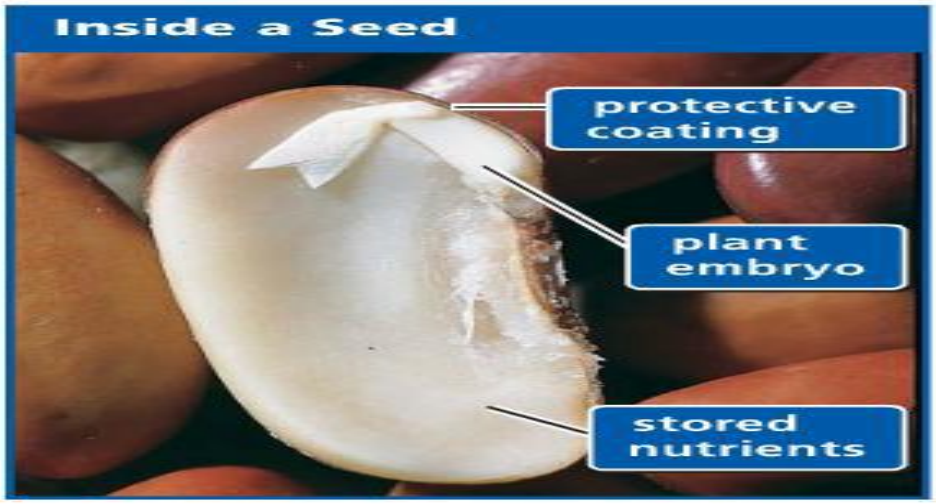
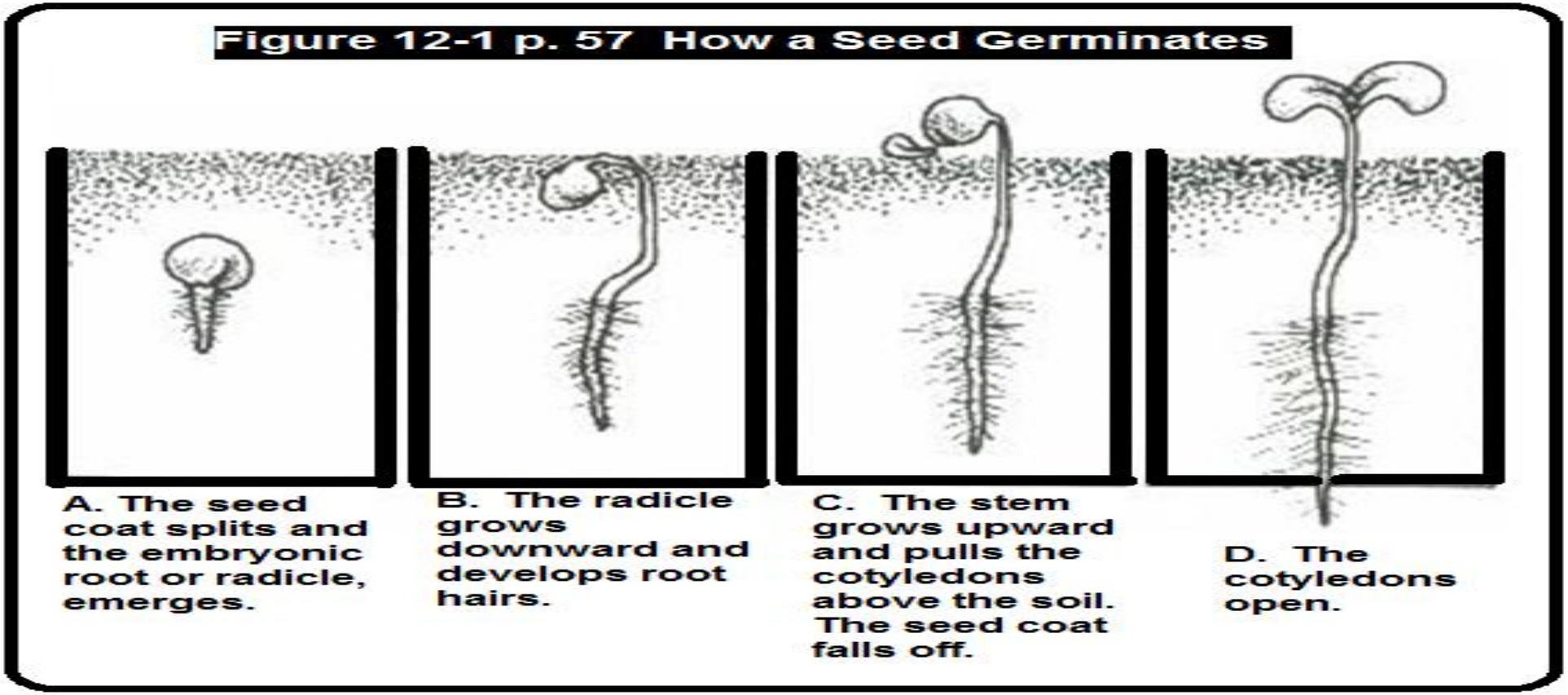
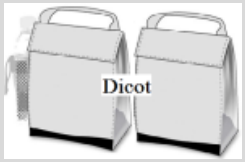
Plant Study Guide for Week 1

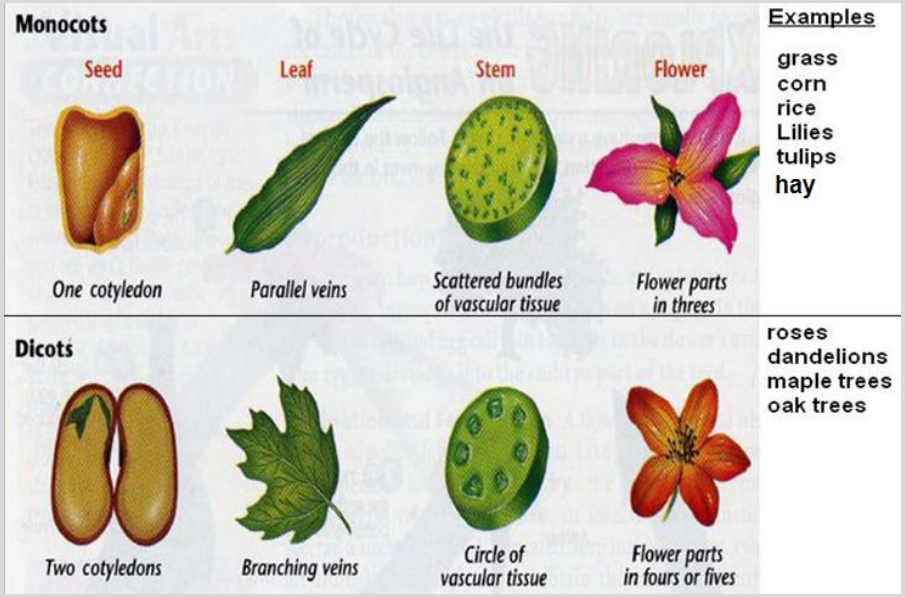


Life Cycle for Wisconsin Fast Plants (calendar on p. 8)

