

Science

Science

Life Science

# FORESTS

## Around the World

Genre	Comprehension Skill	Text Features	Science Content
Nonfiction	Main Idea and Details	<ul style="list-style-type: none"> <li>• Captions</li> <li>• Map</li> <li>• Glossary</li> </ul>	Biomes

Scott Foresman Science 6.6



by Charles Miller



scottforesman.com

## Vocabulary

abiotic factor  
biome  
biotic factor  
community  
ecosystem  
environment  
population

## Extended Vocabulary

canopy  
conifer  
coniferous forest  
deciduous forest  
dormant  
hibernate  
migrate  
rain forest  
understory

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# What You Already Know



Every part of Earth's surface, atmosphere, and oceans is home to living organisms. An organism's environment is all of the things around it that affect how it lives and grows. The abiotic factors of the environment include all of the nonliving things, such as sunlight, air, water, and even temperature. The biotic factors are the living parts of the environment. Both types of factors are important to the survival of an organism.

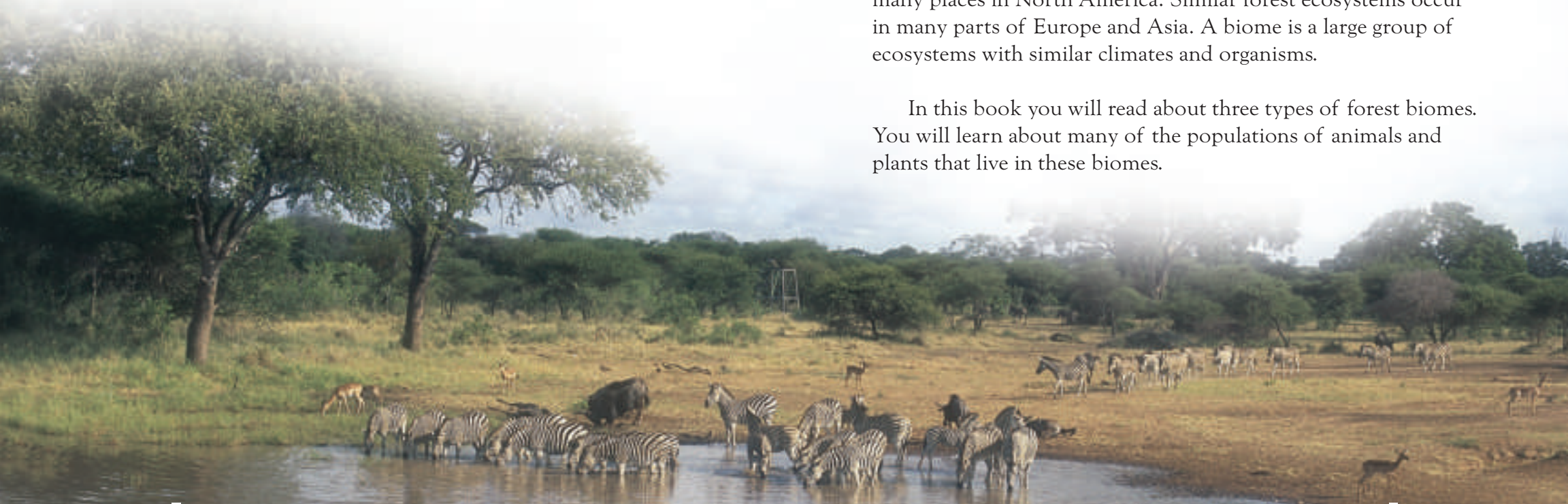
The different species in a particular area interact with one another and with the environment around them. A population is a group of individual organisms of one species that live in an area. Humans can be classified as part of a population. You are part of the human population of your neighborhood, your state, the entire country, and the Earth.

There are as many different populations in an area as there are species. For example, a pine forest has a population of pine trees, but it also has populations of many species of birds. A community is a group of populations that interact with each other in a particular area. The trees and birds are both part of the pine forest community.

