

# Evolution of Plants



# Basics of a Plant: (Kingdom Plantae)

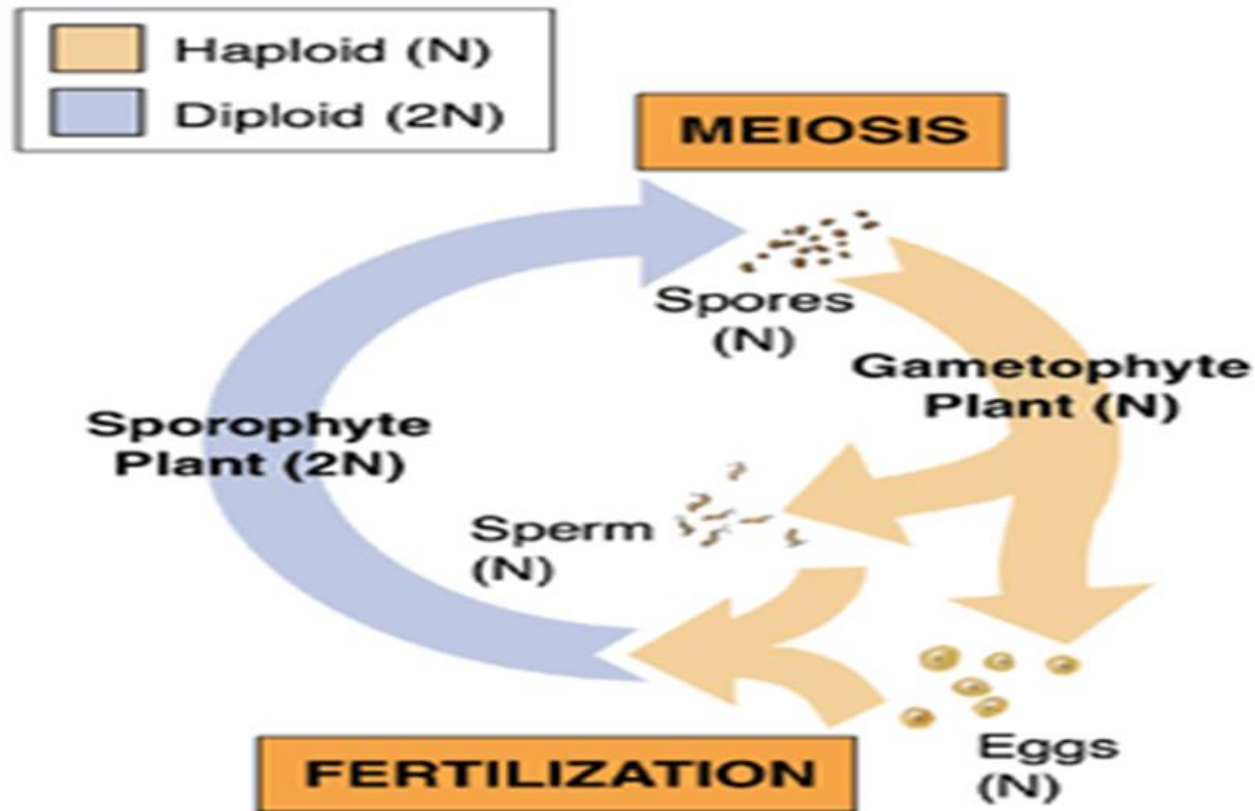


- ▶ **Eukaryotic**
- ▶ **Multicellular**
- ▶ **Cell Wall Made of Cellulose**
- ▶ **Carry out Photosynthesis** using Chlorophyll (Autotrophs).



