Ecosystems Chapter 4

What is an Ecosystem?

Section 4-1

Ecosystems

Key Idea: An ecosystem includes a community of organisms and their physical environment.

- A community is a group of various species that live in the same place and interact with one another.
- An ecosystem is the community, along with the living and nonliving environment.

- A habitat is the place where an organism lives.
- Biodiversity is the variety of organisms in a given area.

Community of Organisms

- A community of organisms is a web of relationships.
- Biotic describes living factors in an ecosystem.
  - Examples:
    - Relationships between organisms
    - Once-living things
      - Dead organisms
      - Waste of organisms

Physical Factors

- Abiotic factors are the physical or nonliving factors of an environment.
  - Examples: oxygen, water, rocks, sand, sunlight, temperature, and climate
    - plants and animals in deserts are small because deserts do not have enough water to support large organisms

Biodiversity

- Physical factors have a big influence on biodiversity.
  - High or low temperatures, or limited food or water can lower biodiversity.
- Ecosystems with high biodiversity are often more able to resist damage.
  - Damage to ecosystems can be caused by severe weather events or human activities.
- Systems with low biodiversity can be severely damaged easily.

Succession

Key Idea: An ecosystem responds to change in such a way that the ecosystem is restored to equilibrium.

- Succession is the replacement of one kind of community by another at a single place over a period of time.

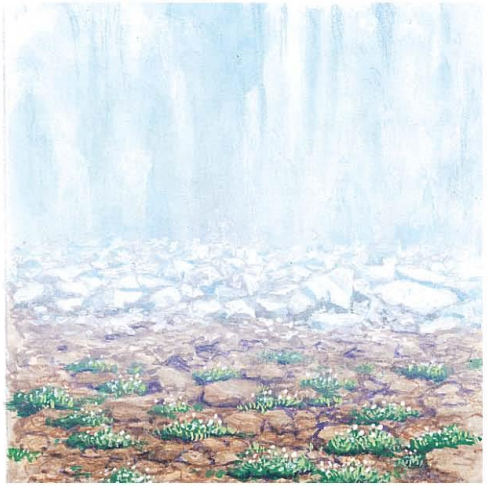
Change in an Ecosystem

- Pioneer species are the first organisms to appear in a newly made habitat.
- Allows other species to live in an ecosystem.
- The new species will replace species.

Equilibrium

- An ecosystem responds to change in such a way that the ecosystem is restored to equilibrium.
  - Example: When a tree falls down in a rain forest, the newly vacant patch proceeds through succession until the patch returns to its original state.

Succession in Glacier Bay



At first, land exposed by the receding glacier is lifeless because it lacks nutrients. An early "pioneer" of this land is the rockrose *Dryas, above left.* After several decades trees such as alder and shrubs grow large enough to shade and kill off the low-growing mat of *Dryas, above center.* After several more decades, these trees and shrubs are replaced by spruce and hemlock, *above right*.

Major Biological Communities

Key Idea: Two factors of climate that determine biomes are temperature and precipitation.

- Climate is the average weather conditions in an area over a long period of time.
- A biome is a large region characterized by a specific kind of climate and certain kinds of plant and animal communities.
- The word range means a scale or series between limits.