The entire community of living things and the nonliving parts of the environment are called an ecosystem. Ecosystems can be small, such as a dead log and the organisms that inhabit it. They can also be an entire forest, including the dead log and its inhabitants.

Similar ecosystems can occur in many places if environmental factors are similar. For example, forests of pine trees exist in many places in North America. Similar forest ecosystems occur in many parts of Europe and Asia. A biome is a large group of ecosystems with similar climates and organisms.

In this book you will read about three types of forest biomes. You will learn about many of the populations of animals and plants that live in these biomes.





# Forest Biomes

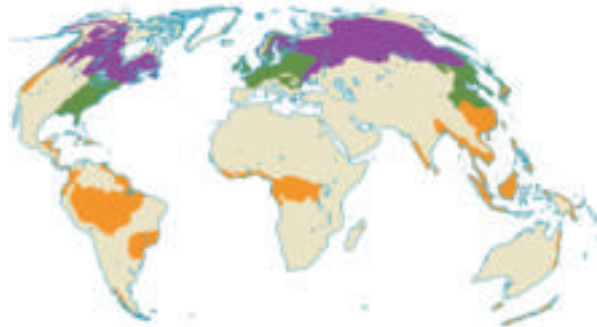
What do you think of when you hear the word *forest*? Although ancient forests were dominated by very tall ferns or mosses, the main characteristic of a modern forest is its trees. In a forest, trees provide food, shelter, and oxygen for many communities of organisms. The types of organisms that live in a forest ecosystem are often determined by the kinds of trees that grow there.

A forest includes much more than just the trees, though. The living parts of the forest—the biotic factors—also include shrubs and grasses, mosses, and other plants. Animals, from tiny insects to large mammals, depend on these plants and affect how they grow. Microorganisms that break down leaves into soil are an essential part of a forest.

Forests cover about thirty percent of the land surface of Earth. There are three major types of forest: deciduous forests, coniferous forests, and rain forests. Deciduous forests have trees with wide leaves that fall off in the winter. They are located in the middle latitudes of the Northern Hemisphere.

## Forests Around the World

-  Deciduous
-  Coniferous
-  Rain forest



The forest biomes form rings around the land masses of Earth.

Deciduous forests grow rapidly, beginning new growth each spring.



The main feature of coniferous forests is trees that produce seeds in cones. Trees in coniferous forests have needlelike leaves that remain on the trees throughout the winter. In general, coniferous forests grow farther north than deciduous forests.

A rain forest grows where temperatures are warm and where it rains throughout most of the year. Rain forests have very dense plant growth and the trees do not lose their leaves in the winter. Most rain forests are located near the equator and are known as tropical rain forests. Along the northwest coast of North America, where the ocean causes some areas to be warmer and wetter, there are some temperate rain forests.



Coniferous forests are adapted to the cold, snowy areas of the north.



In the rain forest plants grow tall, competing for sunlight.







