Name _____ Class _____ Date _____

# 3.1 & 3.2 What Is Ecology? Energy, Producers, and Consumers

**Studying Our Living Planet** **Ecology** is the scientific study of interactions among organisms and between organisms and their environment.

- Earth's organisms live in the **biosphere.** The biosphere consists of the parts of the planet in which all life exists.
- Ecologists may study different levels of ecological organization:
  - Individual organism
  - An assemblage of individuals that belong to the same species and live in the same area is called a **population.**
  - An assemblage of different populations that live together in an area is referred to as a **community.**
  - An **ecosystem** includes all the organisms that live in a particular place, together with their physical environment.
  - A group of ecosystems that have similar climates and organisms is called a **biome.**

**Biotic and Abiotic Factors** Ecosystems include biotic and abiotic factors.

- A **biotic factor** is any living part of an environment.
- An **abiotic factor** is any nonliving part of an environment.

**Primary Producers** Sunlight is the main energy source for life on Earth. Organisms that can capture energy from sunlight or chemicals and use that energy to produce food are called **autotrophs**, or **primary producers**.

- The process in which autotrophs capture light energy and use it to convert carbon dioxide and water into oxygen and sugars is called **photosynthesis**.
- The process in which autotrophs use chemical energy to produce carbohydrates is called **chemosynthesis**.

**Consumers** Organisms that rely on other organisms for their energy and food are called **heterotrophs**. Heterotrophs are also referred to as consumers. There are many different types of heterotrophs:

- **Herbivores**, such as cows, obtain energy by eating only plants.
- **Carnivores**, such as snakes, eat only animals.
- **Omnivores**, such as humans, eat both plants and animals.
- **Detritivores**, such as earthworms, feed on dead matter.
- **Decomposers**, such as fungi, break down organic matter.
- **Scavengers**, such as vultures, consume the carcasses of other animals.

