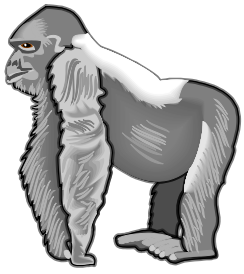
As was mentioned before...

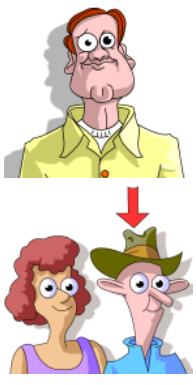
In the 1700's a Swedish botanist, Carolus Linneaus, set up a system to organize all living things. Linneaus' system of classification is the basis for the one that is still used by scientists today.

Originally all living things on earth were grouped into two main categories, plants and animals. As more organisms were identified and advancing technology allowed for the study of more characteristics of organisms, scientists realized that there were living things on earth that did not fit the set of criteria outlined for the animal kingdom or the plant kingdom.

Three additional kingdoms with sets of criteria were eventually developed. Kingdoms Monera, Protista, Fungi, Plantae and Animalia make up a five kingdom system of classification that is widely recognized and used. However, once again as new organisms are identified and as advancing technology allows for the study of more characteristics of previously classified organisms some scientists are starting to further divide some of the kingdoms into newer kingdoms with their own sets of criteria.

A ***phylogenetic tree*** is a diagram the shows the relationships, from an evolutionary perspective, between the kingdoms of classification. Most biology textbooks contain a diagram of a phylogenetic tree.





1. Determine whether each of the following statements about Carolus Linnaeus are true or false. If the statement is false change it to make it true.
    a) He was a Swedish zoologist.
    b) He grouped plants and animals based on their structural likeness.
    c) He insisted on using the common name for organisms.
    d) Many of the names he gave organisms are still used today.
    e) He gave each organisms a unique name in English.
    f) His system consisted of a genus and a species name for an organism.
    g) In his system genus names can be used for more than one group.
2. List the seven levels of classification from the smallest grouping to the largest.
3. To what kingdom do you belong?
    What is your phylum?
    To what class do you belong?
    What is your order?
    To what family do you belong?
    What is your genus?
    To what species do you belong?
4. What is your scientific name?
5. What is the scientific name for a grizzly bear?
6. How does the number of characteristics shared by all members of a classification level change as you progress from species to kingdom?
7. How does the number of organisms at each level of classification change as you progress from species to kingdom?
8. Why is Latin used for naming organisms?
9. Taxonomy is largely based on structural similarity. However, modern technology has allowed taxonomists to use additional traits to classify organisms. Can you name any of these additional traits?

Binomial Nomenclature:

Remember...Binomial nomenclature is a system of scientific naming where all organisms are assigned a two-part name. The scientific name for each organism that has been classified consists of the **genus** and **species** names for the organism. (genus and species are the last two levels of classification.)