1. **When will the cotyledons emerge?** **Answer:** ***day 2 or 3***
2. **When will the true leaves emerge?** **Answer:** ***days 4,5, or 6***
3. **When will the flower buds appear?** **Answer:** ***days 7, 8 or 9***
4. **What are the days of the growth spurt?** **Answer:** ***days 10, 11, or 12***
5. **When should pollination occur?** **Answer:** ***days 14 to 19***
6. **When will the seed pods develop?** **Answer:** ***days 19 to 35***



 **Monocot** 	 **Dicot** 
Fibrous roots (like our corn) 	**One long tap root (like our lima bean)** 
vascular tissue arranged randomly without any shape (overused pin cushion) 	**vascular tissue arranged in a circle (honeycomb shape) in the stem** 
Parallel veins in long/slender leaves 	**net-like veins in wider leaves** 
plant parts/flowers in groups of threes 	**plant parts/flowers in groups of fours or fives** 



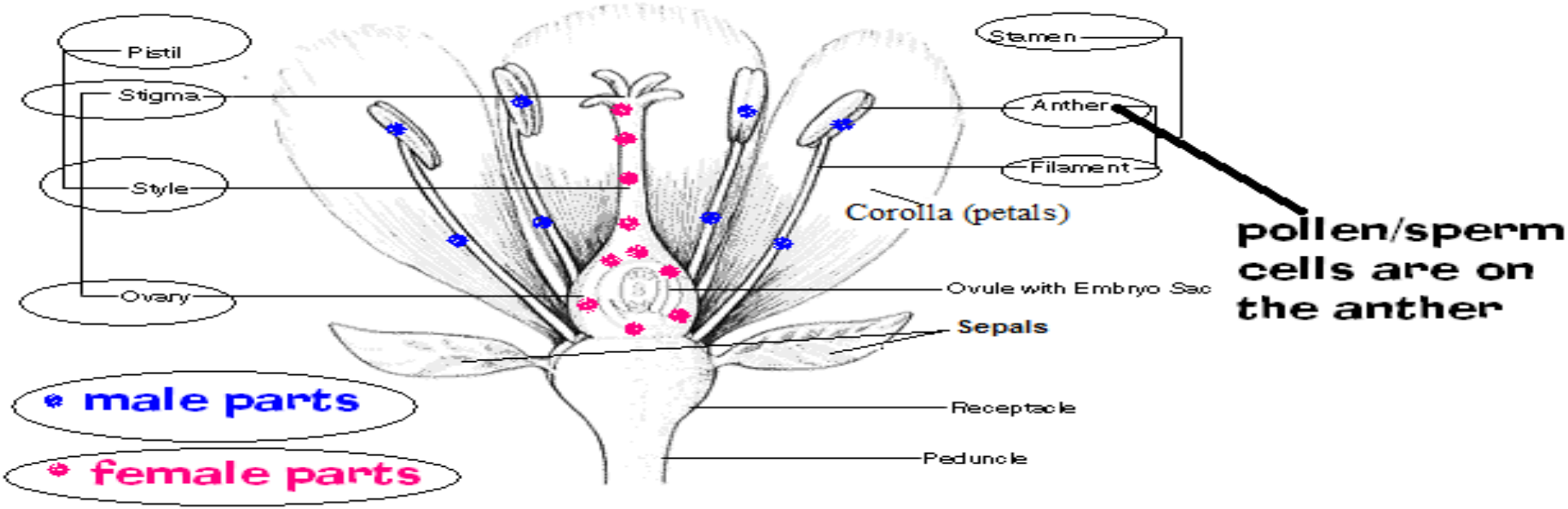
Monocot-A seed with one food storage area is called a ***monocotyledon***, or ***monocot***.

- Flowers of monocots have either three petals or multiples of three.
- The leaves of monocots are long and slender with veins that are parallel to each other.
- The vascular tube structures are usually scattered randomly throughout the stem.
- Examples-include grass, corn, rice, lilies, tulips and hay.

Dicot-A seed with two food storage areas is called a ***dicotyledon***, or ***dicot***.

- Flowers of dicots have either four or five petals or multiples of these numbers.
- The leaves are usually wide with branching veins.
- The vascular tube structures are arranged in circular bundles.
- Examples- roses, dandelions, maple, and oak trees.

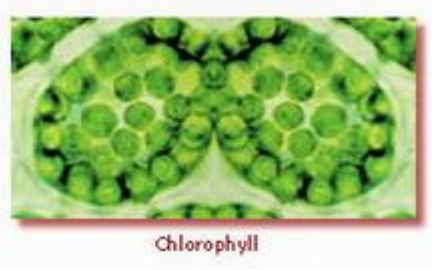
Label the Flower Parts



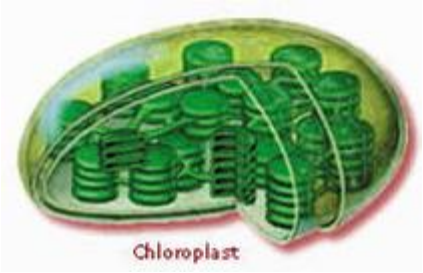
Monocot	Dicot
Fibrous roots (like our corn) 	One long tap root (like our lima bean) 
vascular tissue arranged randomly without any shape (overused pin cushion)	vascular tissue arranged in a circle (honeycomb shape) in the stem
Parallel veins in long/slender leaves	net-like veins in wider leaves
plant parts/flowers in groups of three	plant parts/flowers in groups of fours or fives

Plant Study Guide for Week 3

Chlorophyll- A green pigment found in plant cells that absorbs light energy.



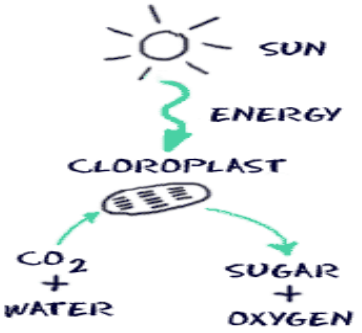
Chloroplasts- Parts of plant cells that contain chlorophyll.

