

Lesson 1

Organisms and Their Relationships

Focus Question

What relationships among organisms might exist with a bird nest built in a thorny tree?

New Vocabulary

ecology

biosphere

biotic factor

abiotic factor

limiting factor

tolerance

population

biological community

ecosystem

biome

habitat

niche

predation

symbiosis

mutualism

commensalism

parasitism

Review Vocabulary

species: group of organisms that can interbreed and produce viable offspring; group of organisms with a distinct evolutionary history

Ecology

- Organisms depend on other organisms and nonliving factors in their environment for survival.
- **Ecology** is the scientific discipline in which the relationships among living organisms and the interaction the organisms have with their environments are studied.

Ecology

- Ecologists observe, experiment, and model using a variety of tools and methods.
- A model allows scientists to visualize or simulate a process or system.
- Scientists use physical models, mathematical models, and computer models.

The Biosphere

- The **biosphere** is the portion of the Earth that supports life.
- It includes landmasses, freshwater, saltwater, lower portions of the atmosphere, and areas beneath the Earth's surface.

The Biosphere

Biotic Factors

- Biotic factors are living factors in an organism's environment.
- Interactions among organisms are necessary for the survival of species in the same geographic location.

Abiotic Factors

- Abiotic factors are the nonliving factors in an organism's environment.
- Organisms adapt to survive in the abiotic factors present in their natural environment.

The Biosphere

- A **limiting factor** is any abiotic or biotic factor that restricts the numbers, reproduction, or distribution of organisms.
- The ability of any organism to survive when subjected to biotic and abiotic factors is **tolerance**.
- For any environment, a range of tolerance is defined by the upper and lower limit of conditions in which an organism can survive.

Levels of Organization

- The biosphere is too large and complex to study as a whole.
- Ecologists divide the biosphere into levels of organization to study.
- The levels increase in complexity as the numbers and interactions between organisms increase.

Levels of Organization

The levels of organization are:

- organism
- population
- biological community
- ecosystem
- biome
- biosphere

Levels of Organization

- The lowest level of organization is an individual organism.
- Organisms of a single species that share the same geographic location at the time make up a **population**.
- A **biological community** is a group of interacting populations that occupy the same geographic area at the same time.

Levels of Organization

- An **ecosystem** is a biological community and all of the abiotic factors that affect it.
- A **biome** is a large group of ecosystems that share the same climate and have similar types of communities.

Ecosystem Interactions

The interactions among organisms are important in an ecosystem. A community of organisms increases the chances for survival of any one species by using the available resources in different ways.

- A **habitat** is an area where an organism lives.
- A **niche** is the role or position that an organism has in its environment.

Community Interactions

Competition

- This interaction occurs when more than one organism uses a resource at the same time.
- Competition is stronger when resources are scarce.

Predation

- **Predation** is the act of one organism pursuing and consuming another organism for food.
- The organism that pursues is the predator, and the organism being pursued is the prey.

Community Interactions

Symbiotic relationships

- **Symbiosis** is the close relationship that exists when two or more species live together. There are three types of symbiosis.
 - **Mutualism**: both organisms benefit
 - **Commensalism**: one organism benefits; the other is neither helped nor harmed
 - **Parasitism**: one organism benefits at the expense of the other