

What You Will Learn...

Main Ideas

1. The environment and life are interconnected and exist in a fragile balance.
2. Soils play an important role in the environment.

The Big Idea

Plants, animals, and the environment, including soil, interact and affect one another.

Key Terms

environment, p. 62
 ecosystem, p. 63
 habitat, p. 64
 extinct, p. 64
 humus, p. 65
 desertification, p. 65

TAKING NOTES

As you read, use a chart like the one below to help you take notes on the main topics in this section.

Limits and Connections in Nature	
Changes to Environments	
Soil and the Environment	

Natural Environments

If YOU lived there...

When your family moved to the city, you were sure you would miss the woods and pond near your old house. Then one of your new friends at school told you there's a large park only a few blocks away. You wondered how interesting a city park could be. But you were surprised at the many plants and animals that live there.

What environments might you see in the park?

BUILDING BACKGROUND No matter where you live, you are part of a natural environment. From a desert to a rain forest to a city park, every environment is home to a unique community of plant and animal life. These plants and animals live in balance with nature.

The Environment and Life

If you saw a wild polar bear outside your school, you would likely be shocked. In most parts of the United States, polar bears live only in zoos. This is because plants and animals must live where they are suited to the **environment, or surroundings**. Polar bears are suited to very cold places with lots of ice, water, and fish. As you will see, living things and their environments are connected and affect each other in many ways.

Limits on Life

The environment limits life. As our tour of the world's climates showed, factors such as temperature, rainfall, and soil conditions limit where plants and animals can live. Palm trees cannot survive at the frigid North Pole. Ferns will quickly wilt and die in deserts, but they thrive in tropical rain forests.

At the same time, all plants and animals are adapted to specific environments. For example, kangaroo rats are adapted to dry desert environments. These small rodents can get all the water they need from food, so they seldom have to drink water.

Connections in Nature

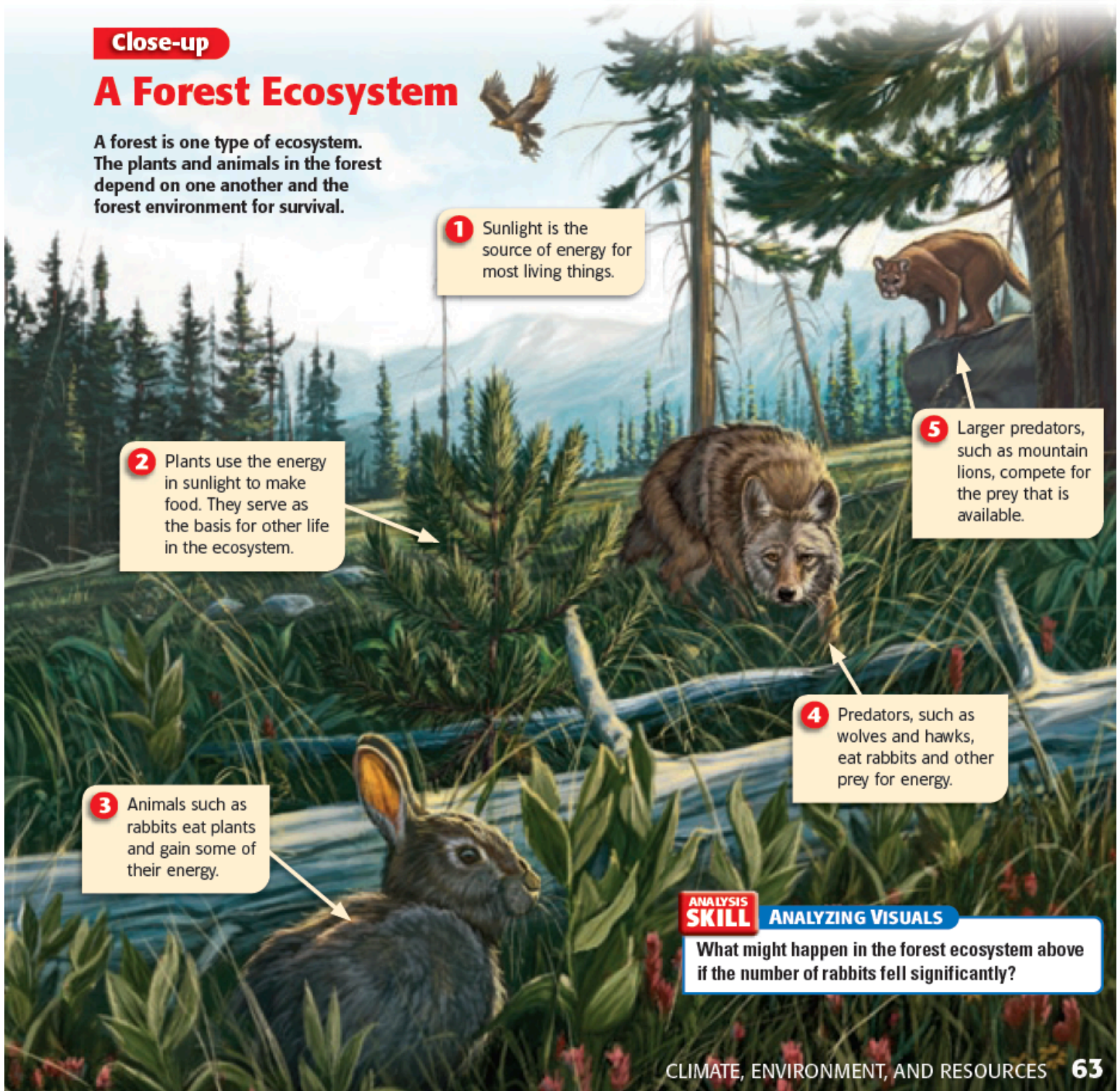
The interconnections between living things and the environment form ecosystems. An **ecosystem** is a group of plants and animals that depend on each other for survival and the environment in which they live. Ecosystems can be any size and can occur wherever air, water, and soil support life. A garden pond, a city park, a prairie, and a rain forest are all examples of ecosystems.

