

# Ecosystems

Textbook pages 34–51

## Before You Read

How do you think ecosystems are related to the biomes you learned about in the previous section? Record your ideas below.

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### ? Create a Quiz

Create a quiz to help you learn the boldface terms introduced in this section. Answer your questions and share your quiz with your classmates.

### ✓ Reading Check

What are the two main components of an ecosystem?

\_\_\_\_\_

\_\_\_\_\_

### ✓ Reading Check

Organize the following in the correct ecological hierarchy: community, ecosystem, species, population.

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\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

### What is an ecosystem?

In an **ecosystem**, abiotic components, such as oxygen, water, nutrients, light, and soil, support the life functions of biotic components, such as plants, animals, and micro-organisms. Biomes contain many different ecosystems. Ecosystems can be small. Examples of small ecosystems include a tide pool and a rotting log. Ecosystems also can be large. Examples of large ecosystems include a coastal Douglas fir forest and a biome.

Ecosystems contain different habitats. A **habitat** is the place in which an organism lives. For example, a sculpin is a fish that makes its habitat between rocks at the bottom of a tide pool ecosystem. ✓

### How are biotic interactions in ecosystems structured?

Organisms within an ecosystem constantly interact to obtain resources, such as food, water, sunlight, or habitat. As a result of these interactions, organisms have special roles—or **niches**—in their ecosystems. An organism's niche includes the way in which it contributes to and fits into its environment. Many different organisms can live in the same habitat if they occupy different niches. Biotic interactions are structured from smallest to largest in an **ecological hierarchy**.

◆ A **species** is a group of closely related organisms that can reproduce with one another.

◆ All the members of a species within an ecosystem are referred to as a **population**.

◆ Populations of different species that interact in a specific ecosystem form a **community**. ✓

## What different biotic interactions occur in ecosystems?

**Symbiosis** refers to the interaction of two different organisms that live in close association. **Commensalism, mutualism,** and **parasitism** are types of symbiotic interactions. Other biotic interactions include **competition, predation,** and **mimicry**.

Interaction	Result	Example
commensalism	One organism benefits and the other organism is neither helped nor harmed.	Barnacles attach to whales and are transported to new locations in the ocean.
mutualism	Both organisms benefit and sometimes neither species can survive without the other.	In lichen, the alga produces sugars and oxygen for the fungus, which provides carbon dioxide and water for the alga.
parasitism	One species benefits and another is harmed.	Hookworms attach to the gut wall and obtain nourishment from their host's blood.
competition	Organisms require the same resource (such as food) in the same location at the same time.	Spotted knapweed releases chemicals into the soil, which prevents the growth of other plants.
predation	One organism (the predator) eats all or part of another organism (the prey).	Cougars have sharp, pointed teeth to catch prey.
mimicry	Prey animal mimics another species that is dangerous or tastes bad to avoid being eaten.	Viceroy butterflies look like bitter-tasting monarch butterflies and are avoided by predators.

Use with textbook pages 34–48.

## Parts of an ecosystem

1. What is the difference between an ecosystem and a habitat?

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2. List three main abiotic components of ecosystems.

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3. What is the difference between a population and a community?

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4. Define the term symbiosis.

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5. What is commensalism?

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6. How does mutualism differ from parasitism?

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7. What is predation?

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Use with textbook pages 39–47.

