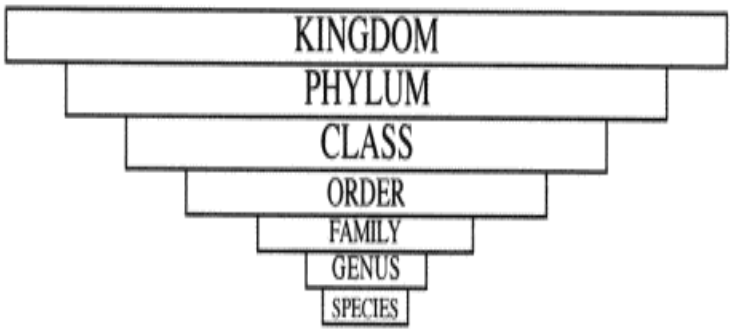
# "Taxonomy Reading"

As you have discovered, living things are put into groups according to their characteristics. This is called ***classification***. The characteristics that are used to classify living things determine the groups they are put into. The characteristics that are chosen to form these groups make up a ***classification system.***

About 1/2 million different kinds of living things have been discovered so far. Each year more organisms are added to this list. Scientists use a classification system to keep track of the different types of living things. The science of classifying living things is called ***taxonomy***. Scientists who classify living things are called ***taxonomists***. Classification allows scientists to organize information about living things and to help identify newly discovered organisms.

The classification system that scientists use today was created in the 1700's by a scientist named Linnaeus. Linnaeus was the first taxonomist. His system has been changed and refined through the years by other taxonomists. This system begins by dividing all living things into large groups called ***kingdoms.*** Each kingdom is then divided into smaller and smaller groups (or levels) moving from the kingdom group to each of the next levels. The organisms in each group share more and more characteristics in common as they are classified into each level in the classification system. From largest to smallest, the classification groups are: ***kingdom - phylum - class - order - family - genus - species***. A species is the smallest classification group. All of the organisms in a species share the same physical characteristics **and** can reproduce among themselves, creating fertile offspring.




Linneaus used the descriptions of organisms that he recorded to place organisms in groups based on their observable features. He also used his observations to devise a naming system for organisms. In Linnaeus' system, called ***binomial nomenclature***, each organism is given a two-part name.

The first part of an organism's scientific name is its genus. For example, pumas, ocelots, and house cats are all classified in the genus *Felis*. Organisms classified in the genus *Felis* share characteristics such as sharp, retractable claws and behaviors such as hunting other animals.

The second part of an organism's scientific name is its species name. A species name sets one species in a genus apart from another. The species name often describes a particular characteristic or feature of an organism such as where it lives or its color.

For example, the scientific name for many pumas is *Felis concolor*. *Concolor* means "the same color" in Latin. The scientific name for some ocelots is *Felis pardalis*. The word pardalis means "spotted like a panther" in Latin. The scientific name for house cats is *Felis domesticus*. Notice that both the genus and species names are Latin words. Linnaeus used Latin words in his naming because Latin was

the language that scientists communicated in during that time. Notice also that the complete scientific name is written in italics. They are sometimes underlined. They are always either italicized or underlined. The genus is always capitalized, while the species begins with a lower case letter. Below you will find the classification for some common organisms.

| | HUMAN | HOUSE CAT | THREE-SPINE STICKLEBACK | WESTERN SUNFLOWER |
|---|---|---|---|---|
| ***Kingdom*** | Animalia | Animalia | Animalia | Plantae |
| ***Phylum*** | Chordata | Chordata | Chordata | Tracheophyta |
| ***Class*** | Mammalia | Mammalia | Osteichthyes | Angiospermae |
| ***Order*** | Primata | Carnivora | Gasterostefomes | Asterales |
| ***Family*** | Homonidae | Felidae | Gasterosteidae | Compositae |
| ***Genus*** | Homo | Felis | Gasterosteus | Helianthus |
| ***Species*** | sapiens | domesticus | aculeatus | Annuus |

When Linnaeus developed his system of classification, there were two kingdoms: plant and animal. But the use of the microscope led to the discovery of new organisms and the identification of differences among cells. A two-kingdom system was no longer useful. ***Currently, most scientists use a system of classification includes six kingdoms: archaebacteria, eubacteria, protists, fungi, plants, and animals.***

**Archaebacteria:** *(ahr kee bak TEER e uh)* – Archaebacteria, which means "ancient bacteria", are unicellular organisms. Unicellular means being comprised of only one cell. Archaebacteria can be either ***autotrophic*** (capable of making their own food) or ***heterotrophic*** (not capable of making their own food). Archaebacteria are ***prokaryotes*** (prō-kăr'ē-ōts')**,** which are organisms whose cells lack a nucleus. Until recently, archaebacteria were classified in the kingdom monera.

Many archaebacteria live in extreme conditions. They can be found in places like hot springs in water temperatures as hot as 110◦C. Others can be found in environments that are as acidic as lemon juice. Some archaebacteria can be found in salty waters such as Utah's Great Salt Lake. Archaebacteria can also live in the intestines of animals, the mud at the bottom of swamps, and in sewage. It is the bacteria that produce the foul odors that you may associate with these places.

