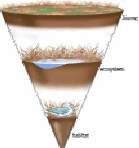


1.1 Biomes

- The word "biosphere" refers to the area on and near Earth's surface where living things exist.
- A biome is a region with similar biotic and abiotic components.
 - Biotic = living things
 - Abiotic = non-living things (air, water, soil, etc.)
- If biotic and abiotic conditions are the same, similar biomes can exist far apart.
- A biome here in B.C. can be the same as a biome in New Zealand.
- Biomes are classified based on many qualities, such as water availability, temperature, and interactions between biotic and abiotic factors.
- Examples of Biomes: Boreal forest, desert, grassland, permanent ice, temperate deciduous forest, temperate rainforest, tropical rainforest, and tundra.




The Biosphere

See pages 8 - 10
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Factors That Influence the Characteristics and Distribution of Biomes

- Certain characteristics help to identify biomes.
 - Temperature and precipitation are two of the most important abiotic factors.
 - Other factors include latitude, elevation, and ocean currents.

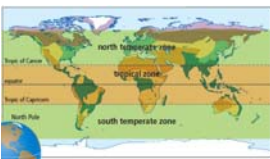


Biomes of the World

See pages 10 - 13
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Factors That Influence the Characteristics and Distribution of Biomes (continued)

- Latitude is an abiotic factor that influences biomes.
 - Latitude is the distance north and south from the equator.
 - Latitude influences both temperature and precipitation.
 - The tropical zone has very warm temperatures and high precipitation.
 - The tropical zone receives more direct sunlight than do temperate zones.
- Elevation also influences biomes.
 - The atmosphere is thinner at higher elevations, and therefore less heat is retained.
 - Windward sides of mountains are wet, leeward sides are very dry.
- Ocean currents carry warmth and moisture to coastal areas.
 - Where warm currents meet land, temperate biomes are found.

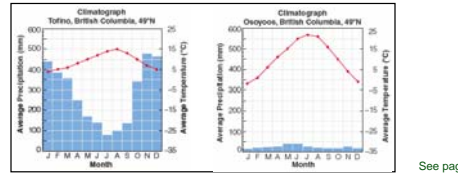


Zones of the World

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Climatographs


- Climate refers to the average pattern of weather conditions of a large region over a period of 30 years or more.
 - A climatograph shows the average temperature and precipitation for a location over a period of 30 years or more.
- Biomes are often defined using information in climatographs.
 - Examine the differences between the climatographs for Tofino and Osoyoos



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Adaptations and Biomes

- Biomes are often identified with characteristic biotic factors,
 - such as a cactus in the desert or a caribou on the tundra.
 - Many of these characteristic factors have special adaptations for that biome.
 - An adaptation is a characteristic that allows an organism to better survive and reproduce.
 - Structural adaptation – a physical feature that helps an organism survive
 - A wolf has large paws to help it run in snow.
 - Physiological adaptation – a physical or chemical event inside the body of an organism that allows it to survive
 - A wolf maintains a constant body temperature.
 - Behavioural adaptation – a behaviour that helps an organism to survive
 - Wolves hunt in packs to capture large prey.

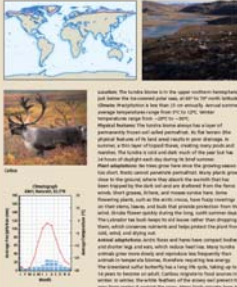


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A Survey of Biomes: Tundra and Boreal Forest

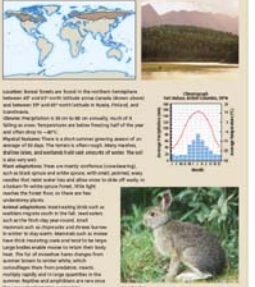
See pages 20 - 21

Tundra



Location: The tundra biome is in the upper northern hemisphere and covers the frozen and semi-frozen soil at the top north latitude. Climate: The tundra has a long, cold winter and a short, cool summer. Precipitation is low, and the ground is often frozen.

Boreal Forest



Location: Boreal forests are found in the northern hemisphere between 50° and 70° north latitude. Climate: Boreal forests have a long, cold winter and a short, cool summer. Precipitation is low, and the ground is often frozen.

