

Unit 2

Bio-Organization:
It's Classified!

Concept 1: Taxonomy

- Lesson Essential Questions:
 1. What famous scientists are involved in the evolution of classification?
 2. What are the major groups in the modern classification system?
 3. What are the five kingdoms?
 4. How do you use a taxonomy key to classify organisms?

What is classification?

- Classification is the arrangement of animals and plants in taxonomic groups according to their observed similarities.
- Taxonomy is the study of the relationships between organisms.

Why do we need classification?

1. It helps identify the relationships between organisms.
 - How are organisms similar and different?
2. It requires scientists to clearly identify key characteristics of each organism.
 - What traits are unique to each organism?
3. It helps to avoid confusion.
 - Common names are different in different places around the world.

How has classification changed over time?

- Aristotle (384-322 BC) divided all living things into plants and animals.
- Carolus Linnaeus (1785) developed a classification system for all living things that divided them into the kingdoms of Plantae and Animalia.
- Ernst Haeckel (19th century) created the third kingdom Protista.
 - Protista are simple organisms that are not plants or animals.

How has classification changed over time?

- In 1969 Whittaker proposed a classification system made of 5 different kingdoms.
 - Bacteria, Protista, Fungi, Plantae, and Animalia.
- Carl Woese (1977) added a 6th kingdom dividing bacteria into two kingdoms,
 - Archaeobacteria and Eubacteria
 - In 1981 he altered his classification system to have 3 domains: Bacteria, Archaea, and Eukarya, these are further divided into 4 kingdoms: Protista, Fungi, Plantae, and Animalia.

Current Classification System

- *Domain*: basic groups of living things based on the genetic and physical structure of individual cells.
- *Kingdom*: a group of similar phyla (phylum).
- *Phylum*: a group of similar classes.
- *Class*: a group of similar orders.
- *Order*: a group of similar families.
- *Family*: a group of similar genus.
- *Genus*: a group of similar species.
- *Species*: a group of organisms that can reproduce together and produce fertile offspring.

Concept 2: Bio-Organization

- Lesson Essential Questions:
 1. What are the stages of abiotic organization?
 2. What are the stages of biotic organization?

Building Blocks of All Things

- Everything in the universe is made of matter.
- Matter is made of substances.
 - Pure substances are known as elements.
 - These are made up entirely of the same type of atom.
 - Mixed substances are known as compounds.
 - These are made up of a mixture of different types of atoms.
- Atoms are the smallest particle of an element that still has the properties of the element.

Building Blocks of All Things

- Atoms are made of 3 smaller particles: protons and neutrons on the inside and electrons on the outside.
- When atoms combine together and their electrons interact they form a molecule.

Stages of Abiotic Organization

- Atoms make up elements.
- Elements combine to make up compounds and molecules.
- Compounds and molecules combine to make up all abiotic things.

Stages of Biotic Organization

- Biotic things are similar to abiotic things in that they are made of atoms, elements, compounds, and molecules.
- However in biotic things molecules continue to build into specific structures (cells) that have specific functions.

Stages of Biotic Organization

- Cells are the smallest units of an organism that carry on the functions of life.
 - Organisms can be made up of only one cell or many millions of cells.
- Cells with the same functions make up tissues.
- Tissues are a group of similar cells that work together to do one job.

Stages of Biotic Organization

- Tissues are organized into organs.
- An organ is a structure made up of two or more different types of tissues that work together to do a job.
- A group of organs that work together to do a job is an organ system.
- Organ systems that combine to make an entire life form are called an organism.

Stages of Biotic Organization

- A population is made up of all the organisms of the same species that live in an area at the same time.
- A community is all the populations of all the species living in an ecosystem.
 - An ecosystem is all the biotic and abiotic factors in an area.
- All of the ecosystems on Earth create the biosphere or the part of Earth that maintains life including land and water.

Stages of Organization

Abiotic

- Atom
- Element
- Compound
- Molecule
- Ecosystem

Biotic

- Atom
- Element
- Compound
- Molecule
- Cell
- Tissue
- Organ
- Organ System
- Organism
- Population
- Community
- Ecosystem
- Biosphere