

**Key Words**

<b>biome:</b>	large geographic area with a certain climate and specific types of communities
<b>tundra:</b>	extremely cold and dry land biome
<b>taiga:</b>	biome dominated by large forests of cone-bearing trees
<b>littoral zone:</b>	area that runs along the shore and is affected by the tides
<b>sublittoral zone:</b>	area that lies just beyond the littoral zone through which sunlight passes to the ocean floor
<b>pelagic zone:</b>	the open ocean past the sublittoral zone

**KEY IDEAS**

Each population of organisms is adapted to a particular environment. It is no coincidence that regions of the earth that have a similar climate also have similar communities. A biome is a large geographic area with a certain climate and specific types of communities.

More than half of all the species on the earth live in the tropical rain forests. The many different kinds of species found in the rain forests are helpful to humans. Many foods and ingredients in the medicines we use come from the rain forests. For example, many plants that have chemicals which fight cancer come from the tropical rain forests. Unfortunately, the rain forests are being destroyed by human activities. They are being cut down for timber, mining, farming, and grazing. Most rain forest organisms are adapted to a very specific environment. Once their home is destroyed, they become extinct. People worldwide are working hard to preserve the rain forests.

The tropical rain forest is an example of a biome. A **biome** (BY-ohm) is a large region of the earth with a certain climate and specific plant and animal species. There are two major types of biomes: land biomes and water biomes. Most land biomes are named for the plant life that dominate the area. Climate affects the plant life of land biomes. Fig. 41-1 compares rainfall and temperature among the earth's six major land biomes.



Fig. 41-1

Land Biome Climates		
Biome	Average yearly rainfall	Average yearly temperature range
Tundra	less than 25 cm	-25°C - 4° C
Taiga	25-100cm	-10°C -14 °C
Deciduous forests	75-125cm	6°C -28° C
Tropical rain forests	200-450cm	25°C -28° C
Grasslands	25-75 cm	0°C -25° C
Deserts	less than 25cm	15°C -40° C

The kinds of populations found in each biome depend on the amount of energy the biome receives. Recall that the main source of energy for all the earth's organisms is the sun. Some regions of the earth receive much energy from the sun all year. The more energy that is available in an area, the more diverse are its populations. The tropical rain forest is such a place. In other places, the amount of energy varies with the seasons. A limited amount of energy, in turn, limits the kinds of species that can be supported by an area.

1. What is a biome? \_\_\_\_\_
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**Tropical Rain Forest Biome.** Near the equator is the tropical rain forest biome. Rain forests receive more than 200 centimeters of rain each year. Temperatures in this biome stay warm all year. The energy flow in tropical rain forests is generally constant. The plentiful energy allows for greater diversity in the populations. The populations are not limited by the amount of water or energy. As a result, more species of plants and animals live in the tropical rain forests than in any other biome.

The organisms live where they can receive the energy they need. Most of the animals live in trees high above the floor of the rain forest. The thick covering of trees prevents the sun's energy from reaching much of the lower part of the forest.

**Deciduous Forest Biome.** In the deciduous forest biome, average rainfall is more than 75 centimeters each year. This amount of rainfall helps the plant life flourish. The dominant plant life is deciduous trees. Deciduous trees have broad, flat leaves, which they lose in autumn. Examples of deciduous trees are oaks, maples, and birches. The trees are suited to the cold winters and warm summers of the region. The supply of energy in the winter is less



than in the summer. The populations must be able to cope with the energy difference. This change limits the number of species that can live in the deciduous forest biome.

Many populations of animals live in the deciduous forest. They include squirrels, deer, rabbits, and wolves. During the summer when energy is plentiful, the plants and animals take in energy and reproduce. During the winters, when little energy is available, the trees and many of the animals become inactive. This allows them to conserve their energy. A large variety of birds spend summers in the deciduous forest. However, the lower energy in the winter forces many bird species to fly to a warmer climate.



2. Why are plants and animals in the deciduous forest biome inactive in winter? \_\_\_\_\_

**Tundra Biome.** The **tundra** (TUN-druh) is a very cold and very dry land biome. Temperatures in this biome are below freezing most of the year. Plants such as mosses, grasses, and low shrubs sprout in the tundra during summer. The plants must grow and reproduce quickly. They have to use the sun's energy when it is available during the short summer. Because there is so little energy available, only one percent of all the earth's plants live in the tundra biome. Only a few animal species with small populations can survive in the tundra. Animals such as caribou and reindeer feed on the sparse plants that appear in summer.