# Deciduous Forests

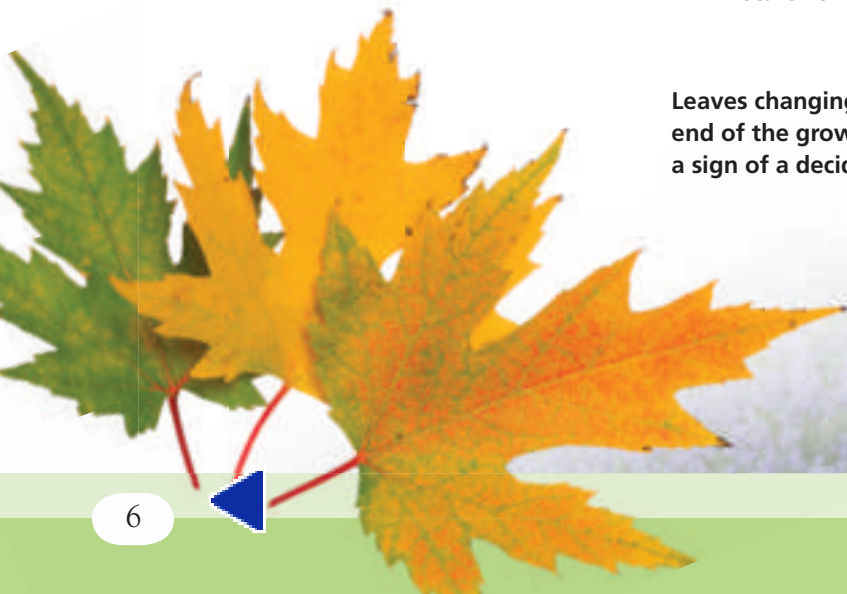
Deciduous forests grow in the temperate regions, between the cold polar area and the hot tropics. The plants and animals in this biome have adapted to cold winters and hot, rainy summers. If you live near a deciduous forest, you have seen leaves like those pictured below. The trees have broad leaves that gather a lot of light during the growing season. Leaves form a canopy, which is a covering high in the trees that blocks much of the light. The floor of the forest is covered with communities of plants, such as azaleas and mosses, that have adapted to decreased sunlight.

Trees use the light, heat, and moisture of the summer to grow and produce seeds. In autumn, when the amount of sunlight decreases, the leaves stop producing food for the tree, change color, and then drop to the ground. When this happens, the forest loses its canopy. If the leaves remained on the tree all winter, enough snow could collect on the leaves to break the branches. During the winter, the trees become dormant, which means that they do not produce food or grow.



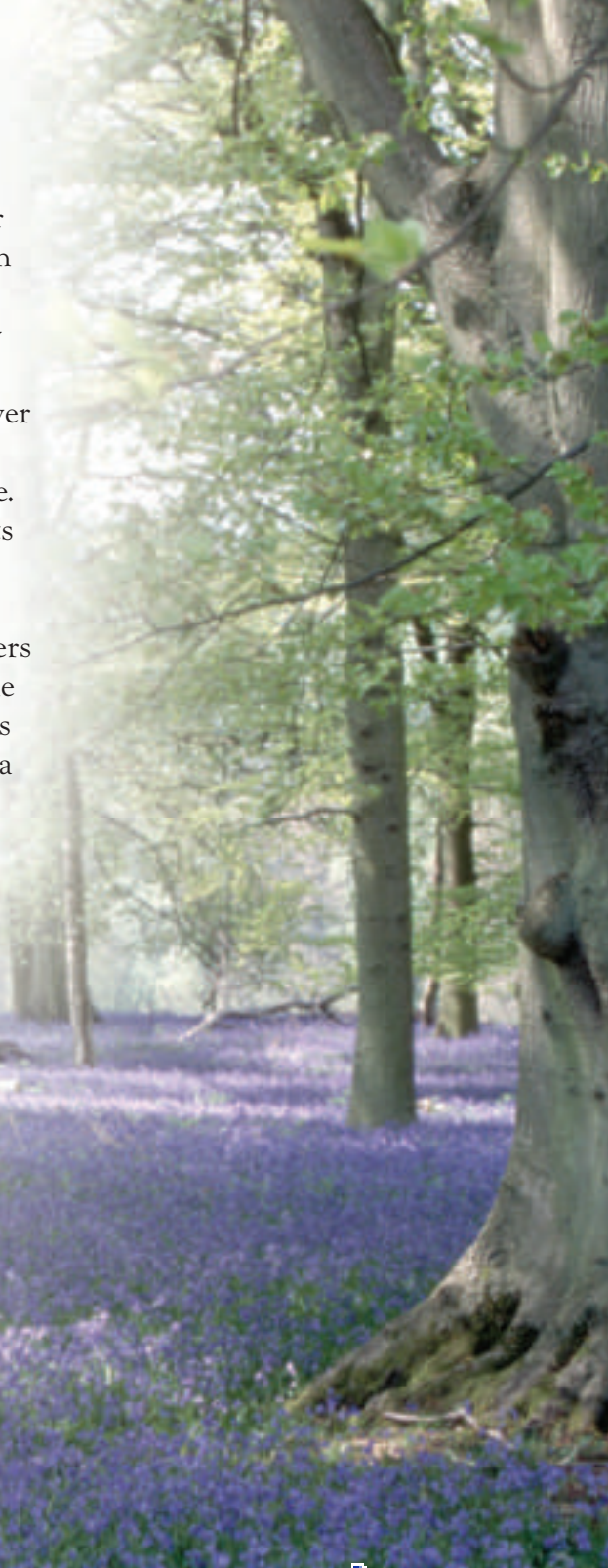
**Acorns and other deciduous tree seeds provide food for many animals, as well as start new trees.**

