

- 1 What Is a Biome?
- 2 Forest Biomes
- 3 Grassland, Desert, and Tundra Biomes



READING WARM-UP

Before you read this chapter, take a few minutes to answer the following questions in your **EcoLog**.

1. Describe the weather in the ecosystem in which you live. Does it rain a lot? Do the seasons change?
2. Describe a plant or animal that lives in your area. What kinds of adaptations does the plant or animal have that help it survive?

This thorny devil lives in the desert of Australia. The grooves in its rough skin help it collect water to drink. Water from rain or condensation lands on its back and runs along the tiny grooves to its mouth.

SECTION 1

What Is a Biome?

Earth is covered by many types of ecosystems. Ecologists group these ecosystems into larger areas known as biomes. A **biome** is a large region characterized by a specific type of climate and certain types of plants and animal communities. Each biome is made up of many individual ecosystems. The map in **Figure 1** shows the locations of the world's major land, or terrestrial, biomes. In this chapter, you will take a tour through these terrestrial biomes—from lush rain forests to scorching deserts and the frozen tundra. When you read about each biome, notice the adaptations that organisms have to their very different environments.

Biomes and Vegetation

Biomes are described by their vegetation because plants that grow in an area determine the other organisms that can live there. For example, shrubs called *rhododendrons* grow in northern temperate forests because they cannot survive high temperatures. However, mahogany trees grow in tropical rain forests because they cannot survive cold, dry weather. Organisms that depend on mahogany trees will live where mahogany trees grow.

Plants in a particular biome have characteristics, specialized structures, or adaptations that allow the plants to survive in that biome. These adaptations include size, shape, and color. For example, plants that grow in the tundra tend to be short because they cannot obtain enough water to grow larger. They also have a short summer growing season, while desert plants, such as cactuses, do not have leaves. Instead, cactuses have specialized structures to conserve and retain water.

Objectives

- ▶ Describe how plants determine the name of a biome.
- ▶ Explain how temperature and precipitation determine which plants grow in an area.
- ▶ Explain how latitude and altitude affect which plants grow in an area.

Key Terms

biome
climate
latitude
altitude

Figure 1 ▶ The ecosystems of the world can be grouped into regions called *biomes*. These biomes shown below are named for the vegetation that grows there.

