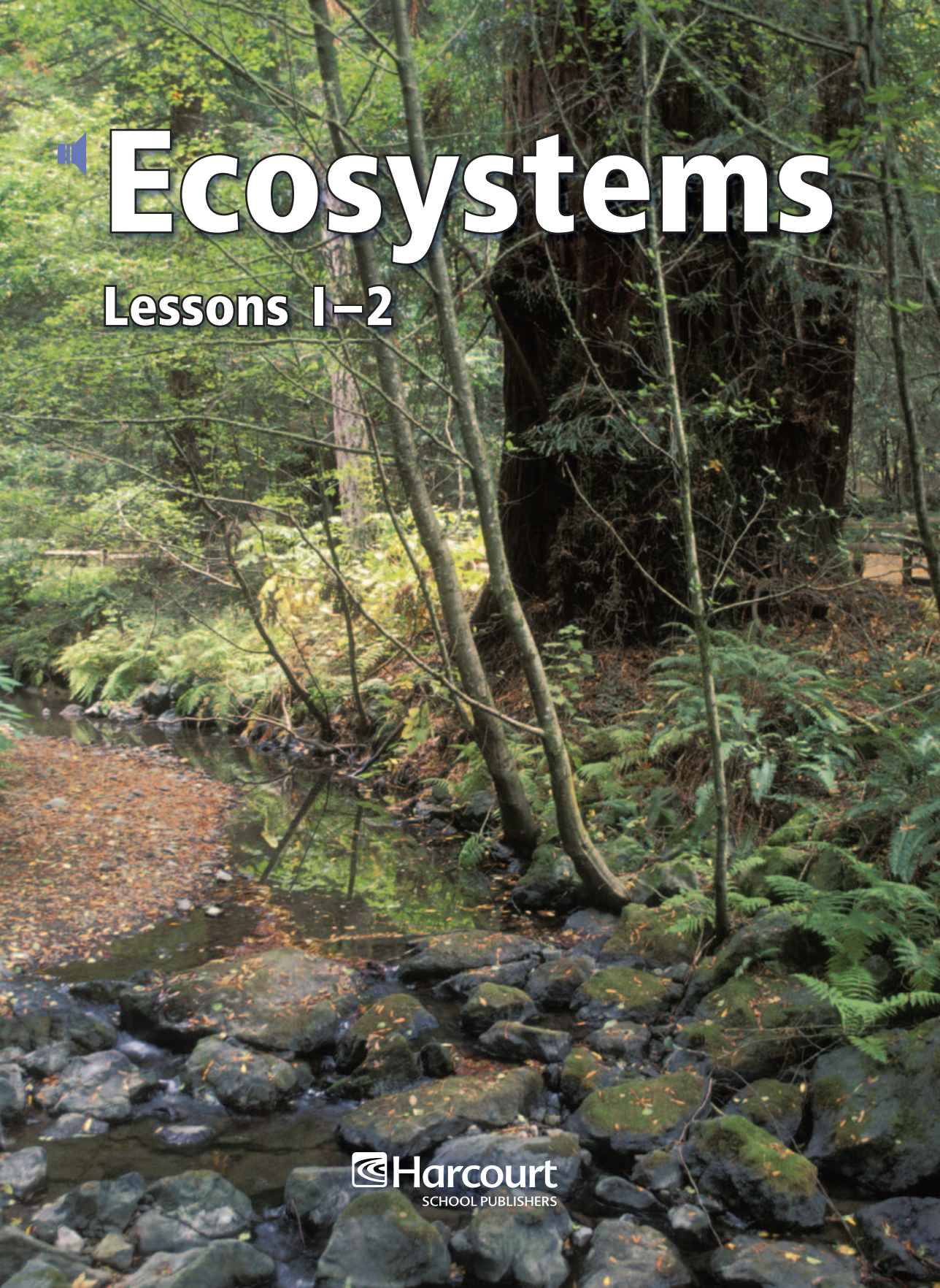


A photograph of a forest stream flowing over dark, mossy rocks. The water is clear, reflecting the surrounding green foliage and trees. The forest floor is covered with ferns and fallen leaves. The scene is peaceful and natural.