The diagram below shows a forest ecosystem. Each part of this ecosystem fills a certain role. The sun provides energy to the plants, which use the energy to make their own food. The plants then serve as food, either directly or indirectly, for all other life in the forest. When the plants and animals die, their remains break down and provide nutrients for the soil and new plant growth. Thus, the cycle continues.

Close-up

A Forest Ecosystem

A forest is one type of ecosystem. The plants and animals in the forest depend on one another and the forest environment for survival.



1 Sunlight is the source of energy for most living things.

2 Plants use the energy in sunlight to make food. They serve as the basis for other life in the ecosystem.

3 Animals such as rabbits eat plants and gain some of their energy.

4 Predators, such as wolves and hawks, eat rabbits and other prey for energy.

5 Larger predators, such as mountain lions, compete for the prey that is available.

ANALYSIS SKILL

ANALYZING VISUALS

What might happen in the forest ecosystem above if the number of rabbits fell significantly?

Changes to Environments

The interconnected parts of an ecosystem exist in a fragile balance. For this reason, a small change to one part can affect the whole system. A lack of rain in the forest ecosystem could kill off many of the plants that feed the rabbits. If the rabbits die, there will be less food for the wolves and mountain lions. Then they too may die.

Many actions can affect ecosystems. For example, people need places to live and food to eat, so they clear land for homes and farms. Clearing land has **consequences**, however. It can cause the soil to erode. In addition, the plants and animals that live in the area might be left without food and shelter.

Actions such as clearing land and polluting can destroy habitats. A **habitat** is the place where a plant or animal lives. The most diverse habitats on Earth are tropical rain forests. People are clearing Earth's rain forests for farmland, lumber, and other reasons, though. As a result, these diverse habitats are being lost.

Extreme changes in ecosystems can cause species to die out, or become **extinct**. As an example, flightless birds called dodos once lived on Mauritius (maw-RI-shuhs), an island in the Indian Ocean. When people began settling on the island, their actions harmed the dodos' habitat. First seen in 1507, dodos were extinct by 1681.

Recognizing these problems, many countries are working to balance people's needs with the needs of the environment. The United States, for example, has passed many laws to limit pollution, manage forests, and protect valuable ecosystems.

READING CHECK Drawing Inferences How might one change affect an entire ecosystem?

Soil and the Environment

As you know, plants are the basis for all food that animals eat. Soils help determine what plants will grow and how well. Because soils support plant life, they play an important role in the environment.

ACADEMIC VOCABULARY

consequences
the effects of a particular event or events

FOCUS ON READING

What are some causes of habitat destruction?

CONNECTING TO Science

Soil Factory

The next time you see a fallen tree in the forest, do not think of it as a dead log. Think of it as a soil factory. A fallen tree is buzzing with the activity of countless insects, bacteria, and other organisms. These organisms invade the fallen log and start to break the wood down.