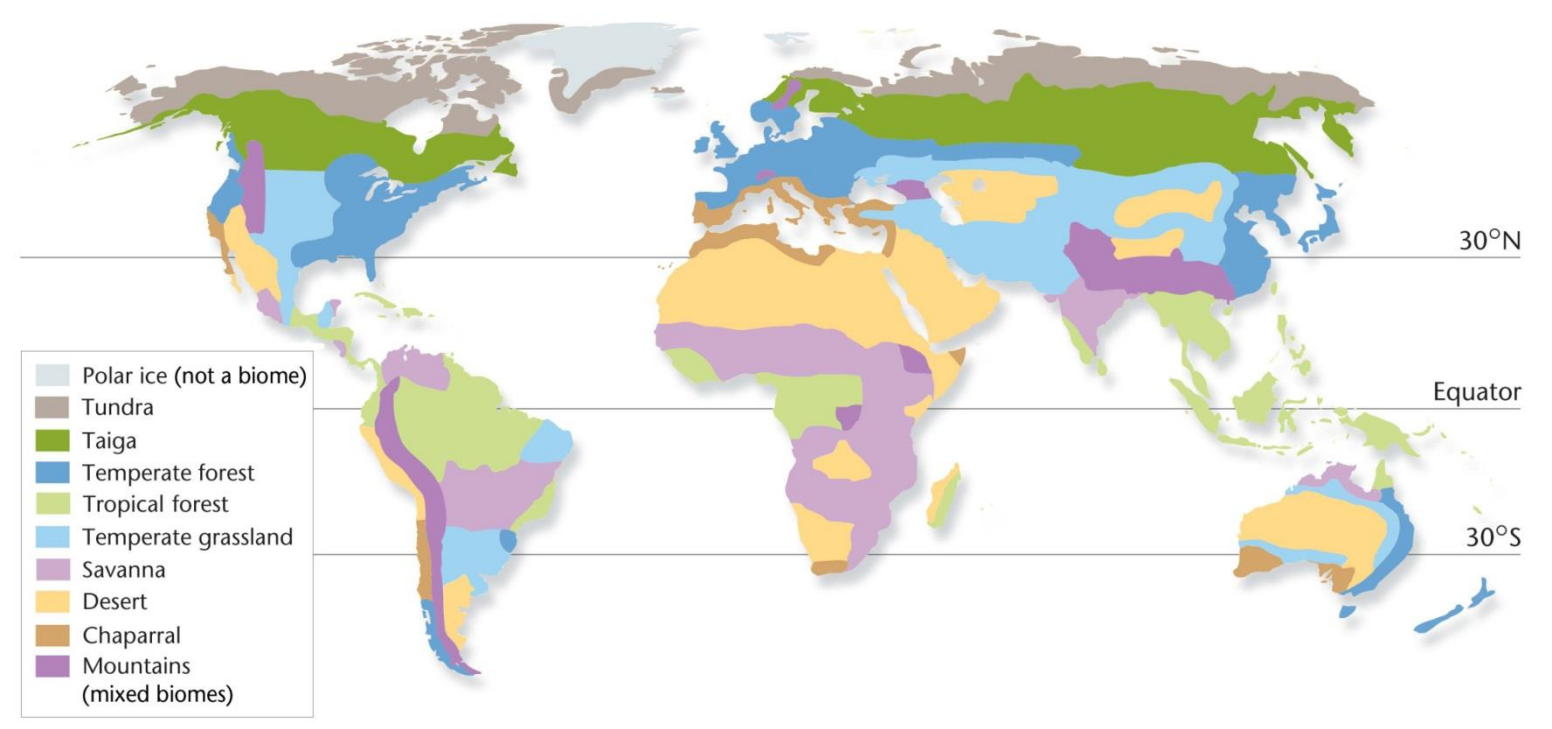
Major Biological Communities

- Most organisms are adapted to live within a particular range of temperatures.
- Precipitation determines the kinds of species that are found in a biome.

Terrestrial Biomes

Key Idea: Earth's major terrestrial biomes can be grouped by latitude into tropical, temperate, and high-latitude biomes.

Earth's Major Biomes



Tropical Biomes

- Tropical biomes are generally near the equator, at low latitudes and all are warm.
- Examples:
  - Tropical rain forests – large amounts of rain and have the greatest biodiversity.
  - Savannas – tropical grasslands and have long dry seasons and shorter wet seasons.
  - Tropical deserts – very little rain and have fewer plants and animals than other biomes.