Ecosystems

Lessons 1–2

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Ecosystems

Lessons 1–2

Lesson 1

What is an Ecosystem?2

Lesson 2

How Do Organisms Get Energy?12

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What Is an Ecosystem?

VOCABULARY

- ecosystem
- population
- community
- habitat
- niche
- diversity



- This **ecosystem** includes water, grass, flowers and air.



- All of these butterflies are a **population** that shares resources.



■ The zebras and elephants are from separate populations. But they are a **community** that live together.



■ An important part of the tortoise's **habitat** is its burrow.



■ The blue bird has its own **niche** in an ecosystem.



■ The shells show the **diversity** of the ecosystem they came from.



READING FOCUS SKILL

MAIN IDEA AND DETAILS

The **main idea** is what the text is mostly about. **Details** are pieces of information about the main idea.

Look for examples of what an ecosystem is.

Look for **details** as to how organisms interact in ecosystems.



Ecosystems

Each organism interacts with other organisms in an ecosystem.

An **ecosystem** is an area where organisms interact with one another and with nonliving parts of the environment. An ecosystem can be as large as a lake or as small as a puddle.

A Forest Ecosystem

- 1 Deer eat lower branches of the trees, allowing more light to reach the forest floor.
- 2 Wood beetles bore into trees and tree trunks to break them down.
- 3 Trillium grows in shady areas of the forest floor. Ants gather the seeds and spread the plant.
- 4 A new plant begins to cover the forest floor.



||| An ecosystem has *biotic* parts, the living plants and animals. An ecosystem also includes *abiotic* or nonliving parts, such as water, soil, or climate.

||| The living parts of the ecosystem help shape the environment. Plants root and grow and animals break down soil. Animals also interact with one another. Larger animals eat plants and other animals to survive.

||| The abiotic parts determine what lives in an ecosystem. Climate is important. Organisms have features that make it possible for them to live in certain ecosystems. Their needs for food, shelter, and water are met only in certain areas.



What is the difference between biotic and abiotic parts of an ecosystem?



