



18-1 Finding Order in Diversity



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Natural selection and other processes have led to a staggering diversity of organisms.

Biologists have identified and named about 1.5 million species so far.

They estimate that 2–100 million additional species have yet to be discovered.

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Why Classify?



How are living things organized for study?



To study the diversity of life, biologists use a classification system to name organisms and group them in a logical manner.

In the discipline of **taxonomy**, scientists classify organisms and assign each organism a universally accepted name.

When taxonomists classify organisms, they organize them into groups that have biological significance.

Assigning Scientific Names

Common names of organisms vary, so scientists assign one name for each species.

Because 18th century scientists understood Latin and Greek, they used those languages for scientific names.

This practice is still followed in naming new species.

Early Efforts at Naming Organisms

The first attempts at standard scientific names described the physical characteristics of a species in great detail.

These names were not standardized because different scientists described different characteristics.

Binomial Nomenclature



What is binomial nomenclature?

Carolus Linneaus developed a naming system called **binomial nomenclature**.



In binomial nomenclature, each species is assigned a two-part scientific name.

The scientific name is italicized.

The first part of the name is the genus to which the organism belongs. A **genus** is a group of closely related species. The genus name is capitalized.

The second part of the name is unique to each species within the genus. This part of the name often describes an important trait or where the organism lives. The species name is lowercased.

Linnaeus's System of Classification

Linnaeus not only named species, he also grouped them into categories.



What is Linnaeus's system of classification?



Linnaeus's seven levels of classification are—from smallest to largest—

- **species**
- **genus**
- **family**
- **order**
- **class**
- **phylum**
- **kingdom**

Each level is called a **taxon**, or taxonomic category.
Species and genus are the two smallest categories.

**Grizzly
bear**



**Black
bear**



GENUS *Ursus*



SPECIES *Ursus arctos*

Genera that share many characteristics are grouped in a larger category, the **family**.

**Grizzly
bear**



**Black
bear**



**Giant
panda**



FAMILY Ursidae

An **order** is a broad category composed of similar families.

Grizzly bear



Black bear



Giant panda



Red fox



ORDER Carnivora

The next larger category, the class, is composed of similar orders.

Grizzly bear



Black bear



Giant panda



Red fox



Abert squirrel



Class Mammalia

Several different classes make up a **phylum**.

Grizzly bear



Black bear



Giant panda



Red fox



Abert squirrel



Coral snake



PHYLUM Chordata

The **kingdom** is the largest and most inclusive of Linnaeus's taxonomic categories.

Grizzly bear



Black bear



Giant panda



Red fox



Abert squirrel



Coral snake



Sea star



KINGDOM Animalia

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Grizzly bear Black bear Giant panda Red fox Abert squirrel Coral snake Sea star



KINGDOM Animalia



PHYLUM Chordata



CLASS Mammalia



ORDER Carnivora



FAMILY Ursidae



GENUS *Ursus*



SPECIES *Ursus arctos*

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- 1 Which statement about classification is true?
- a. Biologists use regional names for organisms.
 - A b. Biologists use a common classification system based on similarities that have scientific significance.
 - c. Biologists have identified and named most species found on Earth.
 - d. Taxonomy uses a combination of common and scientific names to make the system more useful.

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2 Linnaeus's two-word naming system is called

A a. binomial nomenclature.

b. taxonomy.

c. trinomial nomenclature.

d. classification.

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3 Several different classes make up a(an)

- a. family.
- b. species.
- c. kingdom.

A d. phylum.

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- 4 A group of closely related species is a(an)
- a. class.
 - A** b. genus.
 - c. family.
 - d. order.

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5 Which of the following lists the terms in order from the group with the most species to the group with the least?

a. order, phylum, family, genus

b. family, genus, order, phylum

A c. phylum, class, order, family

d. genus, family, order, phylum

END OF SECTION