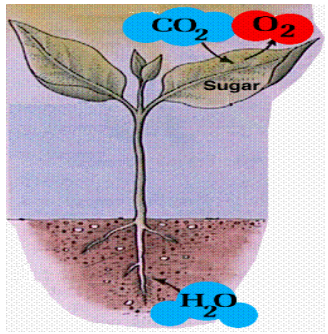


Stomata- Pores (holes) that allow air in and out of leaves.

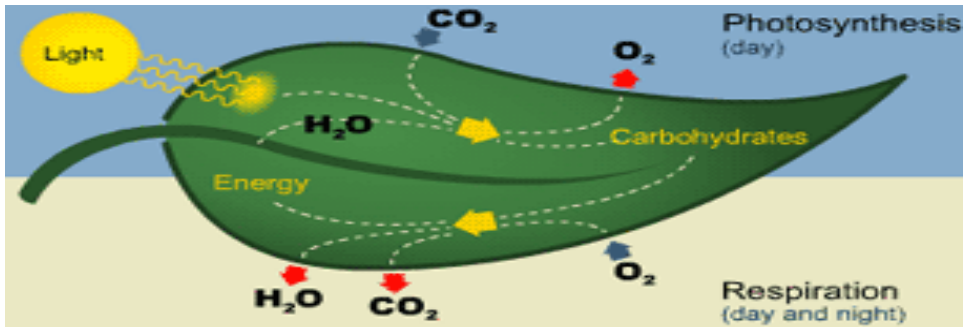
Guard cells-Cells that open and close the stomata to allow or prevent water loss from leaves.

Photosynthesis- Process plants use to make sugar (or their own food) through specialized cells called Chloroplasts





Respiration- Process in which organisms <u>obtain energy</u> from the food it produces (plants) or consumes (animals). Sugar and Oxygen change into water and Carbon Dioxide.



Fertilization- Plant process in which an embryo is formed by a

Pollination- The transfer of pollen from the anther of a stamen to the stigma

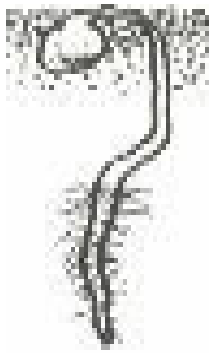
sperm cell from a pollen grain joining with an ovule.

pollen + ovule= embryo
(the sperm) (the egg) (the baby)

portion of the pistil.

Germination – Plant process where environmental conditions (temperature, light, water) are right and a seed begins to grow.

Root hairs -Tiny extensions of plant roots that increase the surface area of the roots to allow more water & nutrients to be absorbed



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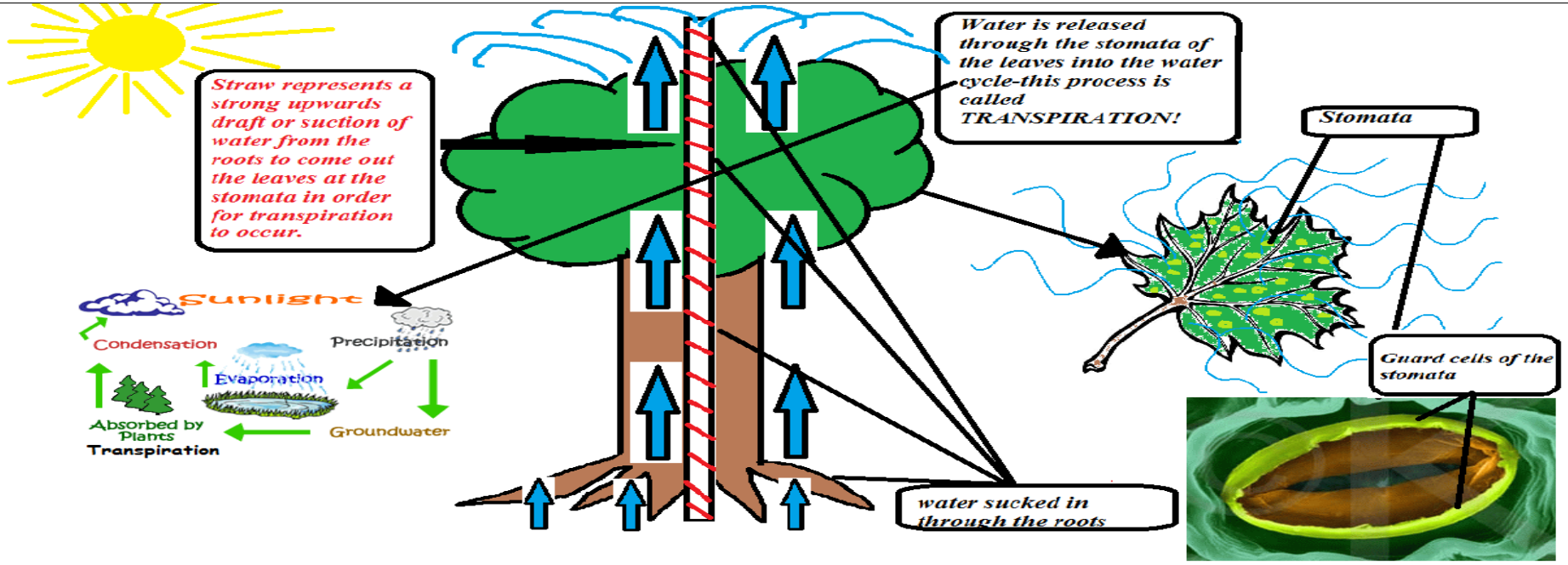
Transpiration- Water loss/movement (evaporation) through the Stomata of the leaves that allows water to travel up the plant against the pull of gravity.



Xylem (up elevator, xylem up)- Vascular tissue that transports water and minerals from the roots up to the rest of the plant. ⇧	**Phloem (down elevator, phloem down)-**Vascular tissue that transports food from the leaves down to the rest of the plant. ⇩

Plant Study Guide for Week 4

Plant Part	Vascular	Non-Vascular
Root	Roots anchor plant and absorb nutrients	No true roots or stems
Stem	Supports plant and transports water and nutrients	Water seeps in from cell to cell
Leaf	Place where photosynthesis, transpiration, respiration take place	No true leaves
Reproduction	Confiers-cones which are naked seeds Flowers/fruit-which contain hidden seeds	Spore formation

Vascular-largest group

Well-developed system for transporting water and food; they have true roots, stems, and leaves.