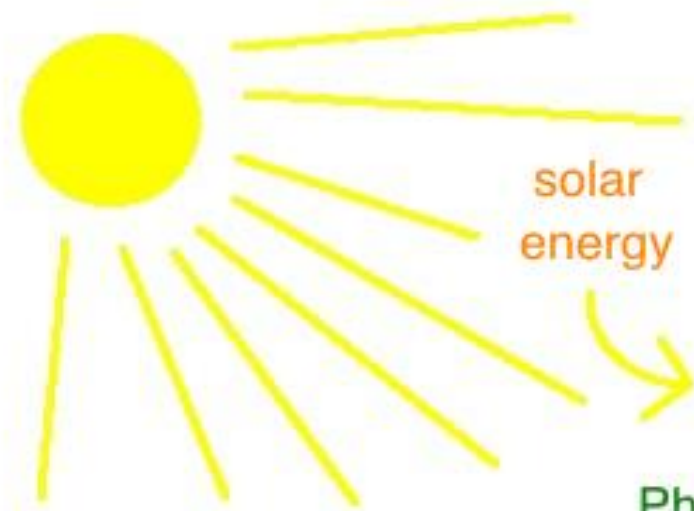
# Reproduction:

- ▶ Alternation of Generations between **Sporophyte (2N)** and **Gametophyte (1N)**

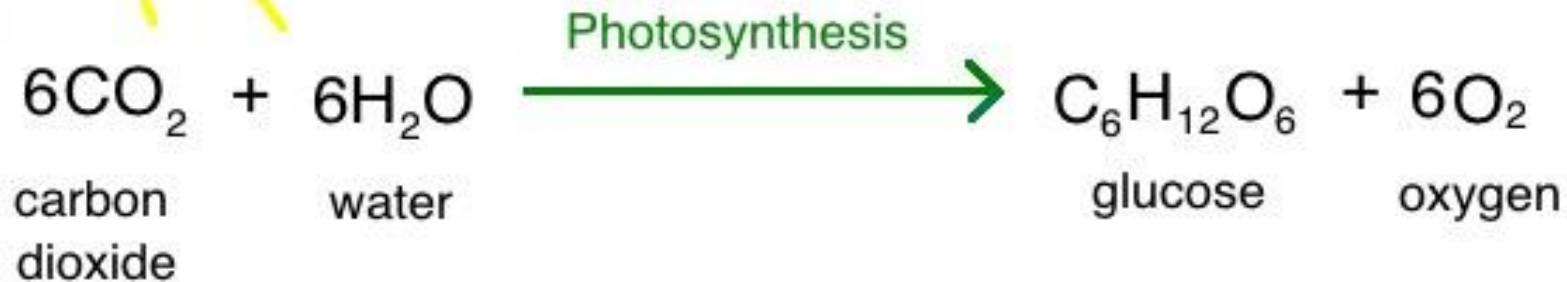


# Requirements for Survival:

- ▶ Water and Minerals, Sunlight, Gas Exchange, and a Movement System for Water and Nutrients