**Eubacteria:** *(yoo bak TEER ee uh)* – Eubacteria, until recently, was also part of the kingdom monera. However, too many differences were found between the archaebacteria and the eubacteria so they were each given their own kingdom. Eubacteria, like archaebacteria, are unicellular prokaryotes. And like archaebacteria, some are autotrophs and some are heterotrophs. The chemical make-up of eubacteria is different from archaebacteria, thus classifying them into their own kingdom.

Unlike archaebacteria, eubacteria do not live in extreme environments. However, they do live everywhere else. For example, millions of eubacteria live on and in your body. Eubacteria coat your skin and swarm in your nose. Most of them are either useful or harmless to you. Eubacteria are responsible for yogurt, as well as strep throat. Most eubacteria, however, are helpful. Some produce foods like yogurt, some produce vitamins, and some recycle essential chemicals such as nitrogen.

**Protista** (*pro-TEE-stuh*) – The protist kingdom is sometimes called the "odds and ends" kingdom because its members are so different from one another. For example, some protists are autotrophs, while others are heterotrophs. Also, though most protists are unicellular, some such as the organisms that are commonly called seaweeds are multicellular. Unlike bacteria however, protists are ***eukaryotes*** (yū-kăr'ē-ōts), organisms with cells that contain nuclei. In addition to being eukaryotes, all protists live in moist surroundings.

Because of the great variety of protists, they are generally grouped into three categories: animal-like protists, funguslike protists, and plantlike protists.

**Fungi (***FUN ji)* – Most fungi share three important characteristics: they are eukaryotes, use spores to reproduce, and are heterotrophs that feed in a similar way. Except for yeasts, which are unicellular, fungi cells are arranged in structures called hyphae. ***Hyphae*** are the branching, threadlike tubes that make up the bodies of multicellular fungi. The appearance of a fungi depends on the arrangement of it hyphae. Fungi include the common bread mold, mushrooms, yeast, and even *Penicillium notatum* which produces the penicillin antibiotic.

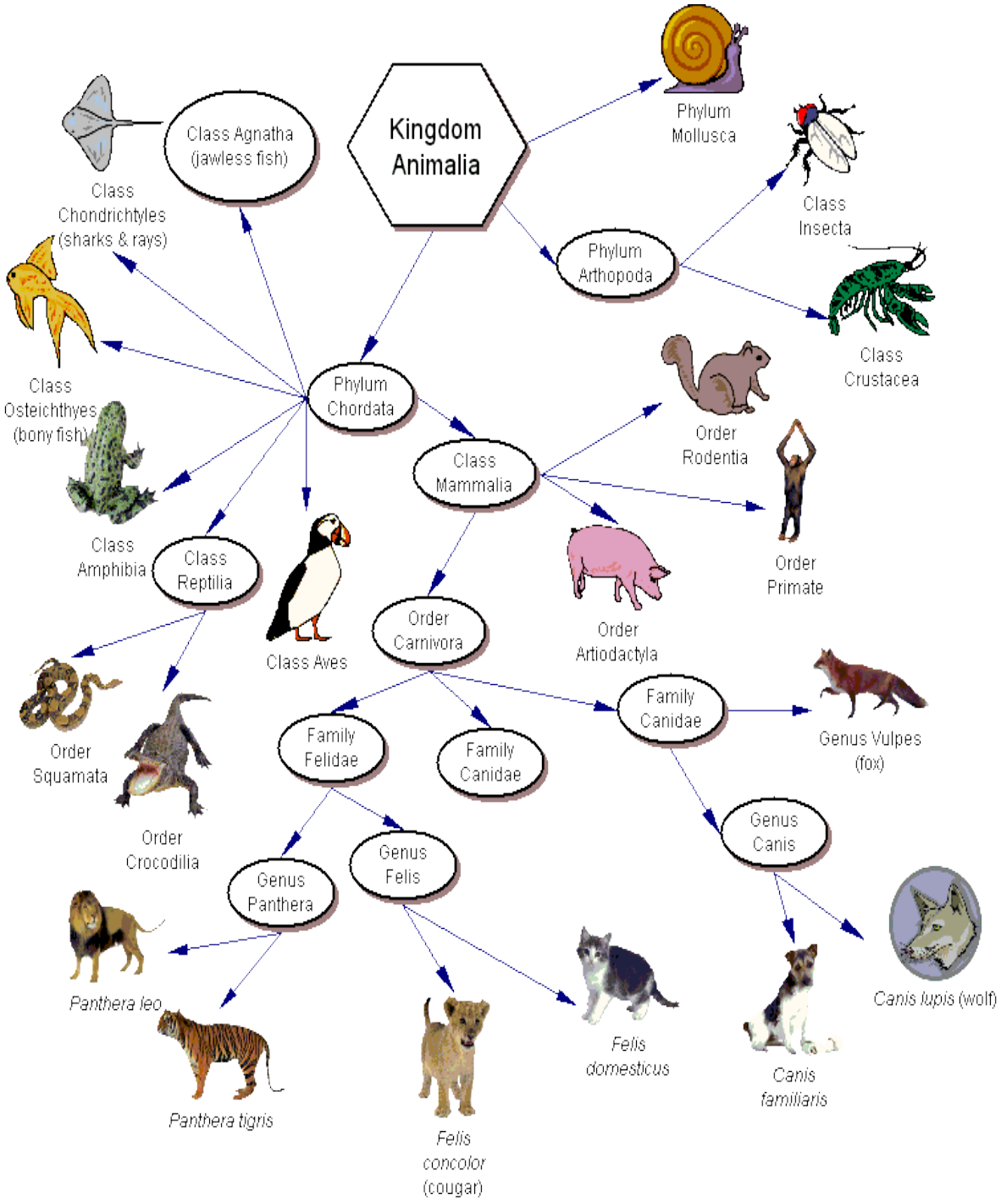
**Plantae** (PLAN-tay) - Plants are autotrophs that produce their own food. In addition, all plants are eukaryotes that contain many cells. Unlike other eukaryotes, however, plant cells have a cell wall. The cell wall is a boundary that surrounds the cell membrane and separates it from the environment. Plants are multicellular, with the same type of cells grouped into tissues.