5 Skunks roam the forest at night looking for insects and rodents to eat.

6 Wild blueberries provide food for animals in the forest.

7 Cardinals eat seeds, fruit, and other insects.

Active Ecosystems

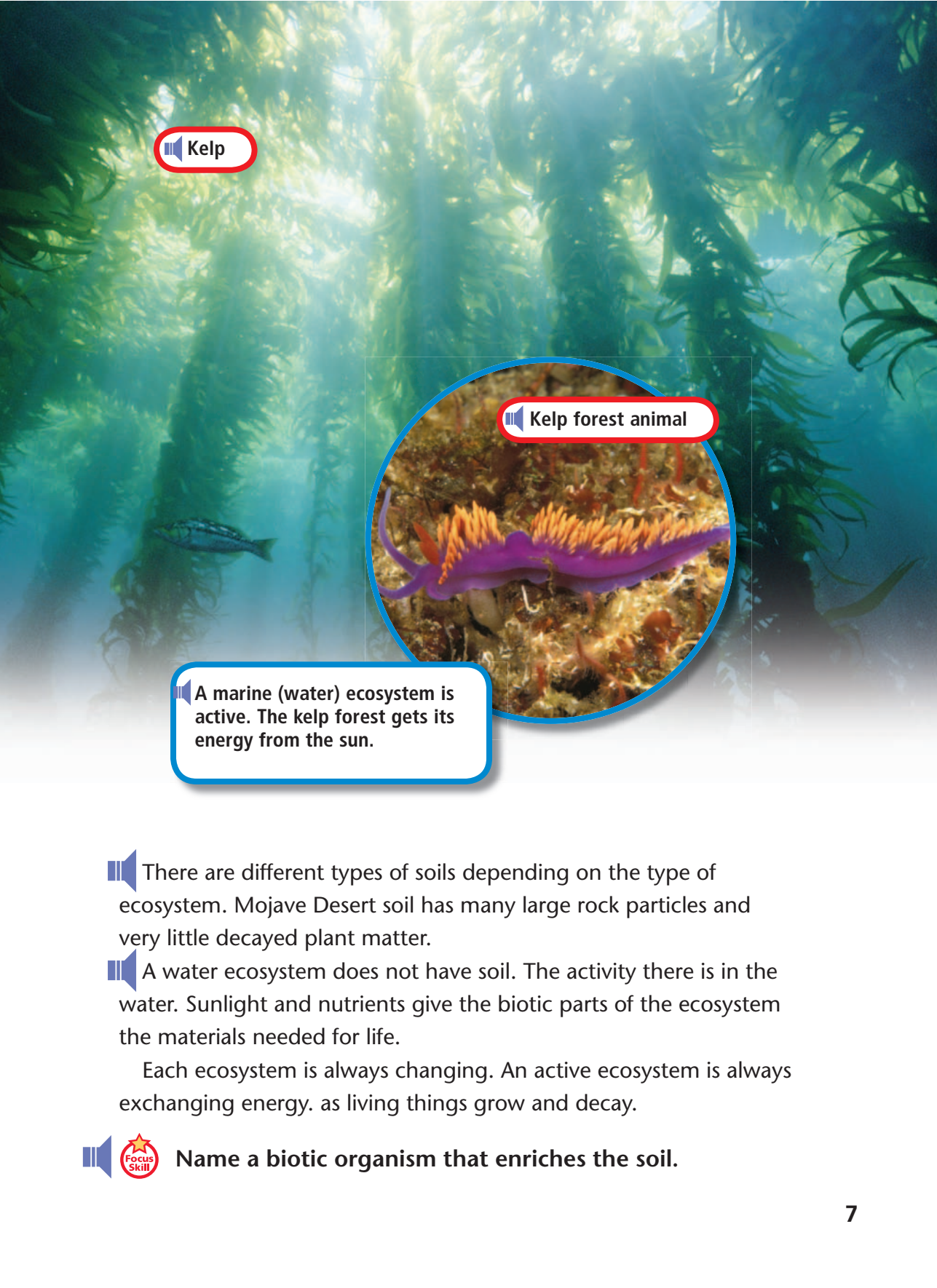
Healthy ecosystems are active. Most of the activity begins in the soil under your feet. The soil is a mixture of biotic and abiotic parts. Rock is broken into small pieces. Air, water, and matter that contains carbon is mixed in with the rock pieces. This soil supports plant life. Many organisms in an ecosystem need healthy plant life for their energy source.

The picture below shows earthworms and fungus. Both of these living things help form soil that is rich with nutrients.

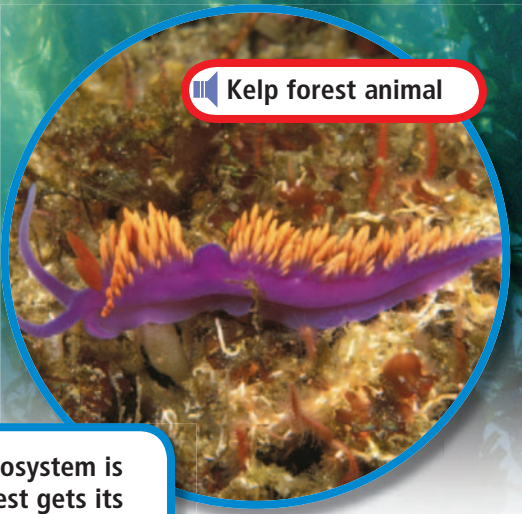
Active ecosystems transfer energy between organisms.

Fungus

Earth Worms



 Kelp



 Kelp forest animal

 A marine (water) ecosystem is active. The kelp forest gets its energy from the sun.

 There are different types of soils depending on the type of ecosystem. Mojave Desert soil has many large rock particles and very little decayed plant matter.