**Photosynthesis Equation :**  
**Copy the equation on**  
**your paper!!!**

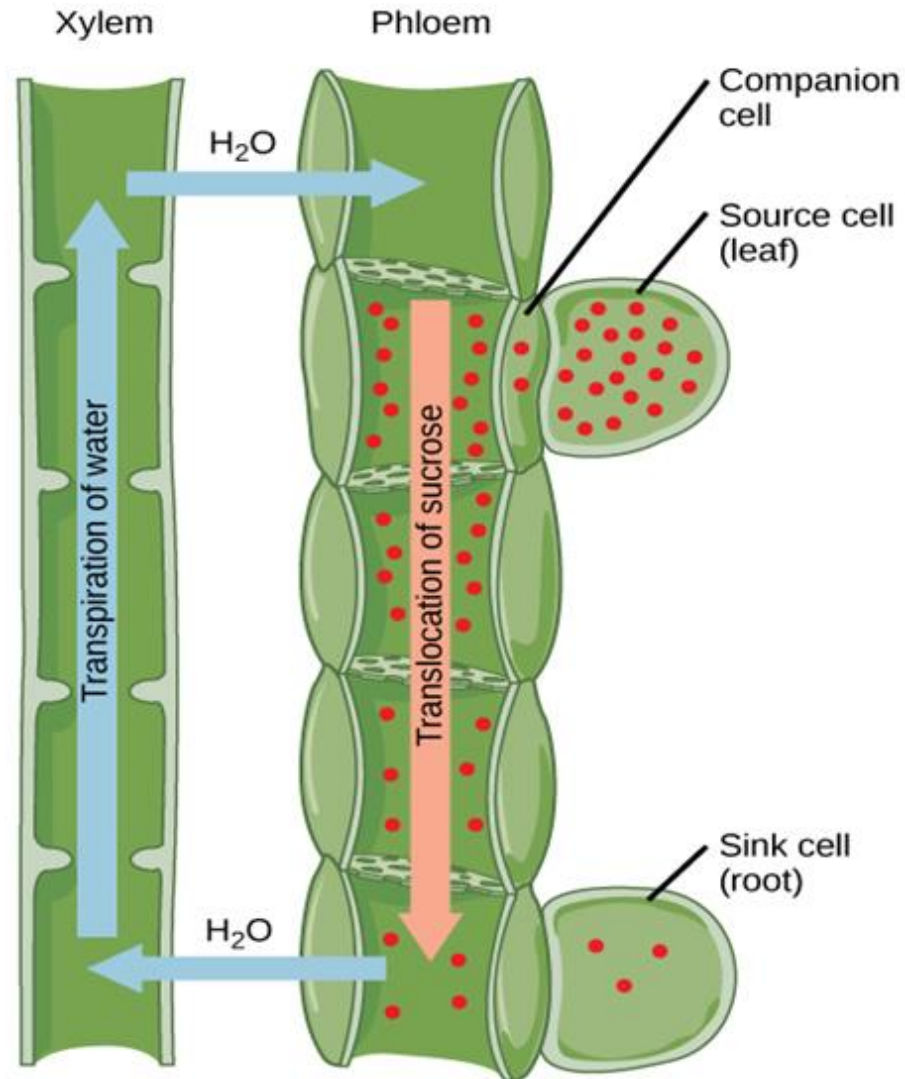




# Plant Parts:

► **Vascular Tissue**  
(Adaptation #1) -  
Transport system to  
move **water** and  
**nutrients** throughout  
the plant. This  
allowed the plant to  
grow taller.

(Terms to Know: Roots,  
Leaves, Stems, Veins)



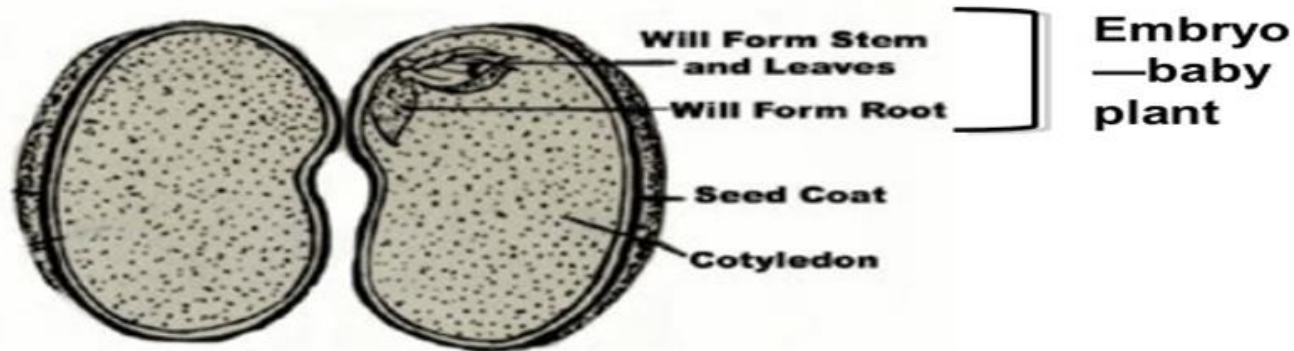
# Seeds (Adaptation #2)-

## ▶ Allowed plants to reproduce without water.

(Terms to Know: Cones, Flowers, Pollen Grain, Pollination, Seed, Embryo, Seed Coat)