A Survey of Biomes: Temperate Deciduous Forest and Temperate Rainforest

See pages 22 - 23

Temperate Deciduous Forest

Location: These forests are found mostly in eastern Canada, the eastern United States, western Europe, and western Japan. Northern Australia and New Zealand also have areas of deciduous forest. They are about 30° north latitude and between 30°P and 60°P north latitude.

Climate: The annual rainfall is about 1000 mm (40 in.) with moderate seasonal differences throughout the year. Temperatures range from 10°C to 20°C in summer. Winters are cold, with temperatures ranging from 0°C to 10°C. There is a long period of snow cover.

Plants: Many temperate deciduous trees are deciduous, losing their leaves in the fall. The trees are mostly 10 to 20 m tall. The forest floor is covered with fallen leaves that decompose into rich soil. The trees are mostly 10 to 20 m tall. The forest floor is covered with fallen leaves that decompose into rich soil.

Temperate Rainforest

Location: Temperate rainforests are found about 50°P to 60°P north latitude along the coast of the Pacific Ocean and from 50°P to 60°P south latitude along the west coast of South America, including southern Chile and southern New Zealand.

Climate: Rainfall is about 2000 mm (80 in.) per year with average temperatures ranging from 5°C to 15°C. Clouding is high throughout the year.

Plants: Many temperate rainforests consist of evergreen trees that are deciduous in winter, when the trees lose their large amount of water on the west coast of North America.

Animals: Many temperate rainforests have a high percentage of evergreen trees. The trees are mostly 10 to 20 m tall. The forest floor is covered with fallen leaves that decompose into rich soil.

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A Survey of Biomes: Grassland (Temperate and Tropical)

See pages 24 - 25

Grassland (Temperate and Tropical)

Location: The grassland forest in Canada is referred to as the temperate grassland or prairie. Grasslands are also found in other locations in North America and Europe. In Asia, temperate grasslands are found about 30°P north latitude and between 30°P and 60°P north latitude.

Climate: Temperatures range from 10°C to 20°C in summer. Winters are cold, with temperatures ranging from 0°C to 10°C. There is a long period of snow cover.

Plants: Many temperate grasslands are composed of tall grasses that are 1 to 2 m tall. The grasses are mostly 10 to 20 m tall. The forest floor is covered with fallen leaves that decompose into rich soil.

Grassland (Temperate and Tropical)

Location: Many cold and moist subtropical grasslands, such as savanna, prairie, and steppes, cover between 10°P and 30°P north latitude. Tropical grasslands, such as the tall grass steppes, are found in South America, Africa, and Australia.

Climate: Temperatures range from 10°C to 20°C in summer. Winters are cold, with temperatures ranging from 0°C to 10°C. There is a long period of snow cover.

Plants: Many temperate grasslands are composed of tall grasses that are 1 to 2 m tall. The grasses are mostly 10 to 20 m tall. The forest floor is covered with fallen leaves that decompose into rich soil.

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A Survey of Biomes: Tropical Rainforest and Desert (Hot and Cold)

See pages 26 - 27

Tropical Rainforest

Location: Tropical rainforests are found in a band 1000 km wide around the equator. They are found in the Amazon basin, the Congo basin, and Southeast Asia. They are about 10° north latitude and 10° south latitude.

Climate: The annual rainfall is about 2000 mm (80 in.) with moderate seasonal differences throughout the year. Temperatures range from 20°C to 30°C in summer. Winters are warm, with temperatures ranging from 20°C to 30°C. There is a long period of snow cover.

Plants: Many tropical rainforests are composed of tall trees that are 10 to 20 m tall. The trees are mostly 10 to 20 m tall. The forest floor is covered with fallen leaves that decompose into rich soil.

Desert (Hot and Cold)

Location: Hot deserts are found on every continent around the world. They are found in the Sahara, the Arabian Desert, and the Great Basin. They are about 30° north latitude and 30° south latitude.