**Animalia** (an-uh-MALE-ee-uh) - Animals are multicelled organisms. The cells of most animals are grouped together to form different kinds of tissue. Tissue may then combine to form an organ, which is a group of different tissues that work together to perform a specific job that is more complex than the function of each tissue by itself. Many organs then combine to form an organ system, such as the skeletal system. Most animals have highly developed brains and body systems. All animals are heterotrophs, and typically reproduce sexually. All animals require food, water, and oxygen to stay alive.

All living things can be classified into one of those six kingdoms. Modern biologists classify organisms into the seven levels of the classification system starting with kingdom, the broadest. Scientists use taxonomic keys to identify organisms. A taxonomic key is a series of paired statements that describe the physical characteristics of different organisms.

You can probably tell that taxonomy can be very complicated. It is not easy to classify every living thing. However, it is very helpful and important to scientists who study the living world. Classification helps scientists learn all there is to know about plants and animals. It helps us understand the world around us and allows us to discover and identify new organisms.

The graphic below shows some of the animals in the Animalia kingdom and how several of the animals are related.




**References:**


Concepts and Challenges in Life Science. New Jersey: Globe Book Company, Third Edition, 1991.

Prentice Hall Life Science. New Jersey: Prentice-Hall Inc., First Edition, 1988.

Prentice Hall Science Explorer *From Bacteria to Plants.* New Jersey: Prentice Hall Inc., 2000.


Name _____ Period _____

***Directions: Answer the questions about the "Taxonomy Reading" in complete sentences.***

1. What is classification?

_____

_____

2. What is taxonomy?

_____

_____

3. Why is classification important?

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_____

4. What are the seven classification levels in Linnaeus' system?

_____

_____

5. Which classification level contains the most organisms?

_____

_____

6. Which organisms would share more characteristics in common, those in the same class or the same family?

_____

_____

8. Which classification group contains organisms that share the same characteristics and can reproduce among themselves?

_____

_____

9. In Linnaeus' system, how are organisms named?

_____

_____

10. Name the six kingdoms of living things.

_____

_____

11. Which two kingdoms used to comprise the kingdom monera?

_____

_____

12. Name two common characteristics of all archaebacteria.

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_____

13. How would you explain the difference between an autotroph and a heterotroph?

_____

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14. Name two ways that eubacteria can be helpful to humans?

_____

_____

15. Why is the protist kingdom sometimes called the “odds and ends” kingdom?

_____

_____

16. What are the three groups protists are generally put into?

_____

_____

17. What are the three characteristics that all fungi share in common?

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18. What are two characteristics of all animals?

_____

_____

19. What tool do scientists use to classify animals?

_____

_____

20. How would you write the scientific name of a human being?

_____

_____

***Use the graphic to answer the remaining questions.***
Answer true or false to the following statements:

21. _____ Dogs belong to the order Felidae.
22. _____ A fox belongs to the phylum Arthropoda.
23. _____ Snakes belong to the phylum Reptilia.
24. _____ Lions belong to the class mammalia
25. _____ All arthropods belong to the Class Insecta
26. _____ All rodents belong to the phylum chordata.
27. _____ All amphibians belong to the class reptilia.
28. _____ All primates are mammals.
29. _____ The class mammalia includes dogs, cats and rats.
30. _____ A lion belongs to the genus Felis.
31. _____ All mammals are primates.
32. _____ Insects and lobsters are arthropods.

***In each set below, circle the pair that is most closely related.***

33. snakes & crocodiles | snakes & frogs
34. rats & cats | cats & dogs
35. insects & lobsters | insects & birds
36. lions & tigers | lions & cougars
37. foxes & rats | foxes & dogs
38. cats & dogs | cats & lions
39. List all the animals pictured that belong in the Felidae family (use the scientific names).

40. List all the common names of the animals pictured that belong to the Carnivora order.