

## Chapter Twenty: The Earth's Ecosystems

### Teacher Notes

#### Lesson One: Land Biomes

- The Earth's Land Biomes
  - Climate-the average weather conditions for an area over a long period of time.
  - Abiotic Factors-nonliving parts of an environment.
  - Biotic Factors-living parts of the environment.
  - Biome-a large region characterized by a specific type of climate and certain types of plant and animal communities.
- Forests-are found in areas that have mild temperatures and plenty of rain.
  - Temperate Deciduous Forests
    - areas of forest where the trees change color and lose leaves in the winter
  - Coniferous Forests
    - forest containing mostly conifers (cone-bearing trees)
      - trees with leaves with a thick, waxy coating to keep them from drying out and from damage during the cold. These trees lose leaves a few at a time all year so they are green all year.
  - Tropical Rain Forests
    - forests with a large biodiversity (larger than any place on Earth)
    - most animals live in the canopy (treetops)
    - located in warm area
    - has soil very poor in nutrients because of the large amount of plants taking nutrients and rain washing the nutrients away.
- Grasslands-flat or gently rolling hills covered with grass.
  - Temperate Grasslands
    - include grasses and other flowering plants with few trees in temperate climates.
    - Fires, drought, and grazing prevent the growth of trees and shrubs.
  - Savannas
    - a grassland that often has scattered trees and that is found in tropical and subtropical areas where seasonal rains, fires, and drought happen.
    - found in parts of Africa, India, and South America
    - grasses have deep roots to survive for months without water.
- Deserts-region that has little or no plant life, periods without rain, and extreme temperatures; usually found in hot climates.
  - adaptation-plants will grow far apart so they don't compete for water; roots grow just under the surface so they can grab water quickly.
  - plants may also have fleshy leaves to store water.
  - animal adaptations-active at night, bury themselves in ground, and store water
- Tundra-a treeless plain found in the Arctic, in the Antarctic, or on the tops of mountains that is characterized by very low winter temperatures and short, cool summers.
  - Polar Tundra
    - found near North and South Poles
    - layer of soil beneath the surface stays frozen all year (called permafrost)
    - layer of soil is too thin for deep-rooted plants

- shallow-rooted plants such as grasses, small shrubs, mosses, and lichens grow in this area
- Alpine Tundra
  - similar to arctic tundra and has permafrost
  - is found at the top of tall mountains
  - alpine tundra is located above the tree line (trees can't grow)

## **Lesson Two: Marine Ecosystems**

- Life in the Ocean
  - oceans are shaped by abiotic factors including water temperature, water depth, and the amount of sunlight that passes into the water.
- Temperature
  - temperature decreases as the depth of the water increases
    - temperature change is not gradual
    - water near the equator is warmer than water near the poles
    - surface temperatures are much warmer than deep waters
  - temperature affects the animals that live in an area
- Depth and Sunlight
  - The Intertidal Zone
    - place where ocean meets land
    - exposed to air for part of the day
    - animals here have adaptations for land and water living
  - The Neritic Zone
    - water is deeper and ocean floor slopes downward
    - water is warm and receives a lot of sunlight
    - corals, sea turtles, fishes, and dolphins live here
  - The Oceanic Zone
    - sea floor drops sharply
    - plankton found near surface; whales, sharks, and fish
    - animals found in the deep water get food from material that sinks down from the surface
  - The Benthic Zone
    - the ocean floor
    - deepest parts get no sunlight
    - very cold
    - animals such as fish, worms, and crabs have special adaptations
    - some organisms get energy from chemicals that escape from thermal vents on the ocean floor
- A Closer Look
  - Intertidal Area
    - found near shore
    - include mud flats, sandy beaches, and rocky shores
    - organisms must be able to survive underwater and on land
    - animals include crabs, clams, worms, and plankton
  - Coral Reefs

- found in warm, shallow areas of the neritic zone
- made of small animals called corals; when they die they leave their skeleton behind
- Estuaries-an area where fresh water from rivers mixes with salt water from the ocean
  - plants and animals must survive the changes in salt concentrations
- The Sargasso Sea
  - found in the middle of the Atlantic Ocean
  - contains floating rafts of algae called sargassum
  - many of the animals here are the same color as the sargassum
- Polar Ice
  - the Arctic Ocean and the ocean around Antarctica
  - support plankton, fishes, polar bears, penguins

### **Lesson Three: Freshwater Ecosystems**

- Stream and River Ecosystems
  - characterized by abiotic factors
    - major abiotic factor is how fast the water is moving
  - plants line the edges of streams and rivers
  - fish live in open waters
  - clams and snails live in the mud at the bottom
  - some organisms have adaptations to prevent them from moving with the water
- Pond and Lake Ecosystems
  - Life Near Shore
    - Littoral Zone-the shallow zone of a lake or pond where light reaches the bottom and nurtures plants.
      - sunlight makes it possible for algae and plants to grow
      - floating plants may also grow here
      - also home to small animals, snails, and insects, frogs, turtles, fish, and snakes
  - Life Away From Shore
    - Open-water Zone-the zone of a pond or lake that extends from the littoral zone and that is only as deep as light can reach.
      - home to bass, lake trout, and other fishes
    - Deep-water Zone-the zone of a lake or pond below the open-water zone, where no light reaches
      - catfish, carp, worms, crustaceans, fungi, and bacteria live here
- Wetland Ecosystems
  - wetlands-an area of land that is periodically underwater or whose soil contains a great deal of moisture.
    - support many plants and animals
    - help to control floods
  - Marshes-a treeless wetland ecosystem where plants such as grasses grow
    - grasses, reeds, bulrushes, and wild rice are common marsh plants
    - muskrats, turtles, frogs, and birds live here
  - Swamps-a wetland ecosystem in which shrubs and trees grow

-found in low lying areas and beside slow-moving rivers

-most are flooded part of the year

-willows, bald cypresses, and oaks are common

-vines, grow up trunks, hang from tree branches, and grow in the standing water

-From a Lake to a Forest

-if a lake or pond fills with sediment plants will grow in the new soil. As this happens the area becomes a wetland and eventually a forest.