**Leaves changing color at the end of the growing season is a sign of a deciduous forest.**



In the spring, before the canopy returns, many smaller plants, such as the bluebells in the photograph on this page, use the extra sunlight to grow rapidly on the forest floor. Many small forest plants flower early in the growing season before the canopy is complete.

Within the canopy, insects and caterpillars feed on the nutrient-rich leaves. In turn, they become meals for warblers and other birds that live in the canopy. The sounds of insects and songbirds give the forest a feeling of constant activity.







Many different kinds of animals live in a deciduous forest. The decaying leaves on the ground provide nourishment for mushrooms and other fungi. The leaves are also home and food for animals such as insects and worms. Other small animals—toads, spiders, moles, and birds—eat the plants and animals on the forest floor. Larger animals that are common in this biome include skunks, raccoons, coyotes, deer, and bears.

After the trees lose their leaves, the food supply of the deciduous forest decreases until spring growth begins. Forest animals have to adapt to this shortage. Some birds and butterflies fly to warmer climates until the spring brings new food. Some animals move to a sheltered place. During the winter their body functions slow down, or they enter a similar state resembling sleep. Other animals, such as squirrels, chipmunks, and blue jays, store extra food in the warm months and then retrieve it in winter.

**This woodpecker finds insects inside trees, digging them out with its strong beak.**



**Deer eat low-growing plants, acorns, and young trees.**



# Coniferous Forests

Coniferous forests are located in a band around the northern parts of the continents of North America, Asia, and Europe. The organisms of these forests must be able to survive long, very cold winters. Most of the trees in these forests are conifers—trees that have long, narrow, evergreen leaves, often called needles. These leaves have waxy coatings that decrease water loss in the winter, when the frozen ground keeps the tree from getting water. Conifers include pines, spruces, and firs. They are called conifers because they produce cones instead of flowers.

Look at the photograph at the bottom of the page. You can see that all the trees have a similar shape—wide at the bottom and coming to a point at the top. Can you think of a reason why that is a good shape for a tree in a place with heavy snow?



**The needle-shaped leaves and the cone full of seeds show that the stone pine is a conifer.**





The shape of conifers is one adaptation to the cold, snowy climate. The branches bend downward and snow falls off the tree before it becomes heavy enough to break the branches. The needles usually are a dark color that absorbs the maximum amount of heat from the Sun, and they do not fall off the tree in winter. Because the summers are short, this allows the plant to start photosynthesis as early in the spring as possible.

The trees in a coniferous forest tend to grow close together and are very densely covered with needles. Because of this few plants grow on the ground. Mosses and lichens are common, but flowering shrubs are rare. Many insects and fungi live in the bark of the trees or in decaying logs of dead trees. Fungi, important decomposers in these forests, are also eaten by insects and other animals. One of the main sources of food for animals in the forest is the seeds produced in the cones of the trees.

