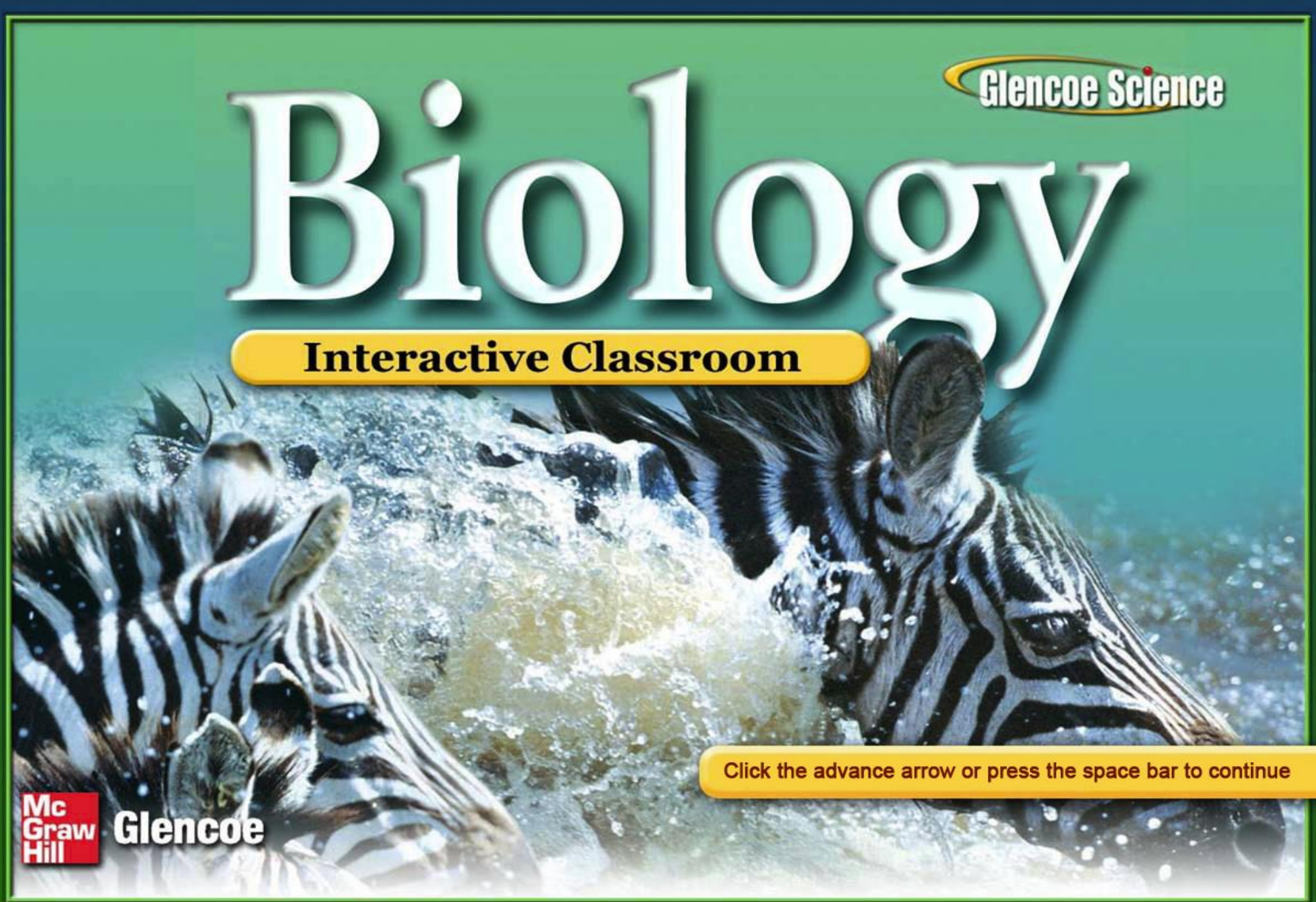
Glencoe Science

Biology

Interactive Classroom



Click the advance arrow or press the space bar to continue

Mc Graw Hill Glencoe

Chapter 3 Communities, Biomes, and Ecosystems

EXIT

Click on a lesson name to select.

3.1 Community Ecology

Communities

- A biological community is a group of interacting populations that occupy the same area at the same time.