As the tree decays and crumbles, it turns into humus. Humus is a rich blend of organic material. The humus mixes with the soil and broken rock material. These added nutrients then enrich the soil, making it possible for new trees and plants to grow. Fallen trees provide as much as one-third of the organic material in forest soil.

Summarizing What causes a fallen tree to change into soil?



Fertile soils are rich in minerals and **humus** (HYOO-muhs), **decayed plant or animal matter**. These soils can support abundant plant life. Like air and water, fertile soil is essential for life. Without it, we could not grow much of the food we eat.

Soils can lose fertility in several ways. Erosion from wind or water can sweep topsoil away. Planting the same crops over and over can also rob soil of its fertility. When soil becomes worn out, it cannot support as many plants. In fragile dry environments this can lead to **the spread of desertlike conditions, or desertification**. The spread of desertlike conditions is a serious problem in many parts of the world.

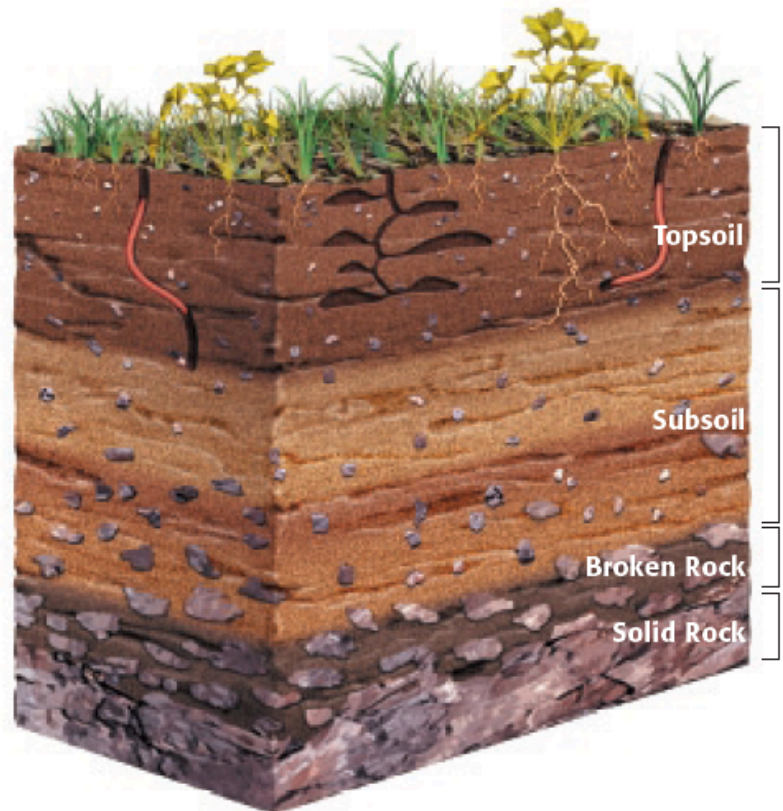
READING CHECK Analyzing What do fertile soils contain, and why are these soils important?

SUMMARY AND PREVIEW Living things and the environment are connected, but changes can easily upset the balance in an ecosystem. Because they support plant life, soils are important parts of ecosystems. In the next section you will learn about Earth's many resources.

Soil Layers

The three layers of soil are the topsoil, subsoil, and broken rock. The thickness of each layer depends on the conditions in a specific location.

ANALYZING VISUALS In which layer of soil are most plant roots and insects found?



Section 3 Assessment

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Online Quiz

KEYWORD: SK7 HP3

Reviewing Ideas, Terms, and Places

- Define** What is an **ecosystem**, and what are two examples of ecosystems?
 - Summarize** How do nature and people change ecosystems?
 - Elaborate** Why can plants and animals not live everywhere?
- Recall** What is **humus**, and why is it important to soil?
 - Identify Cause and Effect** What actions can cause **desertification**, and what might be some possible effects?
 - Elaborate** Why is it important for geographers and scientists to study soils?

Critical Thinking

- Identifying Cause and Effect** Review your notes. Then use a chart like this one to identify some of the causes and effects of changes to ecosystems.



FOCUS ON VIEWING

- Writing about Natural Environments** Jot down ideas about how different types of weather might affect the environment of the place you chose. For example, how might lack of rain affect the area?