**Bears of the coniferous forest grow fat from eating smaller animals, seeds, and berries, and then they are inactive all winter.**



**Birds of prey, including this American kestrel, thrive on the many small animals that live in ponds and bogs.**



Even in areas with little rain, the northern forests still have a lot of ponds and bogs. In spring, the melting snows provide a lot of water, which evaporates slowly in the cool climate. The wet environment is the perfect home for a large insect population. Many species of birds, such as grosbeaks, flycatchers, and warblers, fly to the northern coniferous forests in summer to feast on these insects. When the weather becomes cold, these birds migrate, or move from one place to another, flying south to a warmer climate for the winter. Many seed-eating birds, such as finches and sparrows, stay all year long.

Other animals of the forest adapt to the cold winters in several different ways. Some, such as hares and other small mammals, burrow underground during winter to escape the cold. Others, such as bears and bats, store food in their bodies as fat in summer and autumn, when there is a lot of food, and sleep during much of the winter. Wolves, mink, and wolverines grow thick winter coats so they can hunt even in cold weather.

**Many predators, such as this bobcat, grow a thick, insulating coat for the winter.**







# Rain Forests

The tropical rain forests make up a hot, wet biome located near the equator all around the world. In this climate, plants grow all year round, with no dormant period. Instead of summer and winter, the tropical seasons are the rainy season and the dry season. The temperature never drops below freezing. As you can see in the photo, the rain forest is full of lush, green growth.

The tropical rain forest grows in layers. The upper canopy is formed by trees that grow up to 130 feet tall. In the emergent layer giant trees grow sparsely to about 250 feet tall. Thick vines climb up the trunks of the trees into the canopy and compete with the trees for sunlight. Below the canopy is the middle layer, called the understory, made of vines, smaller trees, ferns, and palms. Many of the plants have huge leaves to capture as much light as possible.

**The rain forest contains layers of plants that compete for sunlight.**

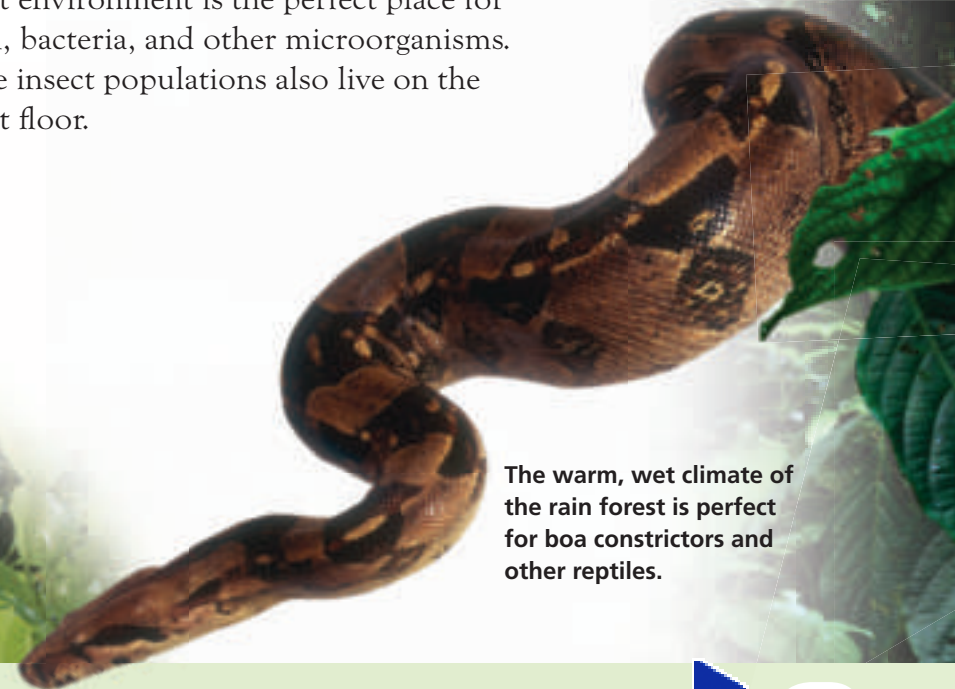


The canopy and understory are home to an incredible number of plants and animals, many of which never leave the trees. Some plants, including orchids and bromeliads, live in the trees, collecting nutrients from small pockets of decaying leaves. Colorful birds such as toucans and parrots, large butterflies and moths, and a wide variety of small reptiles and mammals move through the canopy looking for food and protection from predators. There are so many species in the rain forests around the world that scientists are constantly discovering new ones.

