

## Active Reading

### Section: Energy Flow in Ecosystems

Read the passage below. Then answer the questions that follow.

Ecologists study how energy moves through an ecosystem by assigning organisms in that ecosystem to a specific level, called a **trophic level**, in a graphic organizer based on the organism's source of energy.

Energy moves from one trophic level to another. The path of energy through the trophic levels of an ecosystem is called a **food chain**. The lowest trophic level of any ecosystem is occupied by the producers, such as plants, algae, and bacteria. Producers use the energy of the sun to build energy-rich carbohydrates. Many producers also absorb nitrogen gas and other key substances from the environment and incorporate them into their biological molecules.

At the second trophic level are **herbivores**, animals that eat plants and other primary producers. They are the primary consumers. Cows and horses are herbivores, as are caterpillars and some ducks. A herbivore must be able to break down a plant's molecules into usable compounds. However, the ability to digest cellulose is a chemical feat that only a few organisms have evolved. As you will recall, cellulose is a complex carbohydrate found in plants. Most herbivores rely on microorganisms, such as bacteria and protists, in their gut to help digest cellulose. Humans cannot digest cellulose because we lack these particular microorganisms.

At the third trophic level are secondary consumers called **carnivores**, animals that eat herbivores. Tigers, wolves, and snakes are carnivores. Some animals, such as bears, are both herbivores and carnivores; they are called **omnivores**. They use the simple sugars and starches stored in plants as food, but they cannot digest cellulose.

#### SKILL: READING EFFECTIVELY

Read each question, and write your answer in the space provided.

1. What relationship exists between trophic levels and a food chain?

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2. What group of organisms occupies the first trophic level of an ecosystem?

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**Active Reading** *continued*

3. What group of organisms occupies the second trophic level of an ecosystem?

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4. What group of organisms occupies the third trophic level of an ecosystem?

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5. How are omnivores similar to carnivores? How do they differ?

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**SKILL: SEQUENCING INFORMATION**

**In the space provided, write 1 if the statement describes the first trophic level, write 2 if the statement describes the second trophic level, or write 3 if the statement describes the third trophic level.**

- \_\_\_\_\_ 6. Primary consumers are found here.
- \_\_\_\_\_ 7. Organisms here use the energy of the sun to build energy-rich carbohydrates.
- \_\_\_\_\_ 8. Tigers, wolves, and snakes are found here.
- \_\_\_\_\_ 9. Organisms here are capable of breaking down cellulose.
- \_\_\_\_\_ 10. Secondary consumers are found here.
- \_\_\_\_\_ 11. Plants, algae, and bacteria are found here.
- \_\_\_\_\_ 12. Humans are found here.
- \_\_\_\_\_ 13. Organisms here break down a plant's molecules into usable compounds.

**In the space provided, write the letter of the term or phrase that best completes the statement.**

- \_\_\_\_\_ 14. All of the following are examples of primary consumers EXCEPT
  - a. maple trees.
  - b. caterpillars.
  - c. cows.
  - d. horses.