### Parts of a Seed

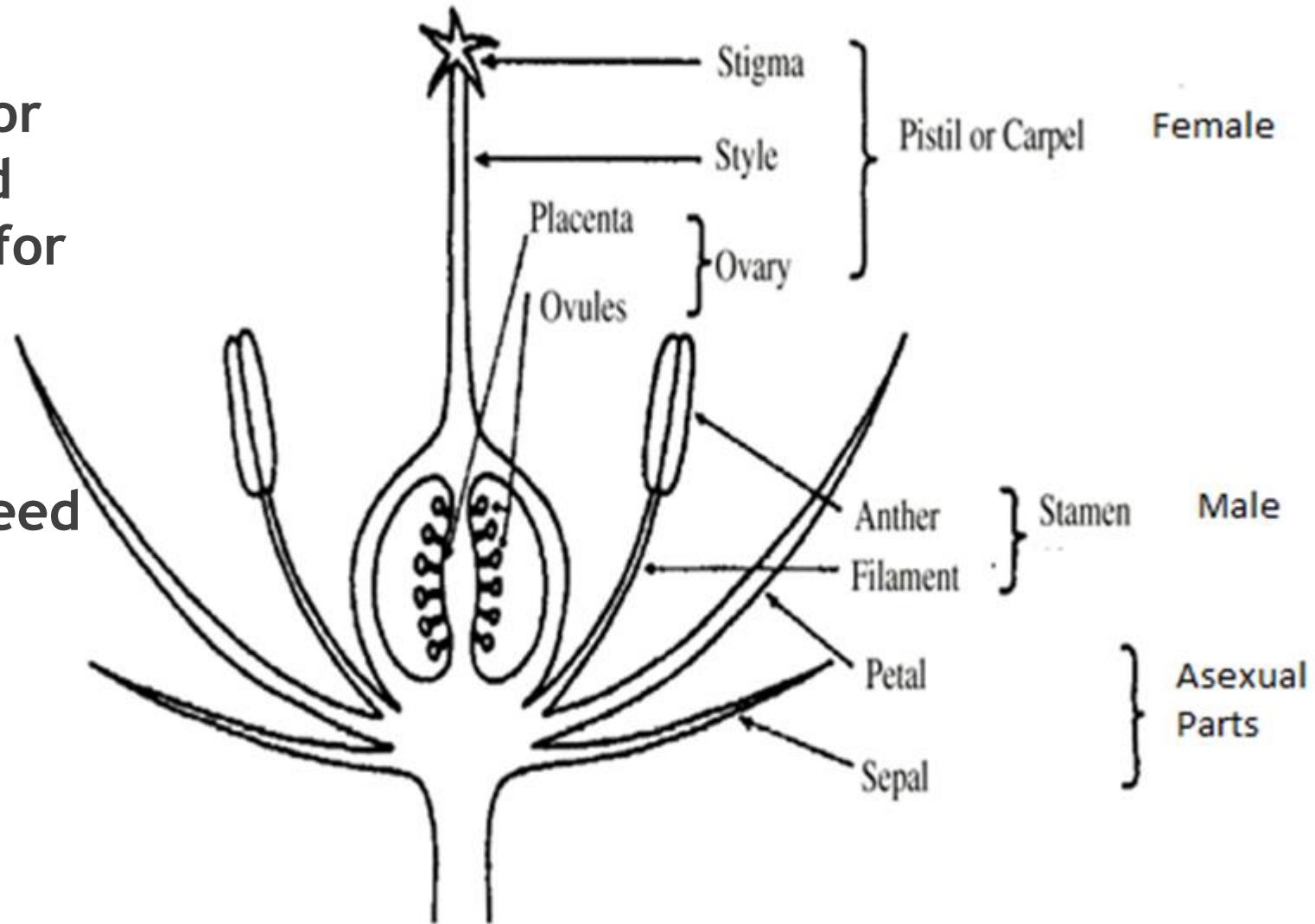
- Seed Coat- protects seed
- Cotyledon—stored food
- Embryo (baby plant) —beginning leaves, stem and root



