

Communities, Biomes, and Ecosystems

section 3 Terrestrial Biomes

MAIN Idea

Ecosystems are grouped into biomes based on the plant communities within them.

What You'll Learn

- the three major climate zones
- the major abiotic factors
- how climate and biotic factors differ among land biomes

Mark the Text

Identify Biomes Highlight each term that introduces a biome. Then use a different color to highlight important facts about each biome.

Picture This

1. **Identify** the latitude below that has the highest average temperature. (Circle your answer.)
 - a. 30°S
 - b. 60°N
 - c. 90°S

Before You Read

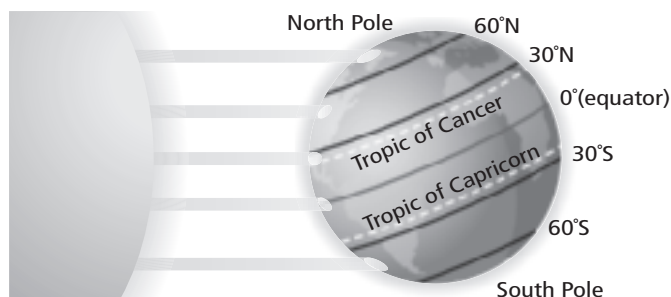
On the lines below, describe the climate in your area. Include seasonal differences in temperatures and precipitation. Then read the section to learn how climate influences the location of biomes.

Read to Learn

Effects of Latitude and Climate

Weather is the condition of the atmosphere at a specific place and time. **Climate** is the average weather conditions in an area, including temperature and precipitation. An area's latitude has a large effect on its climate. **Latitude** is the distance of any point on the surface of Earth north or south of the equator. The equator is 0° latitude. The poles, which are the farthest points from the equator, are 90° latitude.

As shown in the figure below, sunlight strikes Earth more directly at the equator than at the poles. As a result, different areas of Earth's surface are heated differently. Ecologists call these areas polar, temperate, and tropical zones.



What other factors affect biome location?

Recall that a biome is a large group of ecosystems that share the same climate and have similar types of communities. The plant and animal communities are adapted to the area's climate. Factors that determine climate include elevation, landmass features, winds, and ocean currents.

Major Land Biomes

Biomes are classified mainly by the characteristics of their plants. This section describes each major land biome.

What are the characteristics of tundra?

South of the Arctic ice cap, a band of tundra runs across the regions of northern North America, Europe, and Asia, as shown in the figure below. **Tundra** is a treeless biome with a layer of permanently frozen soil called permafrost beneath the surface. Mosses, lichens, and short grasses can grow in the tundra. ✓

Where is the boreal forest?

As shown in the figure below, the taiga extends across North America, Europe, and Asia, south of the tundra. The **boreal forest**, or taiga, is a broad band of dense evergreen forest. It is also known as the northern coniferous forest. The boreal forest does not have permafrost because temperatures are a bit warmer and summers are longer than in the tundra. Spruce, fir, and pine trees and low-growing shrubs and bushes grow in the boreal forest.



✓ Reading Check

2. Define permafrost.

Picture This

3. Identify Does any tundra lie within the United States? If so, where?

What trees thrive in the temperate forest?

Temperate forests are located south of the boreal forests.

Temperate forests are composed mostly of broad-leaved deciduous (dih SIH juh wus) trees. These are trees that shed their leaves over a short period. Areas of temperate forest have four seasons, with hot summers and cold winters. As shown in the figure below, temperate forests cover much of southeastern Canada, eastern North America, most of Europe, and parts of Asia and Australia.

Where do woodlands and shrublands occur?

Woodlands occur in areas surrounding the Mediterranean Sea, along the western coasts of North and South America, in South Africa, and in Australia. Open **woodlands** and shrub communities receive less rainfall than temperate forests. Areas with mostly shrubs are called chaparral. Summers are hot and dry. Winters are cool and wet. ☑

What keeps grasslands from becoming forests?

Temperate grasslands are found on many continents. Grasslands are called steppes in Asia; prairies in North America; pampas and llanos in South America; savannahs and velds in Africa; and rangelands in Australia. The fertile soils of **grasslands** support a thick cover of grasses. Grazing animals and fires keep grasslands from becoming forests. Grasslands have hot summers and cold winters.

Do any plants and animals live in a desert?

As shown in the figure below, deserts exist on every continent except Europe. A **desert** is any area where evaporation occurs at a faster rate than precipitation falls. In spite of dry conditions, deserts support cacti, sage brush, some grasses and bushes, as well as a variety of animals.

✓ Reading Check

4. **Contrast** How do woodlands differ from temperate forests?

Picture This

5. **Classify** Based on the map below and the map on the previous page, what is the main land biome in the northeastern United States?



What are features of a tropical savanna?

Tropical savannas occur in Africa, South America, and Australia. A **tropical savanna** is characterized by grasses and scattered trees in climates with less precipitation than other tropical areas. Summers are hot and rainy. Winters are cool and dry.

Where are tropical seasonal forests?

Tropical seasonal forests occur in Africa, Asia, Australia, and South and Central America. **Tropical seasonal forests**, also called tropical dry forests, have a wet season and a dry season. During the dry season, almost all of the trees drop their leaves to conserve water.

What biome supports the most diversity?

Tropical rain forests are found in the equatorial regions of Central and South America, Asia, western Africa, and Australia. A **tropical rain forest** has warm temperatures and lots of rainfall throughout the year. The tropical rain forest is the most diverse of all biomes. Tall trees covered with mosses, ferns, and orchids form the canopy, or upper layer. Shorter trees, shrubs, and creeping plants make up the understory, or lower layer.

Other Terrestrial Areas

Mountains do not fit the definition of a biome because their climate and plant and animal diversity are determined by elevation. Polar regions are also not true biomes because they are covered by ice masses and lack land areas with soil.

How do conditions change with elevation?

If you climb a mountain, you might notice that temperatures fall as you climb higher. Also, precipitation varies as you climb. As a result, many communities are able to exist on a mountain. Grasslands are at the bottom, pine trees grow farther up, and the cold elevations at the top support communities similar to the tundra.

Do polar regions support life?

A thick layer of ice covers the polar regions. In spite of year-round cold, polar regions support life. Polar bears and arctic foxes live in the arctic polar region in the north. Antarctica, in the south, supports colonies of penguins. Whales and seals prey on penguins, fish, and shrimplike krill in the coastal waters of Antarctica.



Think it Over

- 6. Contrast** How does rainfall differ between tropical rain forests and tropical seasonal forests?



Think it Over

- 7. Draw Conclusions** Name one adaptation of polar bears that helps them survive in their polar home.
