Bellringer: Essential Question

Look through this chapter and list the name of each type of organism illustrated, such as cactuses, bees, humans, oaks, etc.

Why is a scientific method of clasification useful to study living organisms?

Key Ideas of Classification

- Why do biologists have taxonomic systems?
- What makes up the scientific name of a species?
- What is the structure of the modern Linnaean system of classification?

The Need for Systems

- About 1.7 million species have been named and described by scientists. Scientists think that millions more are undiscovered.

- The practice of naming and classifying organisms is called **taxonomy.**

- The general term for any one of these categories is a ***taxon*** **(plural, *taxa*).**

Scientific Nomenclature

- Various naming systems were invented in the early days of European biology. Some used long, descriptive Latin phrases called *polynomials*.

- Names for taxa were inconsistent between these systems and did not account for evolutionary changes and **speciation** over time so the classification systems changed.

- The only taxon which was consistent was the **genus**, which was a taxon used to group similar species.

Scientific Nomenclature, ***cont.***

- A simpler and more consistent system was developed by Swedish biologist Carl Linnaeus in the 1750s.

- Linnaeus introduced a two-word naming system called **binomial nomenclature.**

- His system included the **genus** name and a single descriptive word for each **species** that may have emerged from a common ancestor.

Writing a scientific name

- For example, the scientific name *Apis mellifera* belongs to the European honeybee.

- When you write the scientific name, the genus name should be capitalized and the species identifier should be lowercase.

- Both terms should be italicized.

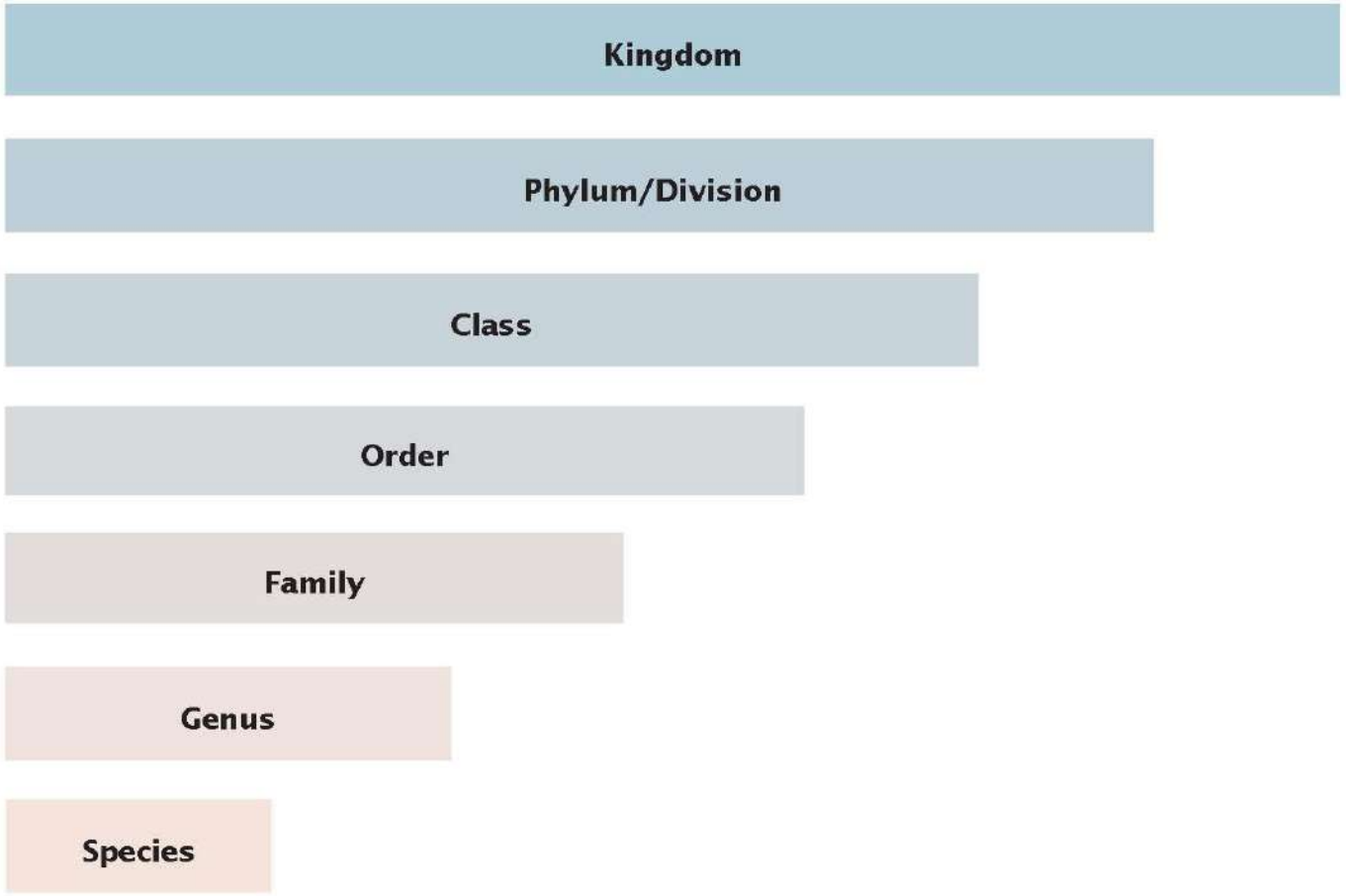
The Linnaean System

- In the Linnaean system of classification, organisms are grouped at successive levels of the hierarchy based on similarities in their form and structure.

- The eight basic levels of modern classification are domain, kingdom, phylum, class, order, family, genus, species.

Biological Hierarchy of Classification

The biological hierarchy of classification is made of seven different levels. When classifying plants, bacteria, and fungi, biologists use the term division instead of phylum.



Classification of a Bee

Kingdom
Animalia

Phylum
Arthropoda

Class
Insecta

Order
Hymenoptera

Family
Apidae

Genus
Apis

Species
Apis mellifera

Updating Classification Systems

- For many years after Linnaeus created his system, scientists only recognized two kingdoms: Plantae and Animalia.
- Biologists have added complexity and detail to classification systems as they have learned more.
- Many new taxa have been proposed, and some have been reclassified.

- Sponges, for example, used to be classified as plants.
- Microscopes allowed scientists to study sponge cells.
- Scientists learned that sponge cells are much more like animal cells, so today sponges are classified as animals.

- In the 1800s, scientists added Kingdom Protista as a taxon for unicellular organisms.
- Soon, they noticed differences between prokaryotic and eukaryotic cells.
- Scientists created Kingdom Monera for prokaryotes.

- By the 1950s, Kingdoms Monera, Protista, Fungi, Plantae, and Animalia were used.
- In the 1990s, genetic data suggested two major groups of prokaryotes.
- Kingdom Monera was split into Kingdoms Eubacteria and Archaebacteria.

Characteristics of Living Things

- ✓Cellular Organization
  - Prokaryotic or eukaryotic
  - single celled or multi-celled
- ✓Homeostasis - Maintain stability of cellular functions
- ✓Stimulus-Response – Make adjustments to varying conditions
- ✓Metabolism – autotrophic, heterotrophic, photosynthetic
- ✓Growth and Development – cellular size increase and specialize
- ✓Reproduction – asexual or sexual