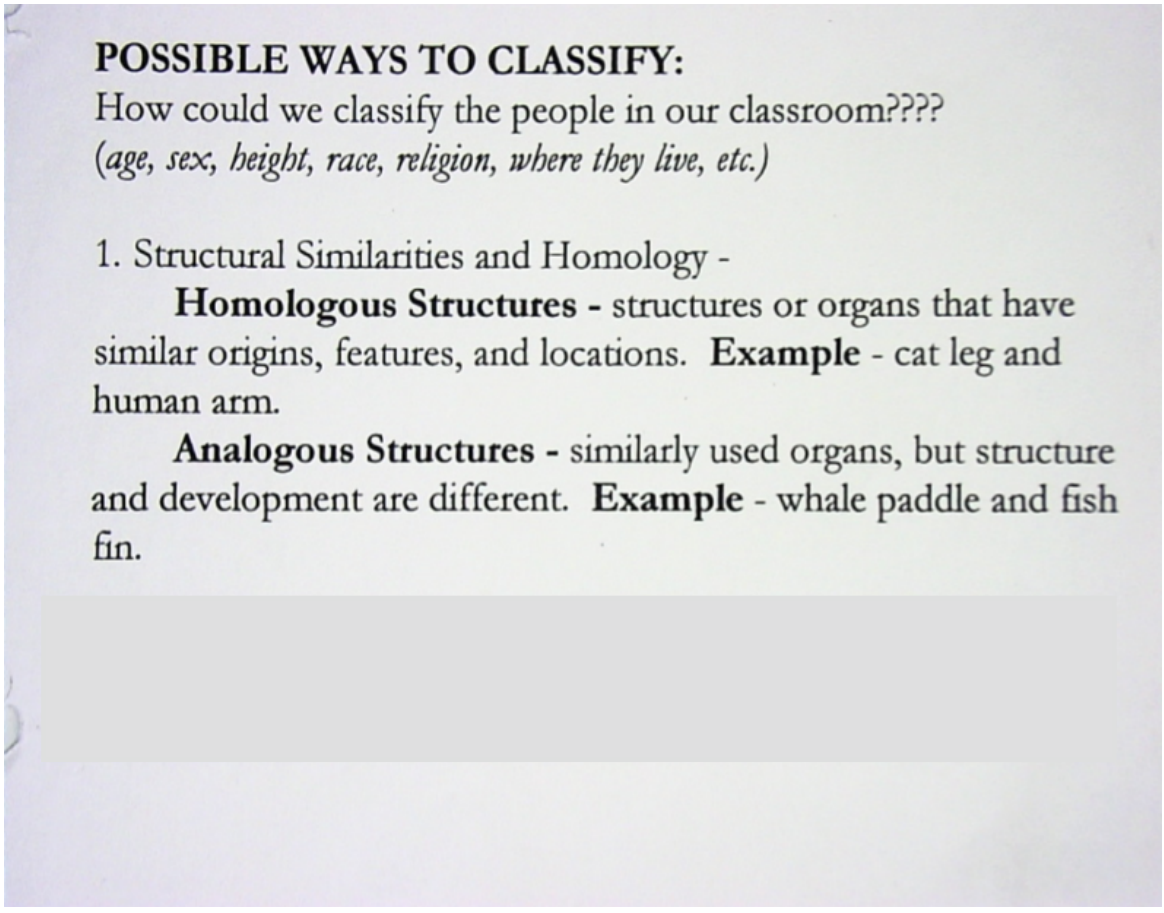
For example, the scientific name for humans is *Homo sapiens*.
The scientific name for Polar bears is *Ursus maritimus.*

The scientific name for Brown bears is *Ursus arctos.*

The next example provides the scientific name for two different species of oak trees. The trees both belong to the same genus but have their own species name.
White Oak - *Quercus alba*
Red Oak - *Quercus rubra*

Two rules that apply to this system of naming are that the genus name can never be used for any other group and the species name cannot be used for any other species within the same genus. Recall that species are groups of organisms that share many characteristics and that can interbreed to produce fertile offspring.

All scientific names must appear in the same format as in the examples outlined above. The genus name should begin with an upper case letter, and the species name should begin with a lower case letter. The entire name should be *italicized* (or <u>underlined</u>).



POSSIBLE WAYS TO CLASSIFY:

How could we classify the people in our classroom????
(*age, sex, height, race, religion, where they live, etc.)*

1. Structural Similarities and Homology -

Homologous Structures - structures or organs that have similar origins, features, and locations. **Example** - cat leg and human arm.

Analogous Structures - similarly used organs, but structure and development are different. **Example** - whale paddle and fish fin.

2. Embryology - more closely related organisms have their embryos develop in similar fashion later in the development stages. **Example** - a fish and human look very similar at the beginning of development but not at the end (HOPEFULLY!!!)

3. Biochemical Similarities - plants and animals produce and are composed of chemical compounds. **Example** - a rabbit is more closely related to a deer than to a gopher because of biochemical compounds.
4. Chromosome or Genetic Similarity - the structure of chromosomes and the numbers of genes differ between organisms. There needs to be the same kind and number of chromosomes between organisms to produce fertile offspring (recall the definition of species).
5. Behavioral Patterns - differences in behavior often keep species apart. **Example** - wolves and dogs.

The Five Kingdoms:

As previously explained, organisms are divided into kingdoms on the basis of certain characteristics that they display. The information provided below outlines the name of the each five main kingdoms, a few of the main characteristics of each kingdom, as well as a few examples of the types of organisms that belong to each kingdom.

It is essential that you understand each of the four terms listed below. Record the definitions for these terms, as they are used frequently throughout the study of biology.

- Prokaryotic
- Eukaryotic
- Autotrophic
- Heterotrophic

KINGDOM:	CHARACTERISTICS:	EXAMPLES:
Monera	single-celled; prokaryotic	bacteria; blue-green algae
Protista	single-celled; eukaryotic	ameoba; paramecium; euglena
Plantae	multicellular; eukaryotic	moss; ferns; pines; flowering plants
Animalia	multicellular; ~~autotrophic~~	hydra; sponges; worms; insects; frogs; reptiles; birds; mammals
Fungi	multicellular; heterotrophic	mushrooms; bread mold

But wait! Life ain't that simple! Look HERE!

Prokaryotic

Eukaryotic