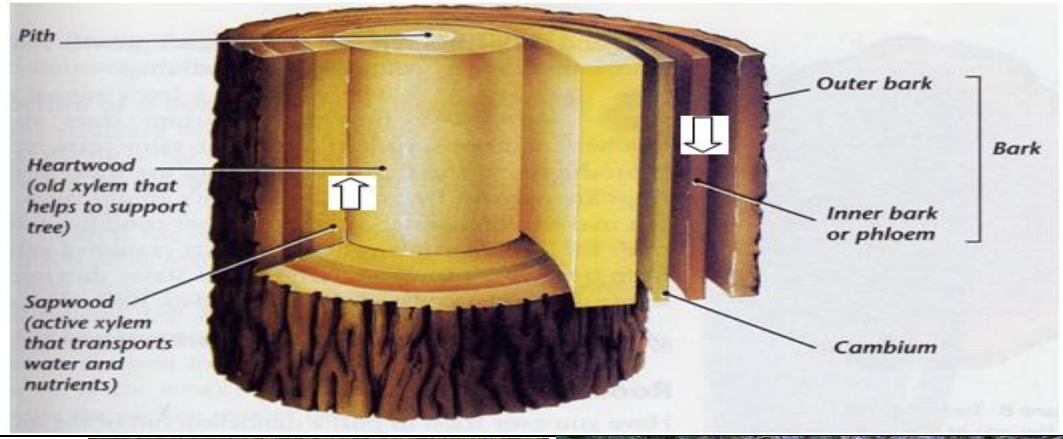
help circulate water and food throughout the plant.

Xylem **transport water and minerals from the roots up to the rest of the plant. (up elevator, xylem up)** ⇧

Phloem **transport food from the leaves down to the rest of the plant. (down elevator, phloem down)** ⇩

Examples:

woody **stems- trees & bushes** ***herbaceous*** **stems- grasses**



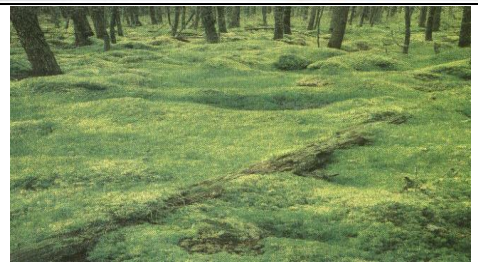
Non-Vascular-smallest group

Plants do not have a well-developed system for transporting water and food; do not have true roots, stems, or leaves.

They must obtain nutrients directly from the environment and distribute it from cell to cell throughout the plant. This usually results in these plants being very small in size.

Examples: mosses, liverworts, and hornworts.

Mosses



Liverworts

Hornworts

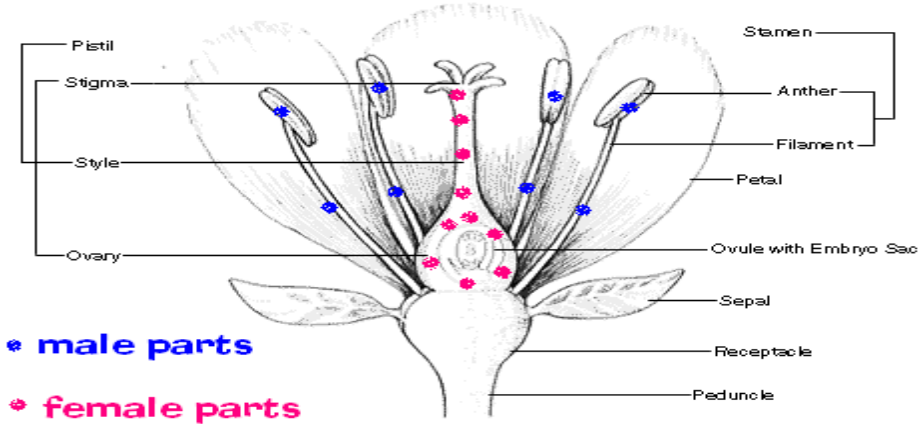
Structures for Reproduction

Seed Producing

There are two major groups of seed-producing plants:

Flowering Plants

- **Flowering plants differ from conifers because they grow their seeds inside an ovary, which is embedded in a flower.**
- **The flower then becomes a fruit containing the seeds.**
- **Examples include most trees, shrubs, vines, flowers, fruits, vegetables, and legumes.**



Functions of the Flower Parts

ovary- contains eggs
ovule- fancy name for egg
stigma- catches pollen
anther- produces pollen
style-supports the stigma
petals (corolla)-attracts insects and animals
sepal-protects the flower
stamen- the male part of the flower
pistil-the female part of the flower
filament-supports the anther

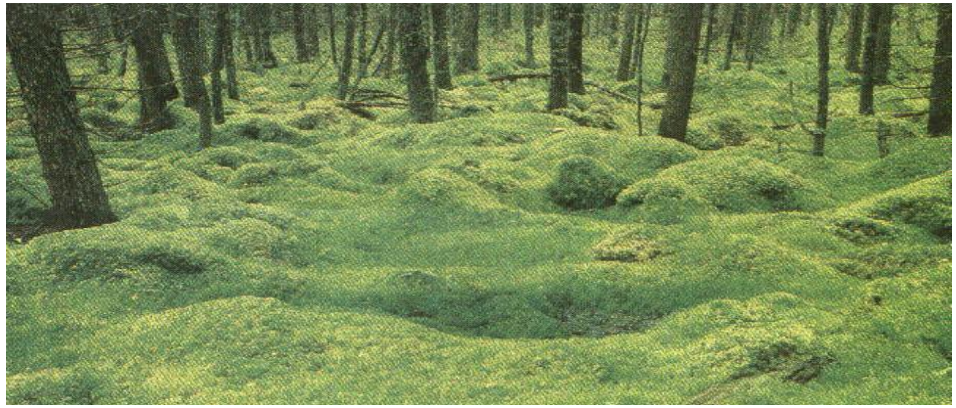
***Look closely below at each picture as you watch the apple blossom flower become a fruit after the sperm/egg unite in fertilization.**

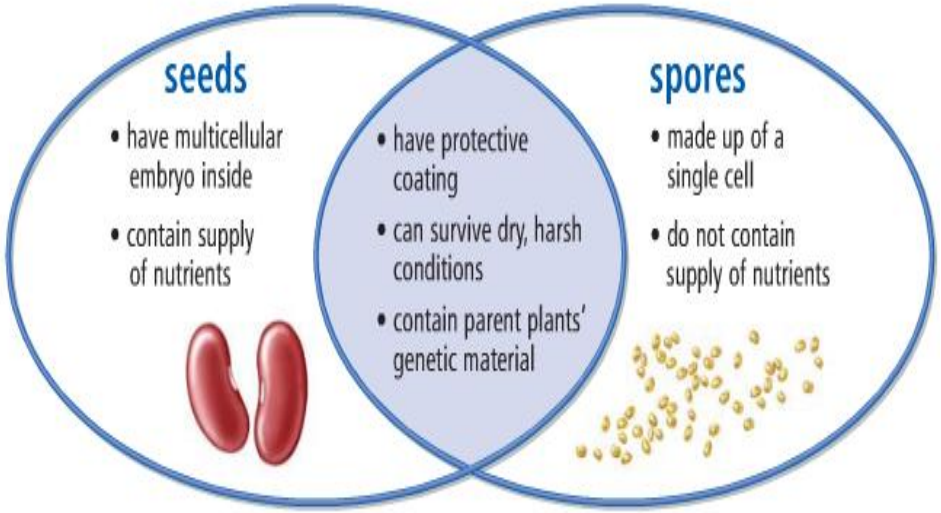
Spore Producing

- **Spores are much smaller than seeds.**
- **Almost all flowerless plants produce spores.**
- **Examples- mosses and ferns**

