

Classification / Taxonomy

- In order to work with such a diversity of life it is useful to have a system of biological classification that **names** and orders organisms in a **logical** manner.

Classification is important because:

- It assigns a world wide accepted name to each organism
- It places organisms into groups that have biological meaning. (When we say “bird” or “fish” we have an idea of what type of organism we are discussing about.)

- The Swedish botanist **Carolus Linnaeus** developed a system of naming plants and animals that is still used today.
- This system is known as **binomial nomenclature**.

Binomial Nomenclature Rules

- Each organism has a **two-part** scientific name.
- The language **Latin** is still used to name organisms. The genus name is **capitalized**, but not the species name. Both the genus and species names are ***italicized*** or **underlined**.
- Example: *Homo sapiens* or Homo sapiens

- Linnaeus also grouped organisms together by similar body structure. These groups are called taxa or (singular: taxon).



Taxonomy

- **Taxonomy** is the science of naming organisms and assigning them to groups (taxa).

An example of the 8 Taxa

Domain	Eukarya
Kingdom	Animalia
Phylum	Chordata
Class	Mammalia
Order	Carnivora
Family	Felidae
Genus	Felis
Species	domesticus

- The taxon species is the only one that has a clear biological identity. Members of the same species can **breed** with one another and produce offspring that in turn mate and produce more offspring.

Mule / Liger

- Mules come from male donkey x female horse
- Ligers come from male lion x female tiger

- Scientists can classify organisms by similar structures in the adult organisms. Scientists try to group organisms that show their **evolutionary** relationships. Species that are closely **related** are classified together.

- Other species that look alike but possess **analogous** structures only are classified in different groups.
- **Analogous** means organisms that have similar looking structures but have different origins and internal structures.
- Examples: bird wings vs butterfly wings

- Today we can also examine biochemical similarities. This may involve examining the organism's **DNA** and /or the **amino acid** sequence.

The Five Kingdoms

- Linnaeus only created two kingdoms: Animalia and Plantae. However, your textbook describes five kingdoms in order to group all the diverse organisms.
- The five kingdoms are **Monera, Protista, Fungi, Plantae, and Animalia.**

Kingdom Monera

- They include all the prokaryotes, which means they lack nuclei, mitochondria, and chloroplasts.
- They are single-celled organisms and reproduce by binary fission.
- An example from this kingdom would be bacteria.
- ***Note: This kingdom has been reorganized and is not used anymore.

Kingdom Protista

- The organisms in this kingdom are **single-**celled organism.
- They are also **eukaryotic**, which means they possess a **nucleus** and membrane-bound **organelles**. Kingdom Protista is also divided into three groups: **fungus-like** protists, **plant-like** protists, **animal-like** protists.
- An example from this kingdom would be **diatoms, paramecium, amoebas**.

Kingdom Fungi

- The members in this kingdom have cell walls that do not contain cellulose. Fungi are heterotrophic and do not carry on photosynthesis.
- **Heterotrophic** means an organism that cannot produce its own food and instead it obtains energy by consuming other organic material.
- . Fungi have nuclei but do not always have separate cells divided by cell walls.
- An example from this kingdom would be mushrooms & molds.

Kingdom Plantae

- The members in this kingdom are **multicellular**. They have cell walls that contain **cellulose**. They are also **autotrophic** and carry on **photosynthesis** using chlorophyll. **Autotrophic** means an organism that uses an energy source (sun) to produce its own from simple inorganic sources (water & CO₂)
- An example from this kingdom would be **trees, grasses, etc.**



Kingdom Animalia

- The members in this kingdom are **multicellular, heterotrophic** and cells that do not have a **cell wall**.
- An example from this kingdom would be **dogs, cats, tigers, monkeys, humans, etc.**



Dichotomous Keys Assignment

- Scientists use dichotomous keys to identify organisms based on their physical characteristics
- Cut out your organisms & create a dichotomous key.
- Write down the characteristic you use that always divides the group into 2 groups or branches. Keep doing this until you end up with only individual organisms
- Use only physical characteristics that are observable
- Can you identify which organisms might be in similar genera or families?
- Present to the class and explain your how you organized your creatures the way you did. Make up scientific names for your organisms/creatures.
- Bonus: Make up scientific names for your organisms/creatures!