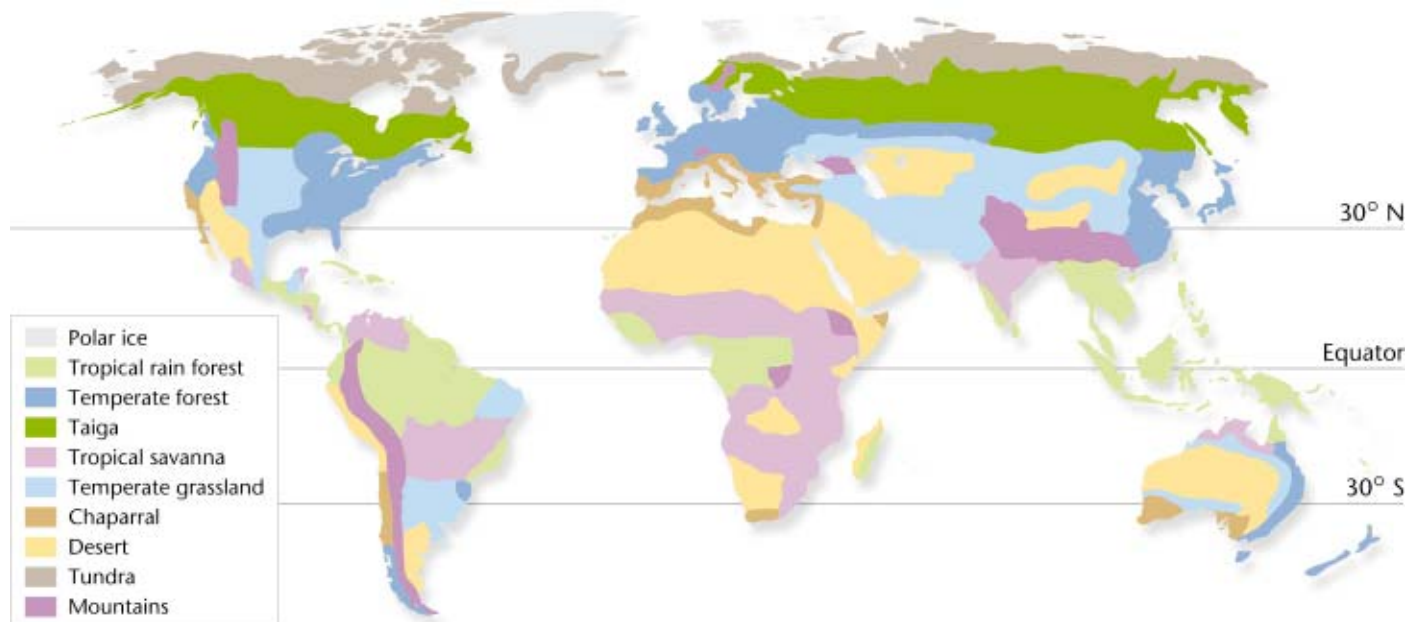
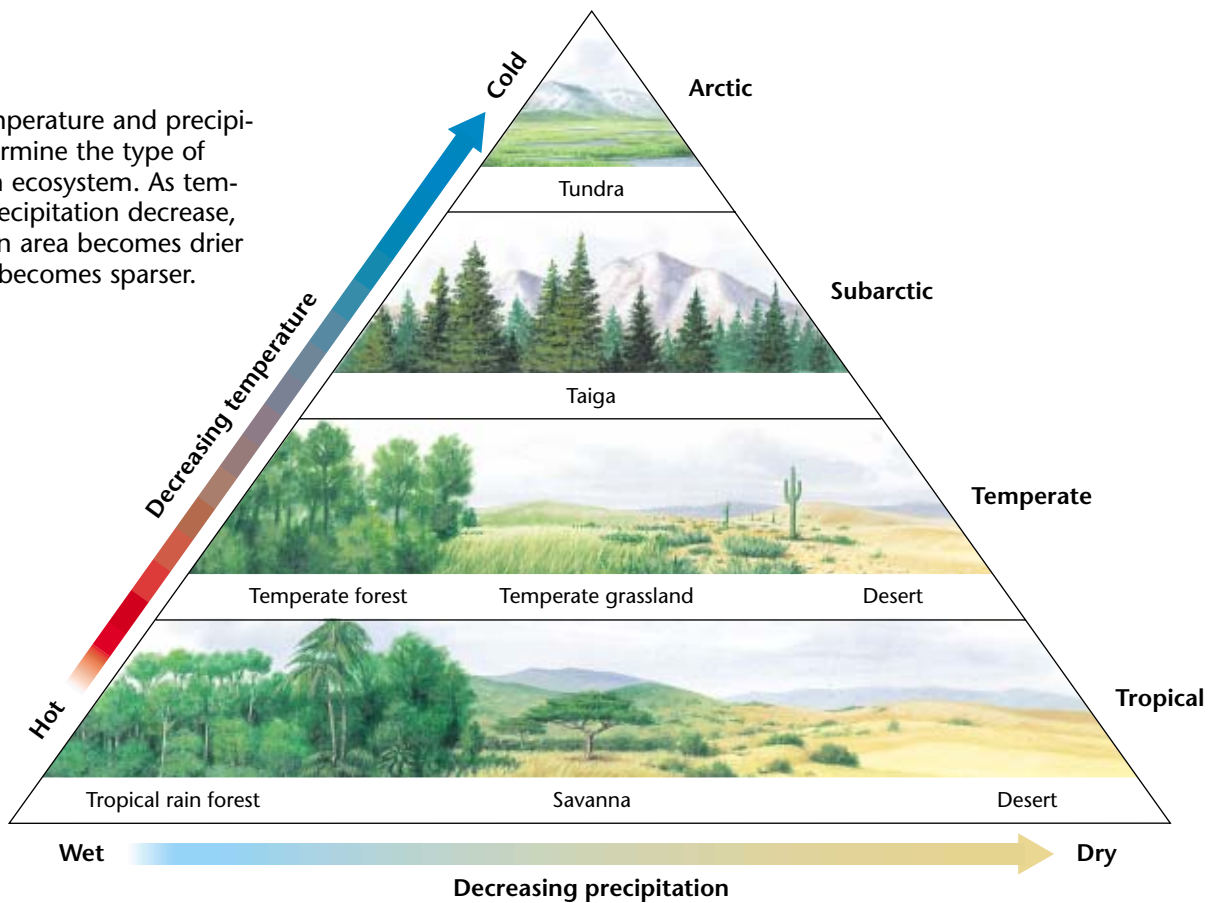




Figure 2 ▶ Plants in the tundra biome, such as those shown above, are usually short because the soil is frozen most of the year, which prevents the plants from obtaining much water.

Figure 3 ▶ Temperature and precipitation help determine the type of vegetation in an ecosystem. As temperature and precipitation decrease, the climate of an area becomes drier and vegetation becomes sparser.



Biomes and Climate

Biomes are defined by their plant life, but what factors determine which plants can grow in a certain area? The main factor is climate. **Climate** refers to the weather conditions, such as temperature, precipitation, humidity, and winds, in an area over a long period of time. Temperature and precipitation are the two most important factors that determine a region's climate.

Temperature and Precipitation The climate of a biome is determined by average temperature and precipitation. Most organisms are adapted to live within a particular range of temperatures and will not survive at temperatures too far above or below their range.