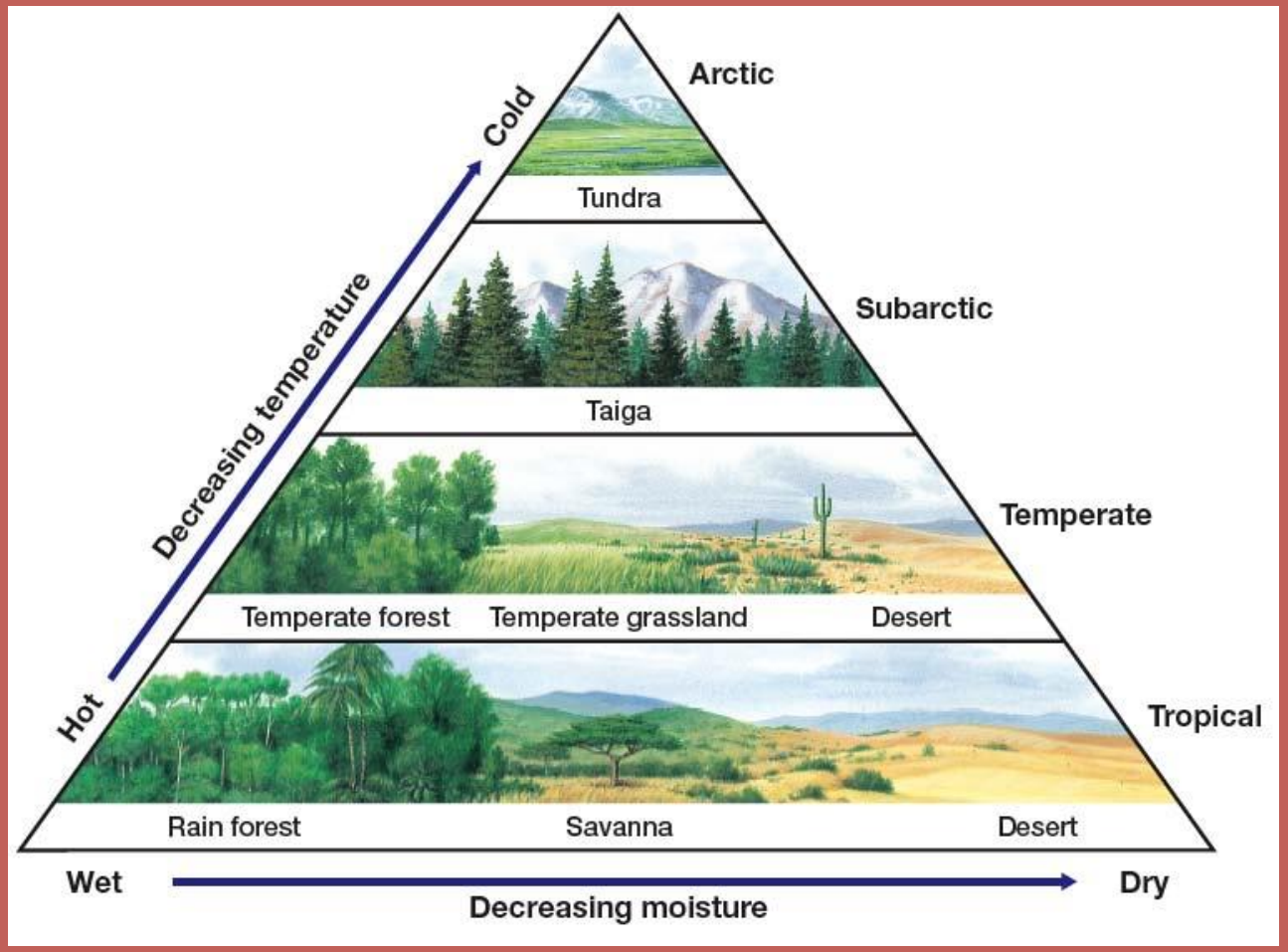
Temperate Biomes

- Biomes at mid-latitudes have a wide range of temperatures throughout the year.
- Examples:
  - Temperate grasslands – moderate precipitation and cooler temperatures often used for agriculture.
  - Temperate forests – grow in mild climates that receive plenty of rain.
  - Temperate deserts – receive little precipitation, but have a wide temperature range throughout the year.

High Latitude Biomes

- Biomes at high latitudes have cold temperatures.
- Examples:
  - Coniferous forests (taiga) – cold, wet climates with long and cold winters. Most precipitation falls in the summer.
  - Tundra – very little rain, so plants are short. Water in the soil is not available because it is frozen for most of the year.

Elements of Climate



Aquatic Ecosystems

Key Idea: Aquatic ecosystems are organized into freshwater ecosystems, wetlands, estuaries, and marine ecosystems.

Aquatic Ecosystems

- Four Types:
  - Freshwater ecosystems – are located in lakes, ponds, and rivers.
  - Wetlands – are linked between the land and fully aquatic habitat. Moderate flooding and clean water that flows through them.
  - Estuary – is where fresh water mixes with salt water. Constantly receive fresh nutrients from the river and the ocean.
  - Marine ecosystems – are the salty waters of the oceans.