 A water ecosystem does not have soil. The activity there is in the water. Sunlight and nutrients give the biotic parts of the ecosystem the materials needed for life.

Each ecosystem is always changing. An active ecosystem is always exchanging energy, as living things grow and decay.



Name a biotic organism that enriches the soil.

A Place to Live

When you observe an ecosystem, you see different types of plants and animals. In the forest, you may see trees, birds, and bees. These are called populations. A **population** is a group of organisms of the same species living together in an ecosystem.

 All of the populations living in an ecosystem make up a **community**. The populations in a community interact, using one another provide food and shelter. Populations change the environment in ways that benefit the whole community.

  **How are a population and a community related in an ecosystem?**

-   A coyote eat other animals, plants, cactus fruits and beans.
-   Tortoises look for food in the morning and use the cactus for shade during the day.
-   Roadrunners store body heat for cold desert nights.
-   Tarantulas come out of their burrows at night to look for insects and small rodents.
-   Gila monsters are lizards that can live underground for months without eating.





||| We live in towns that have many families. The same is true for organisms in an ecosystem. Each has a certain habitat. An organism's **habitat** is the part of the ecosystem in which it lives. The habitat has everything the organism needs to survive.

||| Each organism in an ecosystem has a role. This is called the organism's **niche**. The niche includes everything the organism needs to do so it can survive. Finding shelter and food are part of the niche.

||| A hawk and an owl can share the same habitat because their niches are different. A hawk hunts for food in the daytime and the owl hunts at night. If two animals had the exact same niche, they would compete with one another for food, shelter, and water. One might use these resources better than the other and force the one out of the habitat.



Why can't animals share the same niche?



A coral reef is a very diverse ecosystem.

Diversity

Organisms depend on diversity within an ecosystem. **Diversity** is a measure of the number and the variety of the species in an ecosystem. Some ecosystems are very diverse, while others have just a few species.

 Climate and location are two important factors. Usually, ecosystems that are closer to the equator are more diverse. There are more species in the hot, wet climate. Ecosystems closer to Earth's poles are less diverse and have fewer species. Fewer species are adapted to living in such a cold climate. *Adapted* means that they have features that make it possible for them to live there.

 Ecosystems can become less diverse from human actions. When people build many houses in one area or shopping centers, they



can destroy ecosystems. They cut down forests and drain swamps. Air and water pollution can also cause damage to habitats. That reduces diversity in ecosystems.



What are factors that can determine an ecosystems diversity?



Review



Complete this **main idea** sentence.

- 1. An _____ is an area in which organisms interact with one another. Here, organisms also interact with nonliving parts of the environment.

Complete each sentence with **details** about ecosystems.

- 2. A _____ is a group of organisms of the same species living together.
- 3. A _____ is all of the populations living in an ecosystem.
- 4. Every organism has a _____ in an ecosystem.

How Do Organisms Get Energy?

VOCABULARY

- producer
- consumer
- predator
- prey
- food chain
- food web



A plant is a **producer**. It makes its own food with help from the sun.



A squirrel is a **consumer** because it does not make its own food.



A wolf is a **predator** because it eats other animals.



The rabbit is **prey** for other animals that eat it.



A **food chain** shows how producers and consumers are connected in an ecosystem.



A **food web** shows shows a group of connected food chains in an ecosystem.



READING FOCUS SKILL

SEQUENCE

When you **sequence** things, you put them in order.

Look for the **sequence** of organisms in a food chain, from producers to decomposers.



Producers and Consumers

Some organisms make their own food. They are called **producers**. Plants are producers. Plants use energy from the sun and carbon dioxide from the air. They use these and water from the soil to make sugar and grow.



A **consumer** is an organism that eats other organisms. You are a consumer. Animals are consumers. We all eat other living things.

Some animals eat only plants. Others are **predators**, they feed off other living animals. The animals that predators eat are called **prey**.



What is the difference between a producer and a consumer?



The California succulent is a producer.



The California cougar is a consumer.