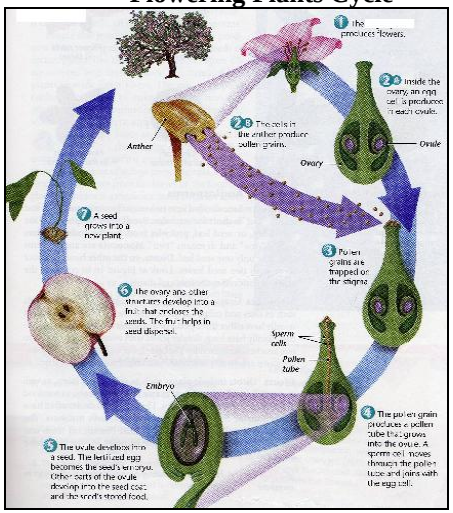
Ferns

Mosses

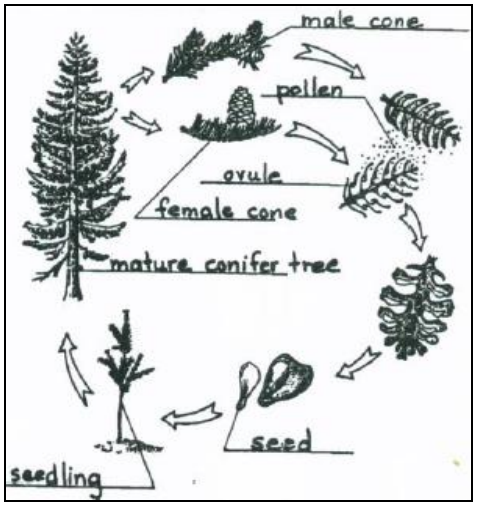




Flowering Plants Cycle



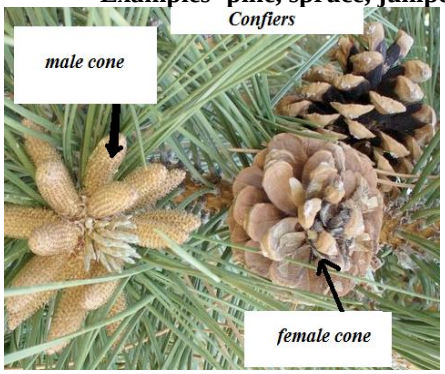
Confier/Cone Plant Cycle



Spores on the underside of a fern.

Conifers

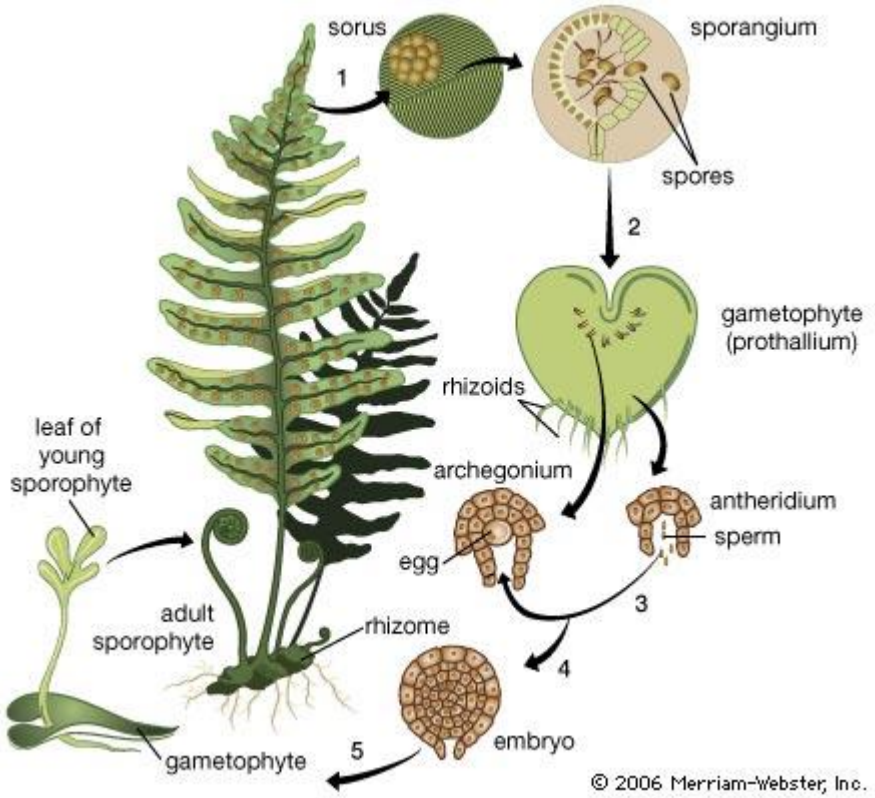
- **Most cone-bearing plants are evergreen with needle-like leaves.**
- **Conifers never have flowers but produce seeds in cones.**
- **Examples- pine, spruce, juniper, redwood, and cedar trees.**