The bottom layer of the rain forest has very few plants because so little light reaches the forest floor, which is covered with wet leaves and decaying plants. The hot and moist environment is the perfect place for fungi, bacteria, and other microorganisms. Large insect populations also live on the forest floor.



**Many exotic birds, such as parrots, live in the canopy of the rain forest.**



**The warm, wet climate of the rain forest is perfect for boa constrictors and other reptiles.**







**This squirrel monkey's tail is useful for life in the branches.**



Many primates, such as monkeys and apes, live among the trees. Large mammals, such as hippopotamuses, rhinoceroses, and even elephants, live on forest floors. Large cats, including jaguars and leopards, prey on other animals, from frogs to antelope.

Rain forest animals have many interesting adaptations. Toucans and parrots have beaks that are designed for particular types of food. Some insects and reptiles protect themselves by making poisons. Poisonous animals are often very brightly colored, so that a predator knows they are dangerous.

Chameleons change the color of their body to blend into their environment and hide from predators.

The sloth, which lives in the South American forests, moves slowly through the trees. It hangs upside down looking for fruit. Algae grow in the sloth's fur, giving it a green color and making it difficult to detect.



**The red-eyed tree frog has huge, brightly colored eyes that scare away predators.**



# Forests at Risk

The type of forest that grows in a particular region depends on its climate. In the coniferous forests of the far north, success depends on developing a way to survive the winter. In the deciduous forests, many of the plants and animals take advantage of the changing seasons. The tropical rain forests provide food and shelter to more species than any other biome on Earth.

The central part of any forest is its trees. Unfortunately, many of the world's forests have disappeared or are threatened. Half of the tropical rain forests have been cut down in the last half century. Some of them have been cut for lumber and others to provide farmland. Because of the large number of different species and how they interact, it is almost impossible to restore a tropical rain forest that has been cleared. Many coniferous forests have also been cut down for lumber, paper manufacturing, and other wood products. Once the trees have been removed, erosion of the land by wind and water can cause problems that make it hard for the forest to regrow. Most of the original deciduous forests have been cut down for lumber and to clear fields for farming. Because this type of forest grows quickly, many of these forests have recovered, but without careful controls, even these forests are at risk.



**Hidden beneath the canopy of this rain forest live an incredible number of plants and animals.**

# Glossary

<b>canopy</b>	a covering of leaves high above the forest floor that absorbs most of the sunlight
<b>conifer</b>	a tree that produces seeds in cones and does not flower
<b>coniferous forest</b>	the forest of the north, centered around conifers and adapted to long, cold winters
<b>deciduous forest</b>	the forest of the temperate regions, in which trees lose their leaves and stop growing in winter
<b>dormant</b>	that does not grow or produce food
<b>hibernate</b>	to be in an inactive condition in which the body functions slow down
<b>migrate</b>	to travel to a different biome
<b>rain forest</b>	the forest of the tropics, which is in continual growth and has the most diversity
<b>understory</b>	the layer of plants growing between the forest floor and the canopy

# What did you learn?

1. Why do some animals in deciduous forests hibernate?
2. What adaptations help conifers survive the winter?
3. Why do few plants grow on the floor of the tropical rain forests?
4. **Writing in Science** The type of biome that exists in an area depends on its climate. What kind of adaptations do trees need to make to take advantage of differences in temperature and light in various climates?
5. **Main Idea and Details** What do you think is the main idea of the second paragraph on page 14? Identify details that support the main idea.