1. What is ecology?

_____

_____

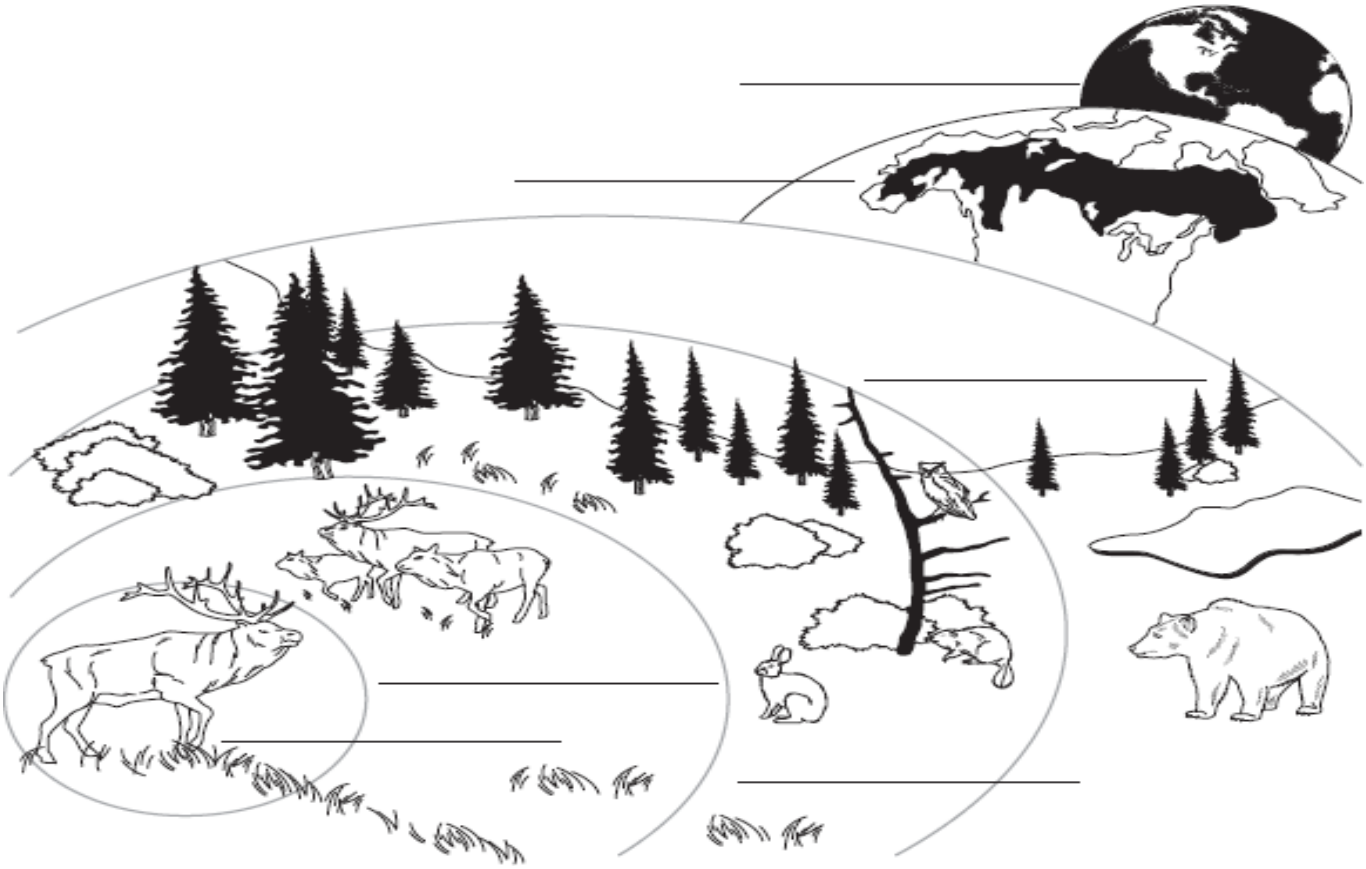
_____

2. What does the biosphere contain?

_____

_____

*Use the diagram to answer Questions 4–5*



**3.** Label each level of organization on the diagram.

**4.** Explain the relationship between ecosystems and biomes.

_____

_____

_____

*Answer the questions.*

**5.** Which level of organization contains all of the organisms of one species that live in a certain area?_____

**6.** What is the highest level of organization studied by ecologists?_____

**7.** A group of populations is called a(n)_____

**8.** Which includes animals of different species living together? Circle the correct answer.

Population community

**9.** A pond with all of its many species of creatures living together in this one location would be a good example of a(n)

**A.** population. **C.** biosphere.

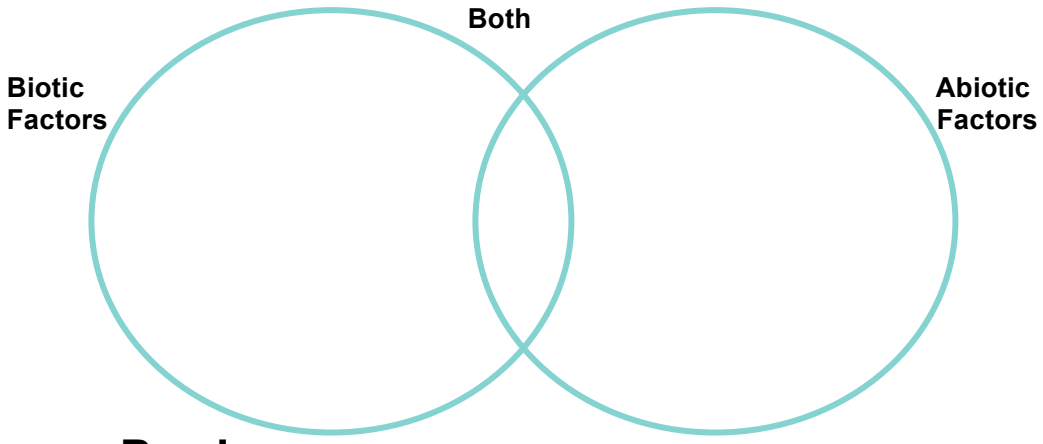
**B.** community. **D.** organism.

# Biotic and Abiotic Factors

**10.** Use the terms in the box to fill in the Venn diagram. List parts of the environment that consist of biotic

factors, abiotic factors, and some components that are a mixture of both.

| | | |
|---|---|---|
| **air** | **heat** | **precipitation** |
| **animals** | **mushrooms** | **soil** |
| **bacteria** | **plants** | **sunlight** |




## Primary Producers

**11.** What do autotrophs do during photosynthesis?

**12.** Can some organisms survive without energy from the sun? Explain your answer.

**13.** Can organisms create their own energy? Explain your answer.

## Consumers

**14.** Complete the table about types of heterotrophs.

| **Types of Heterotrophs** | | |
|---|---|---|
| **Type** | **Definition** | **Examples** |
| Herbivore | | cows, rabbits |
| | Heterotroph that eats animals | |
| Omnivore | | humans, bears, pigs |

| | | |
|---|---|---|
| Detritivore | | |
| Decomposer | | |
| | Heterotroph that consumes the carcasses of dead animals but does not typically kill them itself | |

**Concept Map** A concept map can help you organize information and show how ideas are connected. The concept map below shows the relationships between different types of organisms in this lesson.

*As you read the intro, place the terms from the box in the correct location in the concept map.*

| | | | |
|---|---|---|---|
| **decomposer** | **detritivore** | **omnivore** | **carnivore** |
| **photosynthesis** | **chemosynthesis** | **herbivore** | **primary producer** |
| | **heterotroph** | **scavenger** | |