walls with perforations

# Wilting

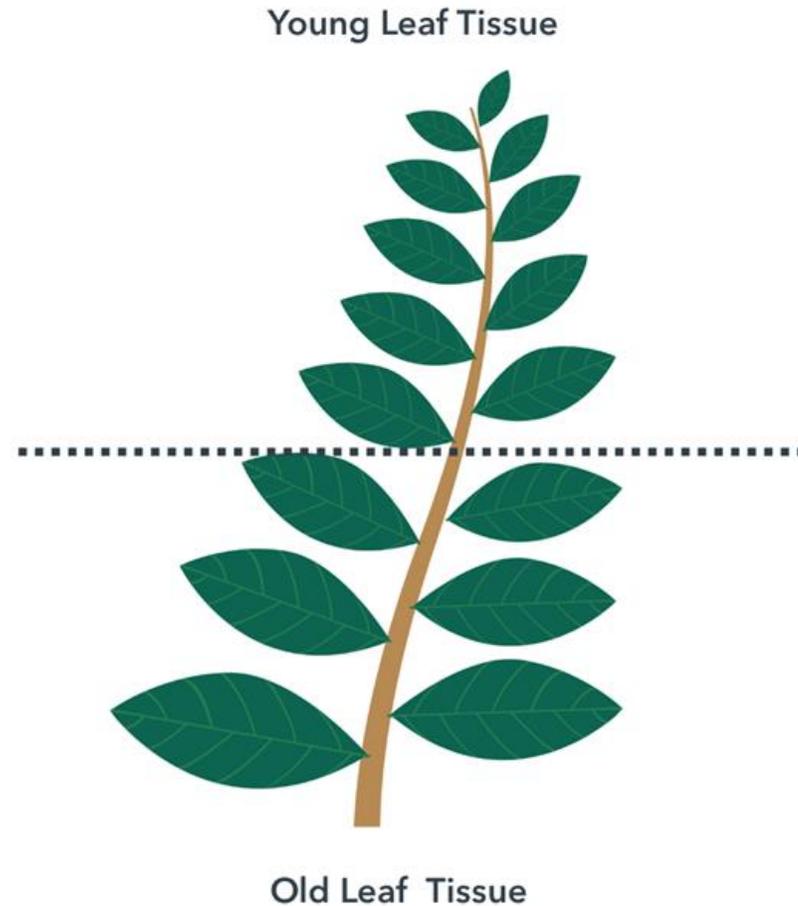
What causes it?

When do we see it?

What factors affect evapotranspiration?



# Plant Nutrients and mobility



Mobile Nutrients	Immobile Nutrients
Nitrogen (N)	Sulfur (S)
Potassium (K)	Calcium (Ca)
Phosphorus (P)	Copper (Cu)
Magnesium (Mg)	Boron (B)
Nickel (Ni)	Manganese (Mn)
Chlorine (Cl)	Iron (Fe)
Molybdenum (Mo)	
Zinc (Zn)	