Getting Energy

All living things need energy to move, eat, grow, and reproduce. A food chain shows how organisms eat and get energy in an ecosystem. A **food chain** is a sequence that connects producers and consumers.

The first step in the chain is when a producer uses the sun to convert energy to food. Then the energy is passed to a consumer that eats the producer. Now the consumer has some of the plant's energy. This consumer may now be eaten by another consumer. Energy is transferred. Last in the food chain is a decomposer. Decomposers break down the dead plant and animal matter. They get energy and also return nutrients to the soil for plants to use.



In what part of a food chain are producers?

Food Chain

This simple food chain shows the flow of energy through several organisms in a forest. The sun is the source of energy. The strawberry plant is the producer. What are the roles of the other three organisms?



Food Webs

A food chain is a series of feeding relationships in an ecosystem. Organisms are usually part of more than one food chain. A group of connected food chains in an ecosystem is called a **food web**.

 Most organisms eat more than one type of food. Because of this, each food web contains several different food chains. In this land food web, the mouse eats a strawberry plant and grass. The owl eats the chipmunk and also the mouse. Bacteria and other decomposers break down the remains of the strawberry plant, chipmunk, and mouse. The nutrients return to the soil, where they are used again by new plants.

 ▼ In this land food web, the owl and snake are the highest-level consumers. What are the producers?

Land Food Web



 A food web depends on producers. What would happen in the aquatic food web if all the algae disappeared? The animals that eat the algae would have less food and they could die out. Consumers that eat only producers (such as algae) would have to look somewhere else for food.

  What is needed before energy can be produced in an ecosystem?

Aquatic Food Web

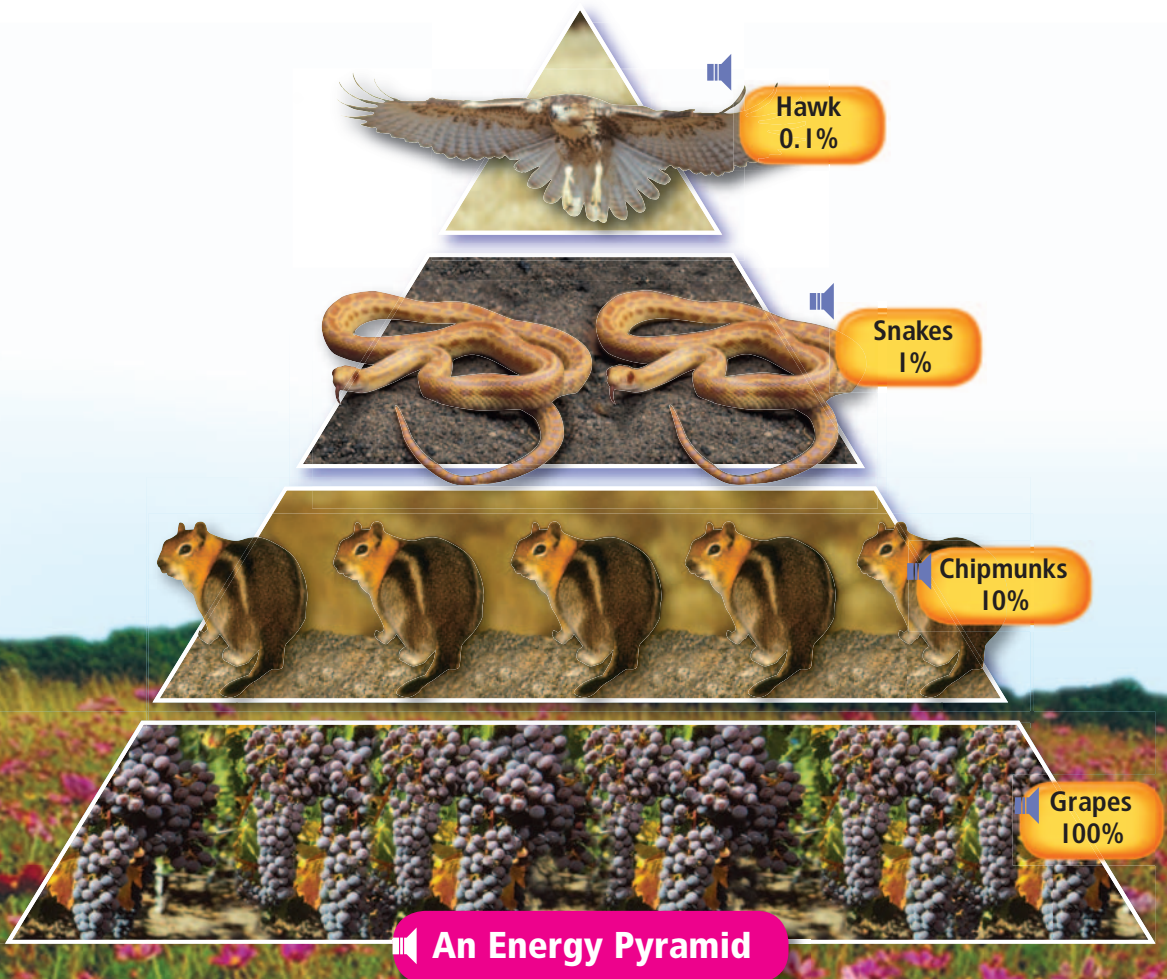
 ▼ This aquatic food web shows organisms that live in water. It also shows connections with organisms that live on land. What are the producers in the ecosystem? What organisms are primary consumers?