Redwood

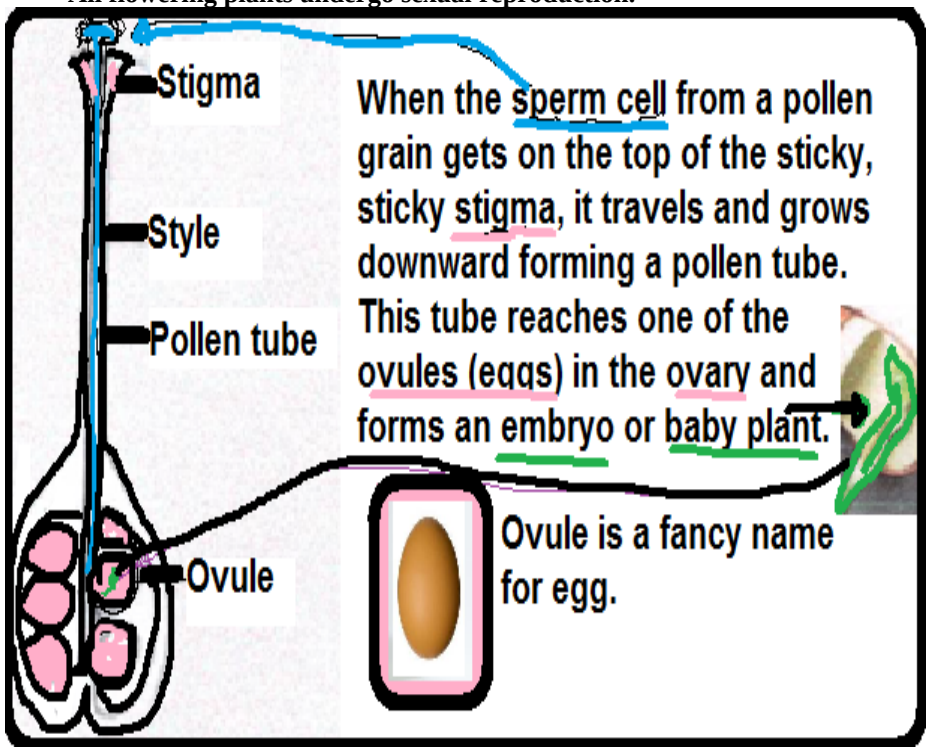
Juniper

Spruce



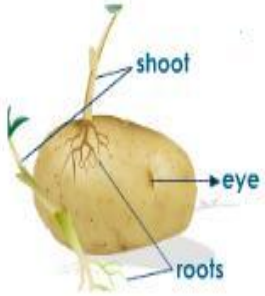
Sexual Reproduction

- **A process of reproduction that requires a sperm cell (in <u>pollen</u>) and an egg cell (in the <u>ovule</u>) to combine to produce a new organism.**
- **All flowering plants undergo sexual reproduction.**



Asexual Reproduction

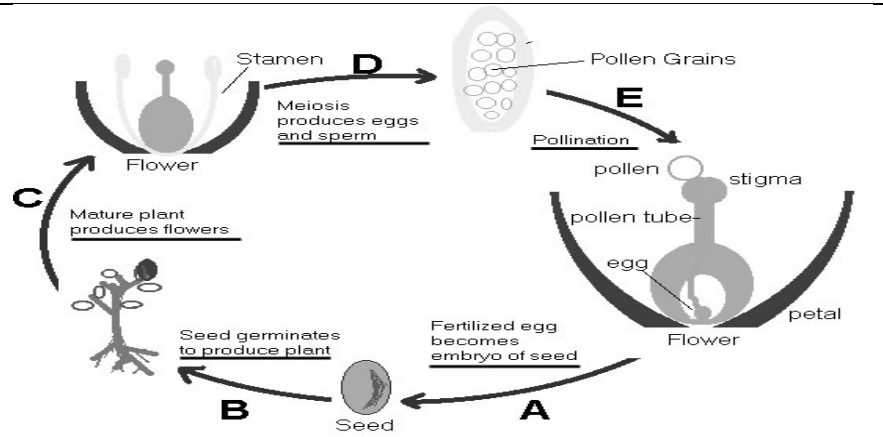
- **A process of reproduction that involves only one parent plant or plant part and produces offspring identical to the parent plant.**
- **Many plants can grow new plants asexually from their plant parts.**
- **If a plant is cut or damaged, it can sprout new growth from the stems, roots, or leaves.**



<u>TUBERS, BULBS</u>

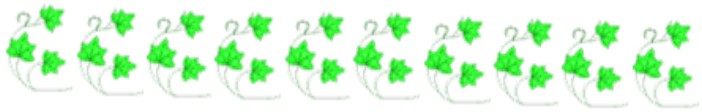
- **underground stems**
- **The "eyes" or buds of tubers, for example potatoes, grow into roots and shoots to produce a new plant.**
- **Bulbs, for example onions, are big buds made of a stem and special types of leaves.**

<u>RUNNERS</u>



Plant Reproduction Flow Chart

- **Stems that run along the ground.**
- **New strawberries or some ivy grow from the tips of runners.**
- **Many lawn grasses grow from runners.**



STEM CUTTINGS

- **When a piece of cut stem is planted, roots may form from the cutting, and then a full plant develops.**
- **Examples: Sugar cane and pineapple ROOTS**
- **Some fruit trees and bushes send up "suckers" or new shoots from the roots.**
- **Some roots that can produce new plants from root pieces, such as a sweet potato.**

Plant Study Guide for Week 5

Four Characteristics of All Living Things; Plant Structures for Defense; Plant Tropisms; Mold/Fungi

Four Characteristics of All Living Things

1. **OBTAIN & USE RESOURCES FOR ENERGY**
   - **need food, oxygen, and water, which provide required energy to perform the basic processes of life, such as growing and developing, or repairing injured parts.**
   - ***Autotrophs*** **(ex: plants) provide their own food for energy through the process of** ***photosynthesis***
   - ***Heterotrophs*** **(ex: animals-US) must find an external source for food.**
   - **Energy is released from food in most organisms through the process of** ***respiration*****.**
2. **RESPONSE TO STIMULI**
   - **A** ***stimulus*** **is any change in an organism's surroundings that will cause the organism to react.**
   - **Examples- changes in: light, temperature, sound, amount of water, space, amounts or types of food, or other organisms present.**
   - **The reaction to the stimulus is called a** ***response*****. It can be an action or behavior performed by the organism.**
3. **ABILITY TO REPRODUCE**
   - **Organisms have the ability to produce offspring that have similar characteristics as the parents. There are two basic types of reproduction:**
   - ***Asexual reproduction*****: involves only one parent and produces offspring that is identical to the parent.**
   - ***Sexual reproduction*****: involves two parents. The egg (female reproductive cell) and sperm (male reproductive cell) from these two parents combine to make an offspring that is different from both parents.**
4. **GROWTH & DEVELOPMENT**
   - ***Growth*** **is the process whereby the organism becomes larger.**
   - ***Development*** **is the process that occurs in the life of the organism that results in the organism becoming more complex structurally.**
   - **Organisms require energy to grow and develop.**

Plant Structures for Defense

- **thorns that can defend the plant from being eaten by some animals**
- **fruits and leaves with poisons so that they are not eaten by animals**
- **the ability to close its leaves when touched (*Thigmotropism*)**





Fungi **Singular: Fungus** **Plural: Fungi pronounced[fuhn-jahy, fuhng-gahy]**

- **Kingdom of organisms that <u>do not make their own food</u>.**
- **<u>Must grow in or on other organisms</u>, such as plants. *<u>It affects the stems, leaves and or fruits of the plants.</u>***
- **Example- grain mold, corn smut, and wheat rust, cause diseases in those plants that result in crop losses (see pictures).**
- **Diseases caused by fungi may also affect other important crops, such as rice, cotton, rye, and soybeans (see pictures).**
- **If a fungus infects a tree, fruit, or grass, it can eventually kill the plant.**

Fungi that break down dead plants and animals are: Decomposers

Food or drink items in the Fungi Kingdom: Soy Sauce, Blue Cheese, Mushrooms, Beer, Wine, Bread Yeast

Who discovered the first antibiotic and what was it? Alexander Fleming = Penicillin (a very helpful fungi to humans).