Climate: The annual rainfall is about 100 mm (4 in.) with moderate seasonal differences throughout the year. Temperatures range from 10°C to 20°C in summer. Winters are cold, with temperatures ranging from 0°C to 10°C. There is a long period of snow cover.

Plants: Many hot deserts are composed of small, drought-tolerant plants. The trees are mostly 10 to 20 m tall. The forest floor is covered with fallen leaves that decompose into rich soil.

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A Survey of Biomes: Permanent Ice (Polar Ice)

See page 28

Permanent Ice (Polar Ice)

Location: This biome includes the polar ice caps and large glaciers in the Arctic, Greenland, and Antarctica. It is found in the Arctic and Antarctic regions.

Climate: The annual precipitation is less than 10 cm, most falling as snow. The temperature is below 0°C. Winters are very cold, with temperatures ranging from -50°C to -60°C. There is a long period of snow cover.

Plants: Many permanent ice biomes are composed of small, drought-tolerant plants. The trees are mostly 10 to 20 m tall. The forest floor is covered with fallen leaves that decompose into rich soil.

[Take the Section 1.1 Quiz](#)

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1.2 Ecosystems

- By studying past and present ecosystems, we can better understand what may happen in the future.
 - Historical ecology is the study of natural and written materials to better understand the ecology of a certain area.
 - Many First Nations sources provide detailed knowledge of plants, animals, and natural occurrences of an area.
- An ecosystem is made up of many parts.
 - Abiotic factors include air, water, soil, nutrients, and light.
 - Biotic factors include plants, animals, and micro-organisms.
 - Ecosystems can take up many hectares of land or can be small, such as a tide pool or a rotting log.
 - A habitat is where an organism lives.

The habitat of the red fox often includes the edges of forests or marshlands.

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Abiotic Interactions in Ecosystems

- The abiotic components are what allow the biotic components to survive in an ecosystem.
 - Abiotic factors include oxygen, water, nutrients, light and soil.
 - Oxygen is produced by the green plants and certain micro-organisms and is used by animals and most other micro-organisms.
 - Water is necessary for all life.
 - Nutrients often enter the food chain with plants and are very important for growth.
 - Light is required for photosynthesis, which is the process in plants that converts and stores the Sun's energy into starches and carbohydrates.
 - Soil not only contains water and nutrients but also is home to many plants and animals.

Earthworms in soil

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Biotic Interactions in Ecosystems



- A community = all the organisms that interact within an ecosystem.
 - ♦ A species refers to all of the organisms within an ecosystem that have the same structure and that can reproduce with each other.
 - ♦ A population refers to all of the members of a certain species within an ecosystem.
- Symbiotic relationships are the interactions between members of two different species that live together in a close association.
 - ♦ Commensalism – one species benefits, one is not affected
 - Example: the barnacles on a whale
 - ♦ Mutualism – both species benefit
 - Example: a bee gathering nectar from a flower
 - ♦ Parasitism – one species benefits, the other is harmed
 - Example: hookworm living in dogs

See pages 39 - 43

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Niches, Competition and Predation



- A niche refers to the role an organism has within an ecosystem, physically, chemically and biologically.
- Competition occurs when a resource is needed by two or more individuals.
 - ♦ Competition usually means resources are limited.
 - ♦ This limits the size and health of that individual and perhaps that population.
- Predation is the relationship between the “eaters” and the “eaten”.
 - ♦ Predators have adaptations to help them catch their prey.
 - ♦ Prey have adaptations to help avoid predators.
 - Examples of adaptations include spines and shells, camouflage and mimicry.
 - ♦ The numbers of predators and prey influence each other.



Coyotes compete over habitat or food sources.

See pages 44 - 47

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Biodiversity in Ecosystems



- Biodiversity refers to the variety and number of different individuals and species in an ecosystem.
 - ♦ Healthy ecosystems generally have high biodiversity.
 - ♦ Most biodiversity losses occur from the loss of habitat.
- Humans often have a negative impact on biodiversity.
 - ♦ Many efforts are now made to lessen this impact in order to maintain biodiversity.
 - Ecological management programs try to balance human progress with maintaining biodiversity.



Wetlands provide habitats.

See page 48

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[Take the Section 1.2 Quiz](#)