The Energy Pyramid

Energy is lost each time it passes from one organism to another. Scientists found that 90 percent of an organism's energy is gone when it reaches the next step of the food chain.

 An *energy pyramid* shows that energy is lost at each level of the food chain. Because of this energy loss, the number of organisms becomes fewer from one level to the next. This explains the pyramid shape. There are fewer hawks in the pyramid than grape plants, chipmunks, or snakes.



Fewer organisms are at the higher levels of the pyramid. They are getting the least amount of energy from what they consume.



Why is less energy available at each level of the pyramid?



A wolf can be a consumer and a predator



Review



Complete each **sequence** statement.

- 1. An organism that makes its own food is called a _____ .
- 2. A _____ provides food for a _____ .
- 3. A _____ is animal that feeds on its _____ .
- 4. A _____ _____ is a sequence of connected producers and consumers. A _____ _____ is a group of connected food chains.

GLOSSARY

-  **community** [kuh•MYOO•nuh•tee] All of the populations living in an ecosystem.
-  **consumer** [kuhn•SOOM•er] An organism that eats other organisms.
-  **diversity** [duh•VER•suh•tee] A measure of the number and variety of species in an ecosystem.
-  **ecosystem** [EE•koh•sis•tuhm] An area in which living things interact with one another and with nonliving things.
-  **food chain** [FOOD CHAYN] A sequence of connected producers and consumers.
-  **food web** [FOOD WEB] A group of connected food chains in an ecosystem.
-  **habitat** [HAB•ih•tat] A place where people or animals live.
-  **niche** [NICH] An organism's role in an ecosystem.
-  **population** [pahp•yoo•LAY•shuhn] A group of organisms of the same species living together in an ecosystem.
-  **predator** [PRED•uh•ter] An animal that feeds on other living animals.
-  **prey** [PRAY] An animal that a predator eats.
-  **producer** [proh•DOOS•er] An organism that makes its own food.

Think About the Reading

-  **1.** What can you do to help you remember what you have learned?
-  **2.** What questions do you have after reading this book?
How can you find the answers to your questions?

Hands-On Activity

-  **1.** Study an ecosystem in your neighborhood. What kinds of plants and animals live there? Can you figure out the food chain or food webs that exist?
-  **2.** Make a list of plants and animals that you consume.

School-Home Connection

Research an energy pyramid. Try to find a pyramid of an ecosystem that you know very little about. Study a desert, underwater, or rainforest ecosystem. Examine food chains and food webs. Use library books and the internet for information.