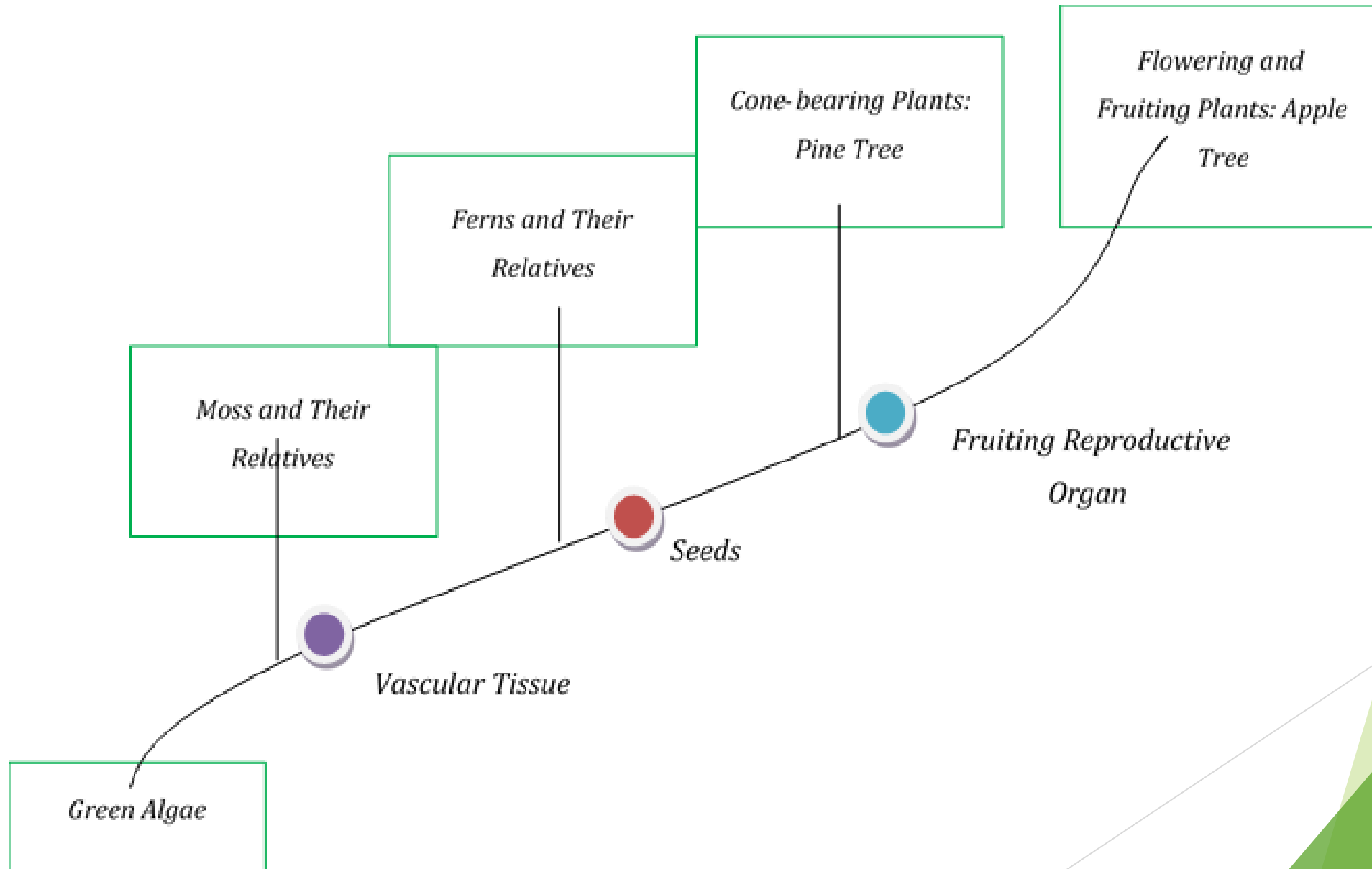
**Bean Cut in Half**

# Flower and Fruit (Adaptation #3)

- ▶ Fruit is protection for the seed and enticement for animals, providing another method of seed dispersal. Flowers are fragrant and colorful to encourage pollination.



