

Unit 8: Diversity of Life

Content Outline: Characteristics and Hierarchy of Life (8.1)

I. Characteristics of living things:

- A. All living things are composed of cells.
- B. Living things possess differing levels of complexity (For example, a cell has a membrane. This is only one complex part of a cell. Cells have ribosomes for making proteins, another part.)
Have students give parts to a car, or a bicycle, or a microscope (good review)
- C. Living things use energy in metabolic processes.
- D. Living things respond to their environment,
Have students give some examples of animals responding and also plants responding – examples flowering based upon number of night time hours, leaves either budding in the spring or falling off in the fall.
- E. All living things adapt to the environment.
Examples of animals panting or sweating based on temp., shivering, plants closing the stomata to control water loss.
- F. All organisms reproduce to keep the lineage going.
- G. All organisms grow and develop.

I. Hierarchy of life:

- A. **Cells** – This is the *basic unit of life*. (Either Prokaryotic or Eukaryotic.)
- B. **Tissues** – These are composed from cells with *common structure and function*.
- C. **Organs** – This functional structure is a collection of *similar tissues working together*.
- D. **Organ Systems** – These are composed of *organs working together*. (There are 11 systems in animals.)
- E. **Organism** – This when all the organ systems are working together to create a multi-cellular organism.
(This is a great example of Emergent Properties.) *(Please review emergent properties with students.)*
- F. **Population** – A group of the *same species, in the same place, at the same time, and showing signs of reproduction*.
- G. **Community** – A group of *interacting populations* in the same area at the same time.
- H. **Ecosystem** – Groups of *interacting communities* all experiencing common *abiotic factors*.
- I. **Biosphere** – The entire part of the planet that can support life.

II. Carolus Linnaeus (1707 – 1778) *(This is review, please do not spend too much time on this section.)*

- A. He is considered the Father of **Taxonomy**. Taxonomy is the Science of species classification. There were originally only two Kingdoms in his system: Plantae & Animalia.
- B. His system uses Binomial Nomenclature. (This term means “Two name Naming system”).
 1. Rules of Binomial Nomenclature:
 - a. The **Genus** name is written *first and has a capitalized first letter*.
 - b. The **Species** name is written *second and is not capitalized*.
 - c. *The whole name is written in Latin and italicized*. Latin is used because Latin is considered a “dead” language. Therefore, the meaning of words will NOT change over time.
- C. The current levels (called “taxons”) of classification.
 1. Domain (This is the *most inclusive*; yet *least specific* taxon.)
 - a. Domains are composed from similar Kingdoms.
 2. Kingdoms
 - a. Kingdoms are composed from similar Phylums or Divisions (if it is plants).
 - b. There exists much debate over how many kingdoms actually exist.
 - c. The two most commonly accepted are:
 - i. **Five Kingdom**- Animalia, Plantae, Fungi, Protista, and Monera (old term for bacteria.)
 - ii. **Six Kingdom** – Animalia, Plantae, Fungi, Protista, Archaeobacteria, Eubacteria
 3. Phylums or Divisions (plants)
 - a. Phylums or Divisions are composed of similar Classes.
 4. Classes
 - a. Classes are composed of similar Orders.
 5. Order
 - a. Orders are composed of similar Families.

6. Family
 - a. Families are composed of similar Genus.
7. Genus
 - a. Genus is composed of similar Species.
8. Species (This is the *least inclusive*; yet *most specific* taxon)
 - Breeds is a sub category of species. (Like for dogs, cats, horses, etc.)
9. Easy way to remember the order of system: **D**ominating **K**ing **P**hillip **C**ame **O**ver **F**or **G**reen **S**alad.