Corn Smut


Pre-harvest grain mold


Shelf Brackets


Tomato fungus

Mold

Wheat Rust

White truffles from Alba, Italy, sell at for $4,000 a pound/$50 each.

Death Caps-NO, DO NOT EAT THESE!

Honey Mushrooms-YES YOU CAN EAT THESE!

- **most mushroom poisonings in the world**
- **looks a lot like other mushrooms which people eat**
- **cap up to six inches wide, and a stalk up to five inches tall**
- **seen from September to November underneath pines, oaks, dogwoods, and other trees**

Plant Responses to Environment (Tropisms)

- ***Dormancy-*** **time when the growth or activity of a plant or seed stops due to changes in temperature or amount of water.**
- **allows various species to survive in environments**
- **ensures that seeds will germinate when conditions are favorable for survival of the small seedlings.**
- **For example, leaves fall from trees prior to the conditions of winter and the leaf buds do not open again until conditions are favorable in the spring.**

***Tropism*- growing or moving their stems, roots, or leaves toward or away from the stimulus.**

Phototropism- **plant grows or moves in response to light**

Gravitropism- **plant grows or moves in response to gravity; also called *geotropism.*** ***Video Clip of Negative Geotropism***

Hydrotropism- **plant grows or moves in response to water.**

Thigmotropism- **plant grows or moves in response to touch (see pictures below).**

Question: How does a Venus Flytrap respond when an insect is detected on it? Answer: It closes up (Thigmotropism)!

Question: How does a Jewelweed pod respond when touched? Answer: It springs open and releases its seeds to be spread in the win (Thigmotropism)!

A closer look at Jewelweed Pods

* A salve can be made from it to cure poison ivy!

Before the pods pop.

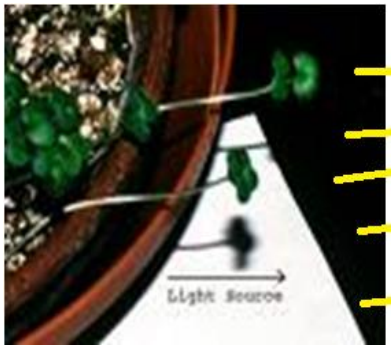
After the pods pop.

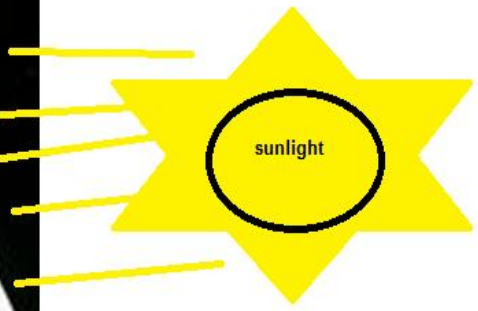
Tropisms

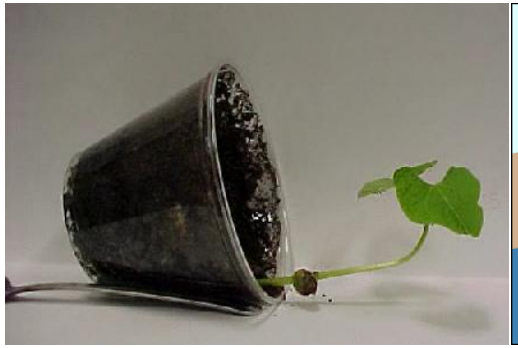
Tropisms occur when plants respond to external stimuli. Tropisms are movements caused by a change in a plant's growth pattern. Tropisms can be negative or positive. If the plant moves toward the stimulus, the tropism is defined as positive. If the plant moves away from the stimulus, the tropism is considered negative.

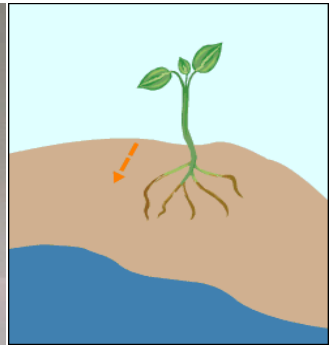
Geotropism	Hydrotropism	Thigmotropism	Phototropism
Gravity causes a response in a plants growth.	The way a plant grows or bends in response to water.	Plants bend or grow because of touch. An example would be when vines wrap around an arbor frame.	The way a plant grows or bends in response to light.
			
In the above image, what part of the plant exhibits positive tropism, and which part (s) of the plant exhibits negative tropism?	Why would it be important for some parts of a plant to be pulled toward water?	What are some other ways a plant can be "touched"?	Why do you think sunflowers were given their name?

Which Tropism do you see? (Answers: thigmotropism, phototropism, geotropism, hydrotropism)