# Biotic interactions in ecosystems

**Vocabulary**

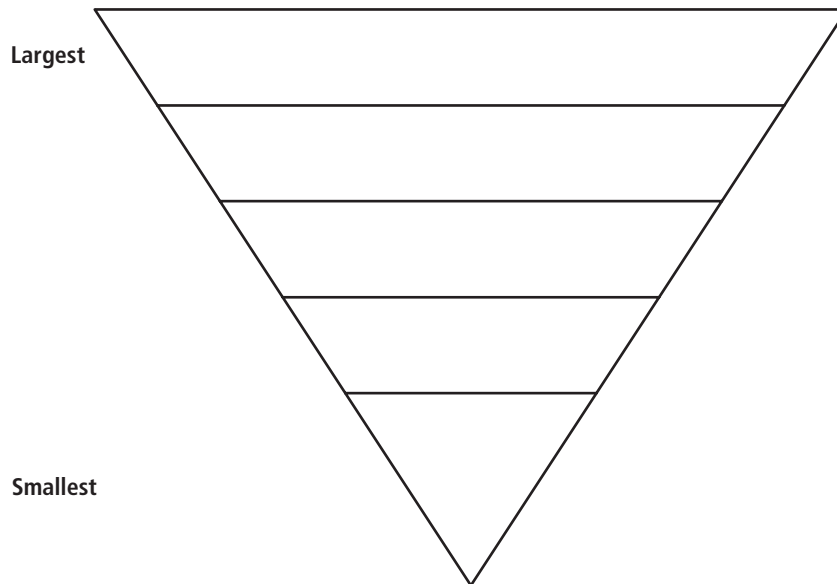
biosphere  
community  
ecosystem

organism  
population

1. Use the vocabulary words in the box above to label the Williams Creek ecosystem.



2. Give the ecological hierarchy for these biotic interactions from largest to smallest.



3. List three populations that interact in your community.

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Name \_\_\_\_\_

Date \_\_\_\_\_

Use with textbook pages 39–47.

## Symbiotic relationships

- commensalism
- mutualism
- parasitism
- competition
- predation

Use the above terms to identify the following descriptions. Identify the term and explain the relationship.

1. An ant lives in the thorns of the bullhorn acacia bush. The ant sips the nectar of the acacia's leaflets. The ants protect the plant by fighting off other insects.

Term: \_\_\_\_\_

Explanation: \_\_\_\_\_

\_\_\_\_\_

2. Spotted knapweed releases chemicals into the soil. These chemicals prevent the growth of other plants and allow the plant to spread quickly.

Term: \_\_\_\_\_

Explanation: \_\_\_\_\_

\_\_\_\_\_

3. Lynx hunt snowshoe hares. When the lynx population increases the snowshoe hare population decreases.

Term: \_\_\_\_\_

Explanation: \_\_\_\_\_

\_\_\_\_\_

4. Spanish moss lives on trees in rainforests and has no roots. The feathery structure of the Spanish moss captures nutrients and moisture from the air.

Term: \_\_\_\_\_

Explanation: \_\_\_\_\_

\_\_\_\_\_

5. The mountain pine beetle is killing British Columbia's lodgepole and white pine forests.

Term: \_\_\_\_\_

Explanation: \_\_\_\_\_

\_\_\_\_\_

Use with textbook pages 34–48.

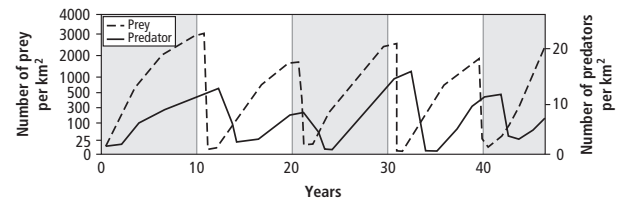
## Ecosystems

Match each Term on the left with the best Descriptor on the right. Each Descriptor may be used only once.

Term	Descriptor
1. _____ commensalism	<b>A.</b> the special role an organism plays in an ecosystem
2. _____ competition	<b>B.</b> a part of a biome in which abiotic components interact with biotic components
3. _____ ecosystem	<b>C.</b> a symbiotic relationship in which one species benefits and another is harmed
4. _____ mutualism	<b>D.</b> a symbiotic relationship in which one species benefits and the other species is neither helped nor harmed
5. _____ niche	<b>E.</b> a harmful interaction between two or more organisms that occurs when the organisms compete for the same resource in the same location at the same time
6. _____ parasitism	<b>F.</b> a symbiotic relationship between two organisms in which both organisms benefit
7. _____ predation	<b>G.</b> predator-prey interactions in which one organism eats all or part of another organism

Circle the letter of the best answer.

8. What relationship is demonstrated by a barnacle being attached to a whale?
- A.** mutualism  
**B.** commensalism  
**C.** parasitism  
**D.** competition
9. Which of the following is an example of mutualism?
- A.** similar colouring of shrimp and crimson anemone  
**B.** hookworms attaching to a dog's intestine  
**C.** coyotes hunting in packs to kill large animals  
**D.** snapdragon flowers that open for bees of a specific mass



10. Which of the following situations best describes the relationship of the predator and prey population shown in the graph above?
- A.** As the predator population increases the prey population increases.  
**B.** As the predator population decreases the prey population decreases.  
**C.** As the predator population increases the prey population decreases.  
**D.** Predator population has no effect on prey population.