**Taiga Biome.** The **taiga** (TY-guh) biome is dominated by large forests of coniferous, or cone-bearing, trees. Conifers such as fir, pine, and spruce trees thrive in the taiga. The needle-shaped leaves hold in heat and water to survive the long, cold, dry winters. Many types of animals are also adapted to this environment. Moose, black bears, and elk inhabit the taiga year round. During the summer, birds such as ducks and geese migrate to the coniferous forests. They feed on the many insect populations that thrive during the warm, moist summer.

**Desert Biome.** In the desert biome, rain might fall only once every few years. To survive, desert plants, such as sagebrush and cacti, must be able to store water. Desert organisms must also be able to survive the very hot days and very cool nights of this biome. Many desert animals, such as owls and coyotes, are active mainly at night.

**Grassland Biome.** The grassland biome is generally found in the interior parts of the continents. The biome does not receive enough rainfall to support much tree growth. However, the hot, dry summers and cold, snowy winters are ideal for wheat, corn, and other grasses. Grazing animals such as antelope, cattle, and sheep thrive in this biome.



The six land biomes you have just read about cover vast areas of the earth. But more than 75 percent of the earth's surface is covered by water. This water surface is divided into two biomes: freshwater biomes and marine biomes.

**Freshwater Biome.** Rivers, streams, swamps, and lakes make up freshwater biomes. These bodies of water contain little or no salt. Some freshwater biomes, such as lakes and ponds, contain standing water. Other freshwater biomes, such as rivers and streams, contain running water. The types of organisms found in a freshwater biome are determined by temperature, water speed, food sources, sunlight, and the amount of oxygen and particles in the water. Algae, trout, crayfish, and bass are examples of populations suited to this biome.

**Marine Biome.** The other type of water biome is the marine, or ocean, biome. The marine biome is larger than all other biomes combined. This biome consists of bodies of salt water such as the earth's oceans. Because it is so vast, scientists divide the marine biome into three different zones, or areas.

The **littoral zone** (LIHT-er-ul ZOHN) is the area of the ocean that runs along the shore. It is affected mostly by the tides, or the rise and fall of water. Organisms that live in the littoral zone must be able to stand the force of waves hitting the shore. They must also be adapted to changes in water level and temperature. Sea stars, mussels, and crabs are organisms that live in the littoral zone.

Farther out to sea, just past the littoral zone is the **sublittoral zone** (suhb-LIHT-er-uhl ZOHN). The sublittoral zone is shallow. This zone receives a large amount of energy from sunlight. Sunlight passes through the shallow salt water to the ocean bottom. This energy and the large supply of nutrients make the sublittoral zone the most populated place in the ocean. In fact, about 90 percent of all the ocean's species live in the littoral and sublittoral zones.



3. Why is the sublittoral zone the most populated place in the ocean?

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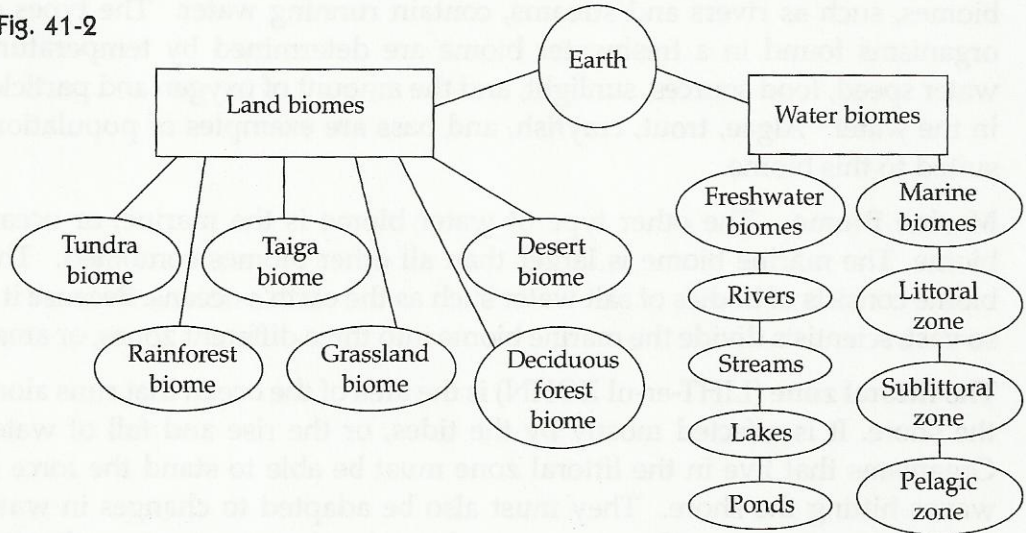
Beyond the sublittoral zone lies the open ocean, or **pelagic zone** (puh-LAJ-ihk ZOHN). Sunlight passes through only the top 200 meters of this zone. The ocean is 15,000 meters deep in some parts. This means that all the energy is concentrated in a very small portion of the zone. Water at depths below 200 meters is dark and cold. Water pressure is very high. Thus very few organisms live in the ocean below 200 meters. The organisms that do live there cannot get energy directly from the sun. They must depend on eating organisms that live in the sunlit zone to obtain energy.