# Go get a specimen!



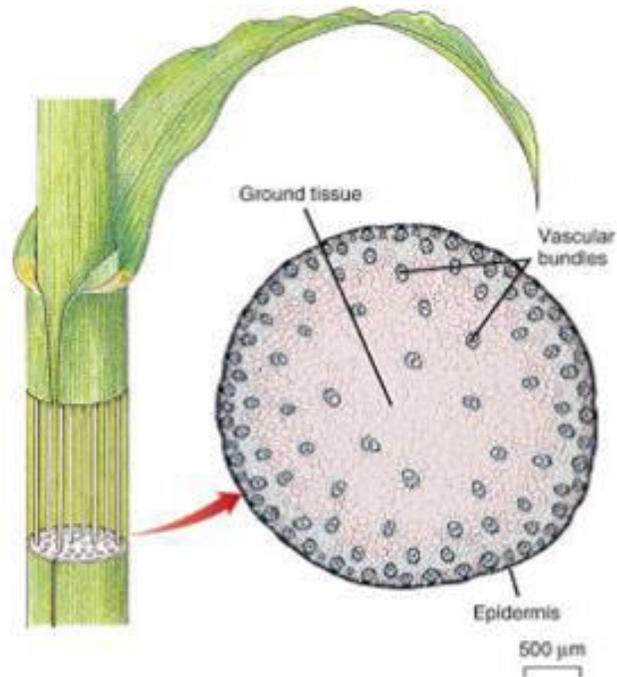
# Monocot vs. Dicot



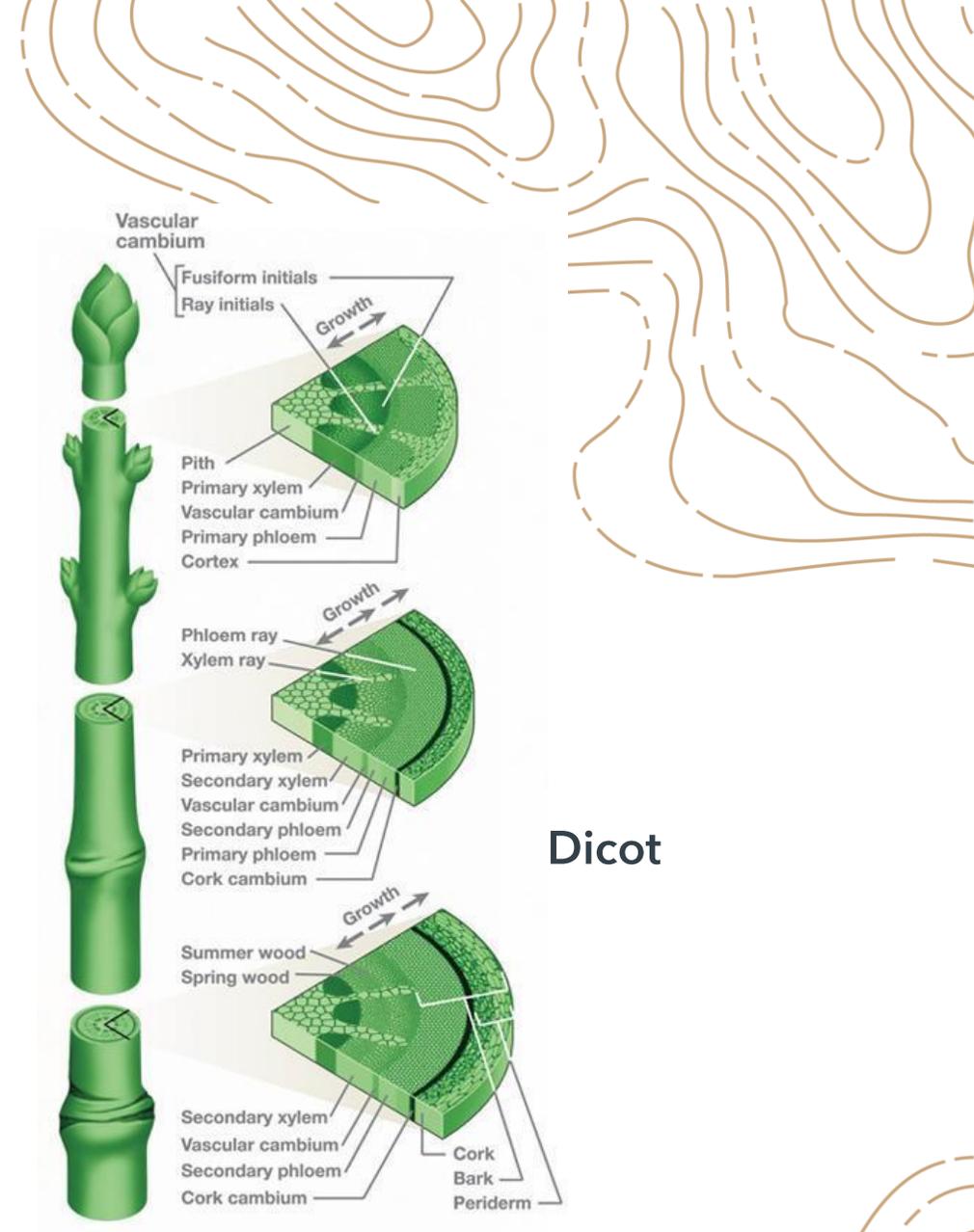
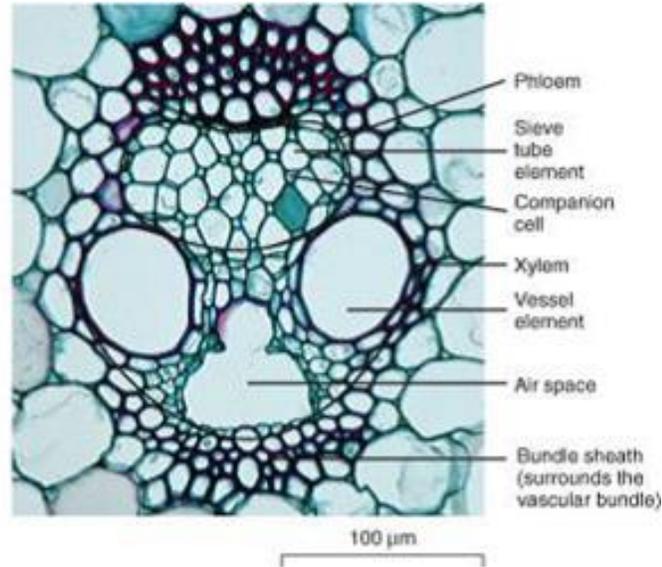
# Common Trends Among Monocots & Dicots