# Evolution of Plants:

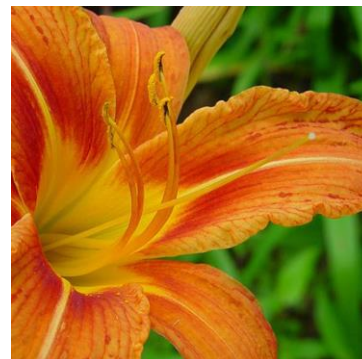


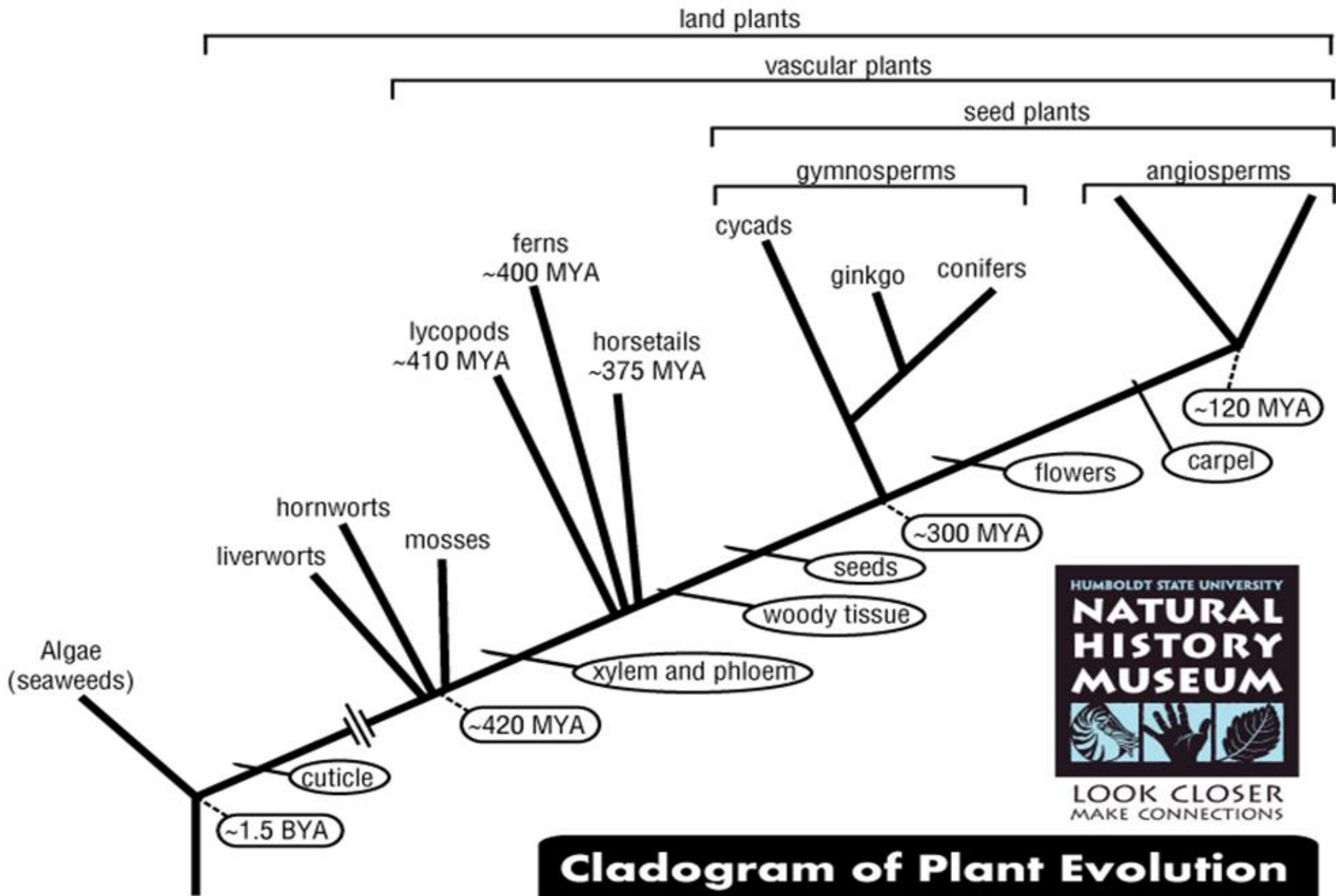


The ancestor to modern plants was **green algae**, kingdom **protista**.