Organisms living in the pelagic zone below 200 meters must be adapted to its unique environment. Often, the organisms have keen sense organs that help them find food in the dark. The flashlight fish, for example, produces light that helps it find prey.

**TAKE  
ANOTHER  
LOOK**

Fig. 41-2 shows the 6 major land biomes and the 2 water biomes.

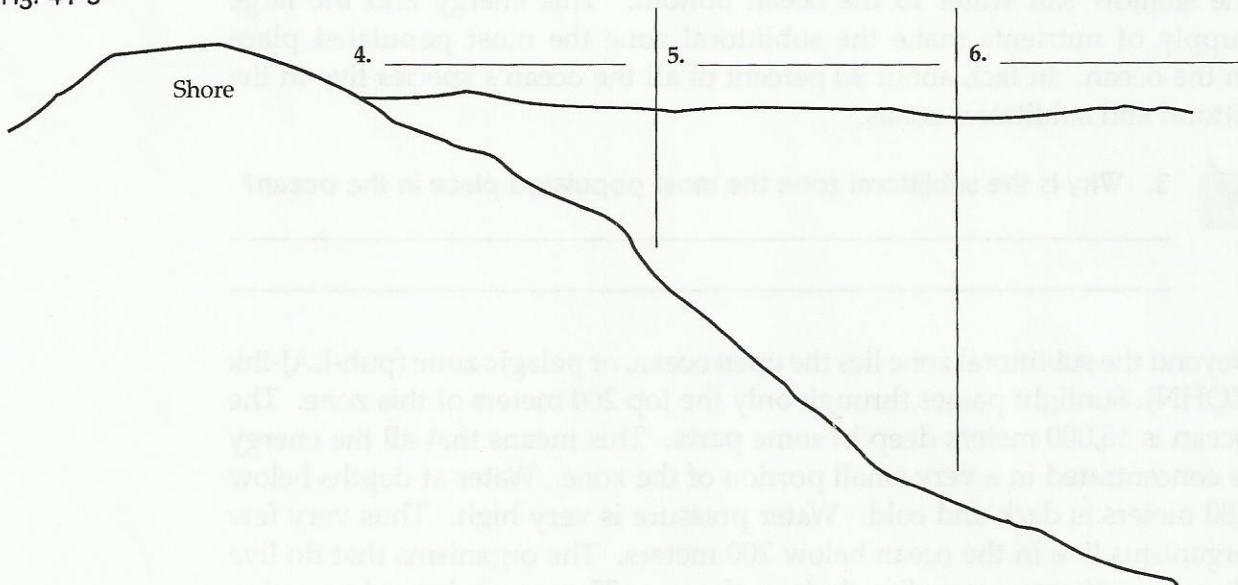
Fig. 41-2



**Check Your  
Understanding**

Label Fig. 41-3 with the names of the three zones of a marine biome.

Fig. 41-3







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7. What are the six land biomes?

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8. Why do certain populations live in a particular biome?

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9. Why are there are so many different species living in the tropical rain forest biome? \_\_\_\_\_

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10. Why do organisms living in the pelagic zone below 200 meters depend on organisms living above that depth to supply their energy?

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