Precipitation also limits the organisms that are found in a biome. All organisms need water, and the larger an organism is, the more water it needs. For example, biomes that do not receive enough rainfall to support large trees support communities dominated by small trees, shrubs, and grasses. In biomes where rainfall is not frequent, the vegetation is made up of mostly cactuses and desert shrubs. The plants in **Figure 2** grow close to the ground in the tundra because there is not enough water to support larger plants and trees. In extreme cases, lack of rainfall results in no plants, no matter what the temperature is. As shown in **Figure 3**, the higher the temperature and precipitation are, the taller and denser the vegetation is. Notice how much more vegetation exists in a hot, wet tropical rain forest than in a dry desert.

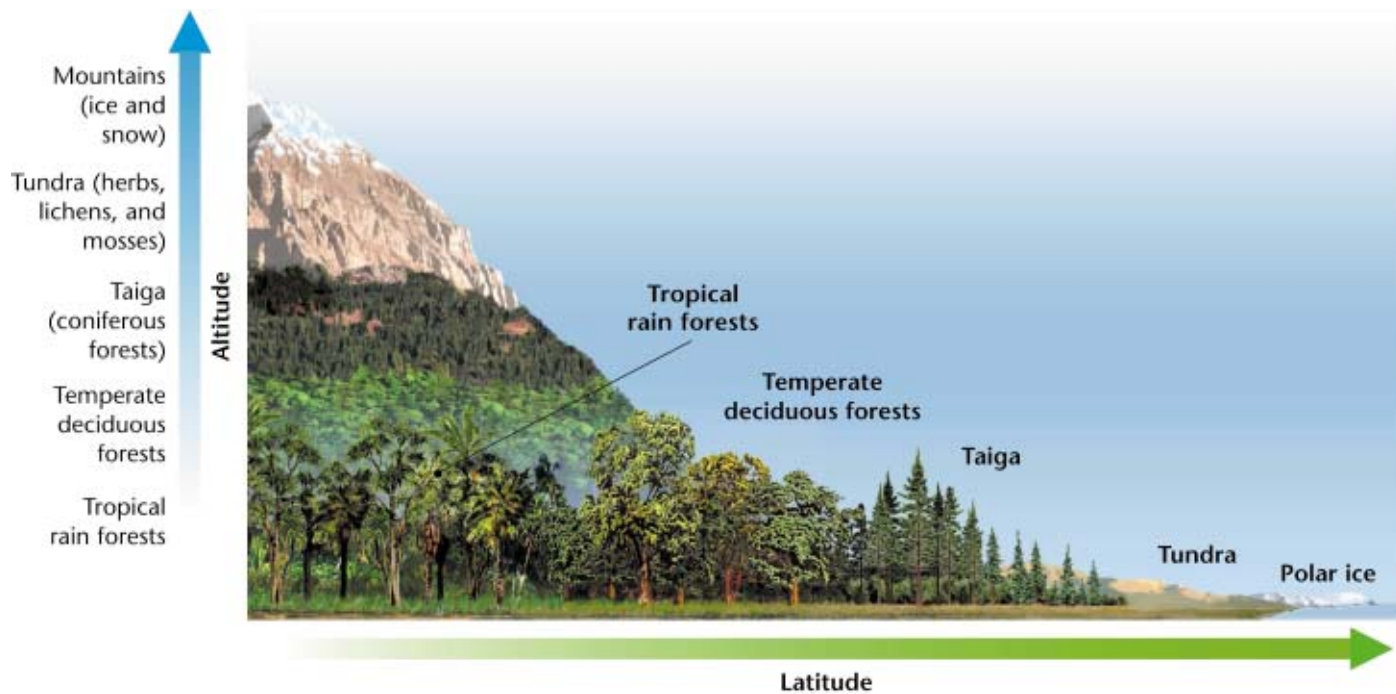


Figure 4 ▶ Latitude and altitude affect climate and vegetation in a biome.

Latitude and Altitude Biomes, climate, and vegetation vary with latitude and altitude. **Latitude** is the distance north or south of the equator and is measured in degrees. **Altitude** is the height of an object above sea level. Climate varies with latitude and altitude. For example, climate gets colder as latitude and altitude increase. So, climate also gets colder as you move farther up a mountain.

Figure 4 shows that as latitude and altitude increase, biomes and vegetation change. For example, the trees of tropical rain forests usually grow closer to the equator, while the mosses and lichens of the tundra usually grow closer to the poles. The land located in the temperate region of the world, between about 30° and 60° north latitude and 30° and 60° south latitude, is where most of the food in the world is grown. This region includes biomes such as temperate forests and grasslands, which usually have moderate temperatures and fertile soil that is ideal for agriculture.

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SECTION 1 Review

- Describe** how plants determine the name of a biome.
- Explain** how temperature affects which plants grow in an area.
- Explain** how precipitation affects which plants grow in an area.
- Define** *latitude* and *altitude*. How is latitude different from altitude? How do these factors affect the organisms that live in a biome?

CRITICAL THINKING

- Making Inferences** The equator passes through the country of Ecuador. But the climate in Ecuador can range from hot and humid to cool and dry. Write a short paragraph that explains what might cause this range in climate. **WRITING SKILLS**
- Analyzing Relationships** Look at Figure 1, and locate the equator and 30° north latitude. Which biomes are located between these two lines?