	Seed	Root	Stem	Leaf vein pattern	Flower Parts
Monocot					
Dicot					

# Vascular Systems



Monocot



Dicot



# Plant Growth

Plants do move!

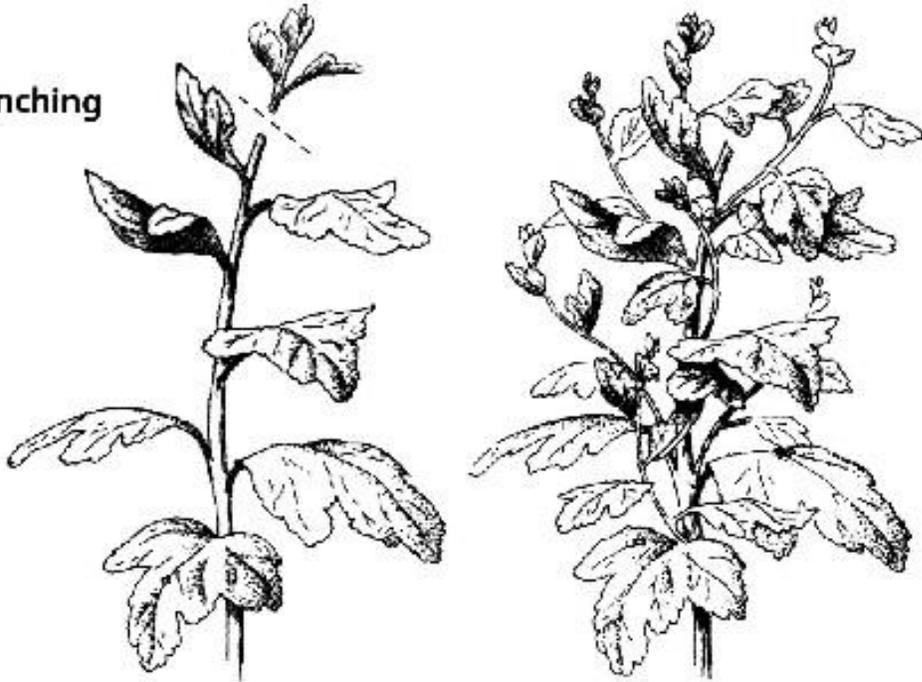


# Plant Growth: Buds and Nodes

- Areas of active growth are called meristematic tissue (aka *meristems*)
  - Apical meristem
  - Intercalary meristem (monocots)
  - Buds
    - Terminal buds (aka *apical*)
    - Latent buds (aka *axillary*)
    - Adventitious buds

# New Growth

pinching



# Recommended Resources

- Brian Capon. *Botany for Gardeners*, 1990
- Gurevitch, Scheiner, and Fox. *Ecology of Plants*. 2nd Edition, 2006
- Tim Motis and Dawn Berkalaar. *Agricultural Options for Small-Scale Farmers* - ECHO
- [Where There is No Farm Advisor](#) - ECHO
- ECHO Tech Notes e.g. [A Beginner Guide to Small-Scale Tropical Agriculture](#), [Preparing for Agricultural Missions](#), [Small Farm Resource Development Project](#), [Nutrient Quantity or Access](#)
- Taxonomy Search:  
<http://www.itis.gov/servlet/SingleRpt/SingleRpt>
- [Asia Note 29](#) : Diagnosing Crop Nutrient Deficiencies in the Field