Plants can be categorized into four different divisions:

- 1) **Bryophytes**
- 2) Pterophyta, **Arthropphyta**, and Lycophyta
- 3) **Coniferophyta** (Gymnosperms)
- 4) **Anthophyta** (Angiosperms)









LOOK CLOSER  
 MAKE CONNECTIONS

**Cladogram of Plant Evolution**



# Key Characteristics of each group:

Category	Characteristics	Examples
 <p><b>Bryophytes</b></p>	Seedless and <b>Nonvascular</b> Depend on <b>water</b> for reproduction No <b>roots</b> , rhizoids instead	<b>Moss</b> , Liverworts, and Hornworts
 <p><b>Pterophyta, Arthropophyta, and Lycopphyta</b></p>	Seedless, but do have <b>vascular</b> tissue (xylem and phloem)	Club Moss, Horsetails, and <b>Ferns</b>
 <p><b>Coniferophyta (Gymnosperms)</b></p>	<b>Vascular</b> Tissue and seeds <b>Cones</b> for reproduction “Naked Seeds”	Gnetophytes, Cycads, Ginkgoes, and <b>Conifers</b>
 <p>Angiosperms are plants that produce <i>flowers</i>.</p> <p><b>Anthophyta (Angiosperms)</b></p>	<b>Vascular</b> Tissue and seeds <b>Flowers</b> and <b>Fruits</b> for reproduction <b>Monocots</b> or <b>Dicots</b> Woody or Herbaceous <b>Annuals</b> , biennials, <b>perennials</b>	Apple tree Azalea Bush Lily Sunflowers

## Types of Plants

Use what you know about plants to fill in the missing information in the table. One row has been completed for you.

	Bryophytes	Ferns	Gymnosperms	Angiosperms
Vascular tissue	no	yes	yes	yes
Produce seeds		no		
Require water for fertilization			no	
Produce pollen				yes
Produce cones			yes	
Produce flowers and fruit		no		

Use the table to answer the questions.

1. Give an example of a seedless vascular plant.

\_\_\_\_\_

2. What characteristic do only angiosperms have?

\_\_\_\_\_

3. What characteristic do only gymnosperms have?

\_\_\_\_\_

4. What types of plants require water for fertilization?

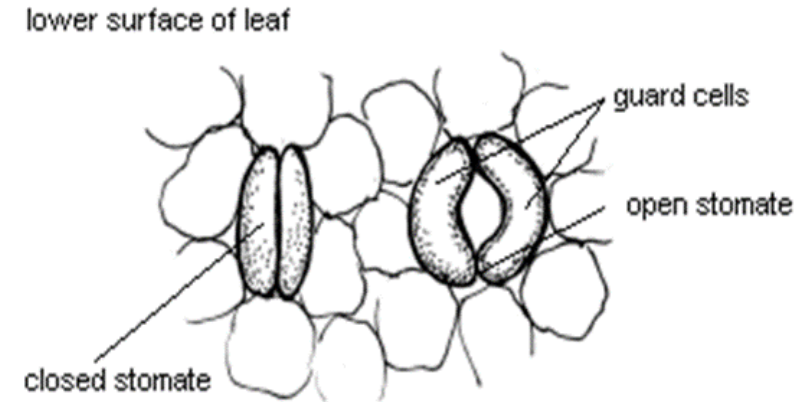
\_\_\_\_\_

5. A pine tree has vascular tissue and produces cones. What type of plant is a pine tree?

\_\_\_\_\_

# Plant Adaptations and Tropisms:

- ▶ **Stomata** - Opens just enough to exchange gases, closes to ensure that they do not lose excess water.
- ▶ **Seed Dispersal** - Animals, Wind, and Water
- ▶ **Fruit** - Makes seeds enticing to animals to eat and pass seeds to other areas.
- ▶ **Dormancy** - Does not grow due to poor temperature and water conditions.





# Hormones

Auxins - Stimulates cell **elongation**

Cytokinins - determines plant **growth**

Gibberelins - increases the **size** of plants (flowers and fruits)

Ethylene - Stimulates **ripening** of fruits.

# Tropisms

**Phototropism** - Plant grows and bends towards the sun



**Gravitropism** - Roots grow down no matter the direction they leave the seed.



**Thigmotropism** - Plant response to touch



**Photoperiodism** - Short v. Long Day Plants (Seasonal plants)

**Photoperiodism**

**Photoperiodism**

- Many plants have the ability to measure the length of the sun cycle.
- This allows them to schedule their flowering period for a specific time of year
- Experiments have proven that plants measure night length, not day

LIGHT	DARK	Flowering
LIGHT	DARK	Vegetative
LIGHT	DARK	Vegetative