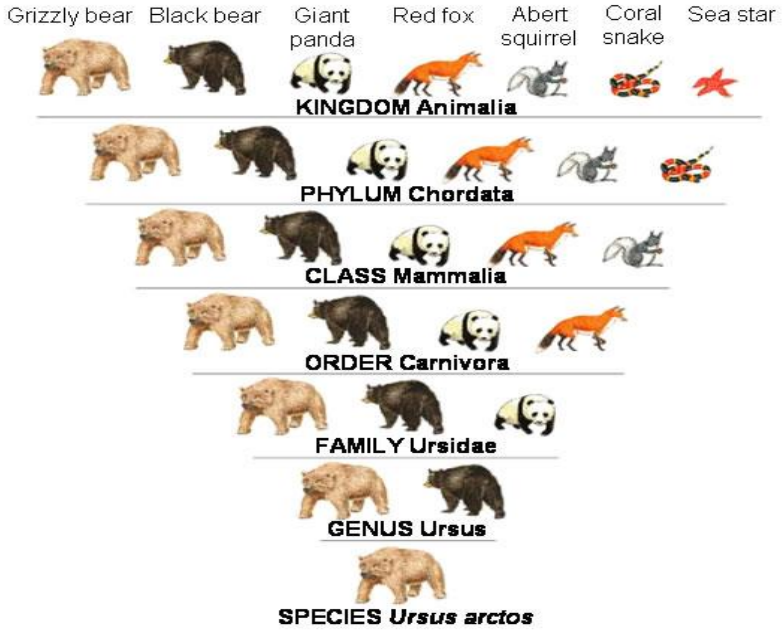
Plant Study Guide for Week 6

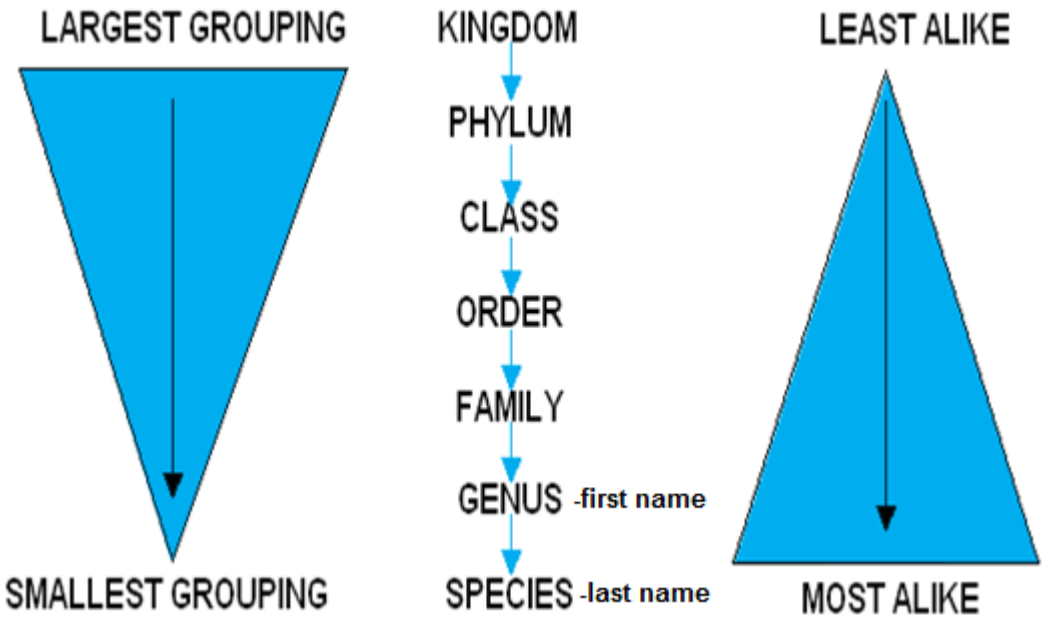
Classification/5 Kingdoms

Classification of Organisms

The study of classifying organisms is known as *taxonomy*.

- **An organism is placed into a broad group and is then placed into more specific groups based on its structures.**
- **The levels of classification, from broadest to most specific, include: kingdom, phylum, class, order, family, genus, and species.**
- **The more classification levels an organisms share, the more characteristics they have in common.**





KINGDOM

- **While scientists currently disagree as to how many kingdoms there are, most support five. (Plants, Animals, Fungi, Protists, Monerans)**
- **Organisms are placed into kingdoms based on their ability to make food and the number of cells in their body.**

Taxonomists- scientists who group organisms.

PHYLUM (pl. PHYLA)

In the Plant Kingdom, phyla are sometimes referred to as *divisions*.
Plants are normally divided into two groups: vascular and nonvascular.
In the Animal Kingdom, there are 35 different phyla. These phyla can be divided into two groups: vertebrates and invertebrates.

CLASS, ORDER, FAMILY

levels more specific, include fewer organisms

GENUS (pl. GENERA)

Contains closely related organisms.

The genus is used as the first word in an organism's scientific name.

SPECIES

All the organisms of the same type which are able to breed and produce young of the same kind.

The species is used as the second word in an organism's scientific name.

SCIENTIFIC NAME

The scientific name of an organism is made up of its genus and species.

It is written in italics (*Genus species*) with the genus capitalized.

For example, *Canis lupus* is the scientific name for the wolf and *Pinus taeda* is the scientific name for a loblolly pine.-example: *felix catus*

King Phillip Came Over For Great Spaghetti...

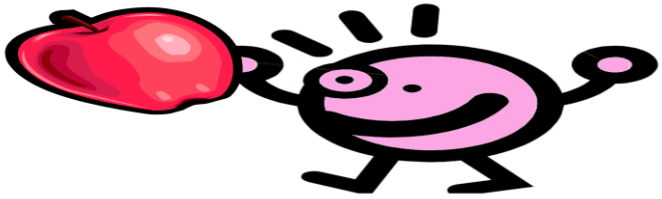
KINGDOM
PHYLUM
CLASS
ORDER
FAMILY
GENUS
SPECIES

Scientific Classification of a Pea

Kingdom	*Plantae*
Phylum	*Magnoliophyta*
Class	*Magnoliopsida*
Order	*Fabales*
Family	*Fabaceae*
Genus	*Pisum*
Species	*Sativum*

The Five (5) Kingdoms

My Pink Friend Prefers Apples



Monera

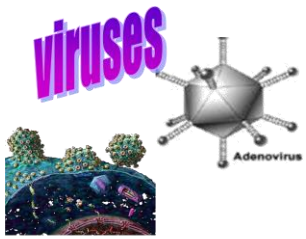
Animalia

Protista

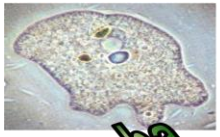
Fungi

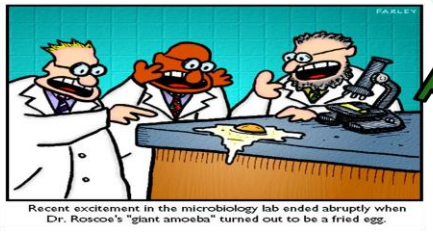
Plantae

MONERA- made up of the smallest and most primitive forms of life.



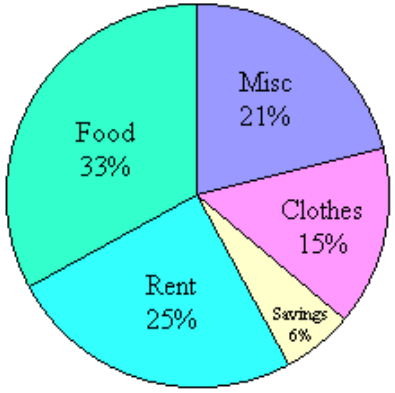
PROTISTA- made of organisms having nuclei and cell parts





Shapes you have to know

Round is the shape of a circle or a ball.



Oblong-is the shape of an egg, sunflower seed, and some leaves.