Oasis

3.1 Community Ecology

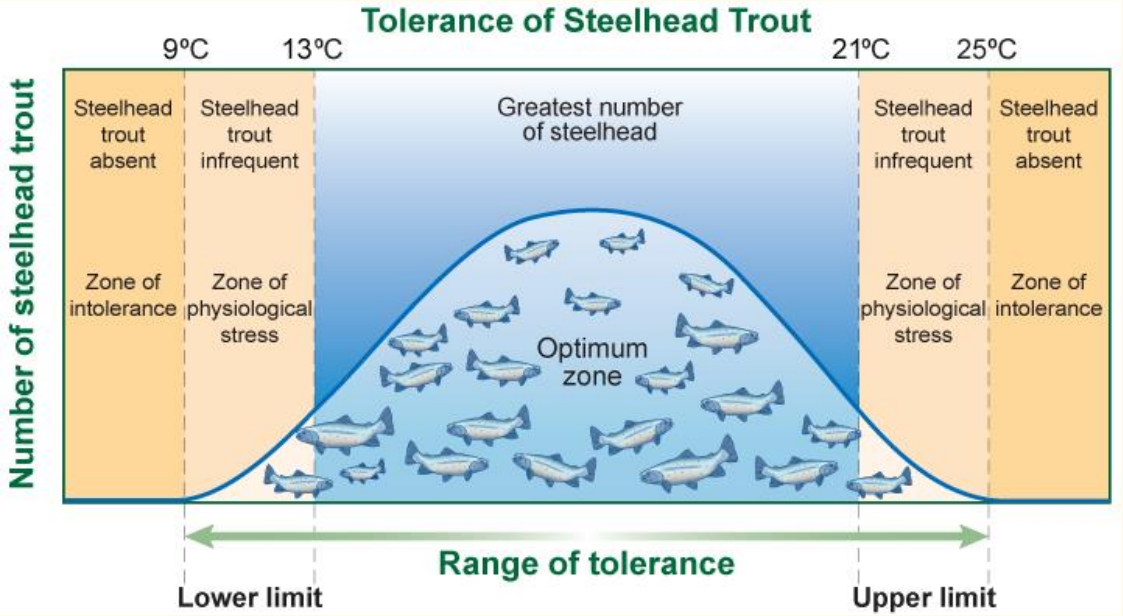
Limiting Factors

- Any abiotic factor or biotic factor that restricts the numbers, reproduction, or distribution of organisms is called a limiting factor.
- Includes sunlight, climate, temperature, water, nutrients, fire, soil chemistry, and space, and other living things

3.1 Community Ecology

Range of Tolerance

- An upper limit and lower limit that define the conditions in which an organism can survive
- The ability of any organism to survive when subjected to abiotic factors or biotic factors is called tolerance.



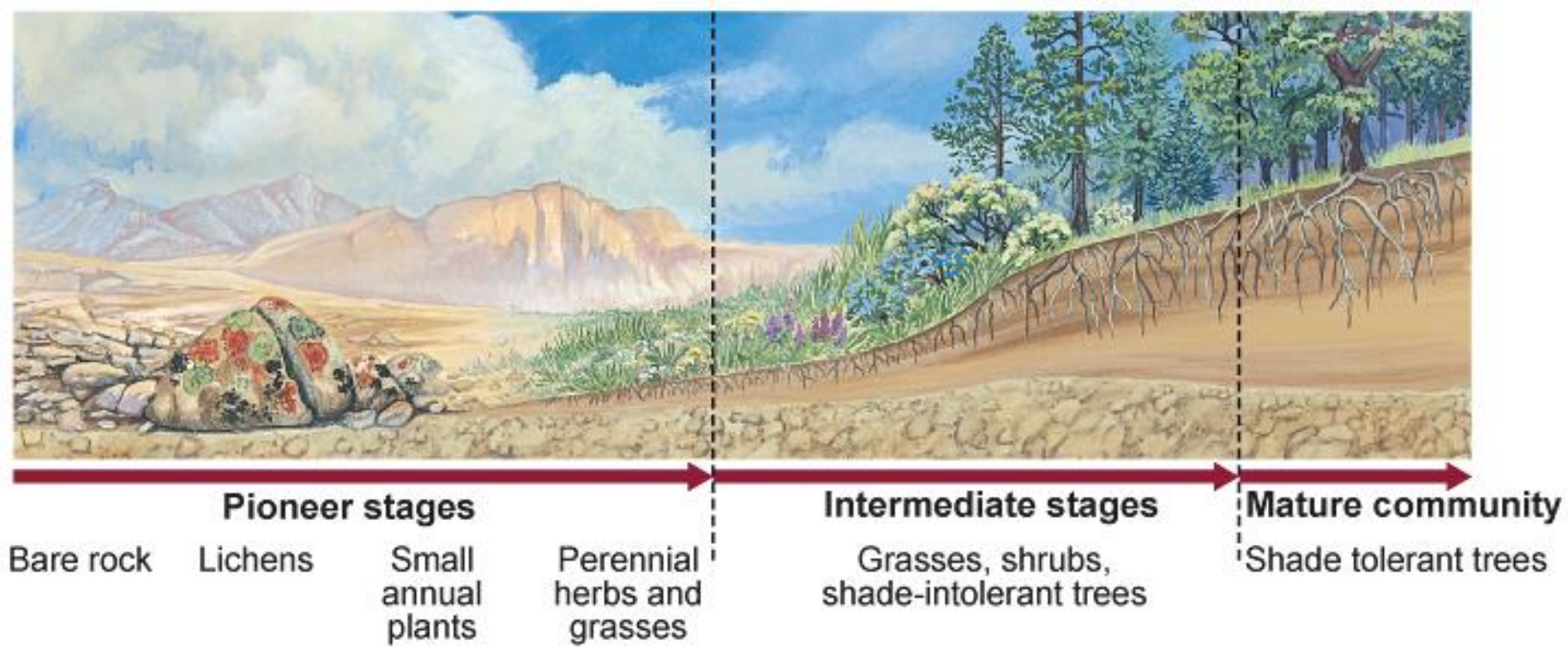
3.1 Community Ecology

Ecological Succession

- The change in an ecosystem that happens when one community replaces another as a result of changing abiotic and biotic factors is ecological succession. 
- There are two types of ecological succession—primary succession and secondary succession.

3.1 Community Ecology

- The establishment of a community in an area of exposed rock that does not have any topsoil is primary succession.

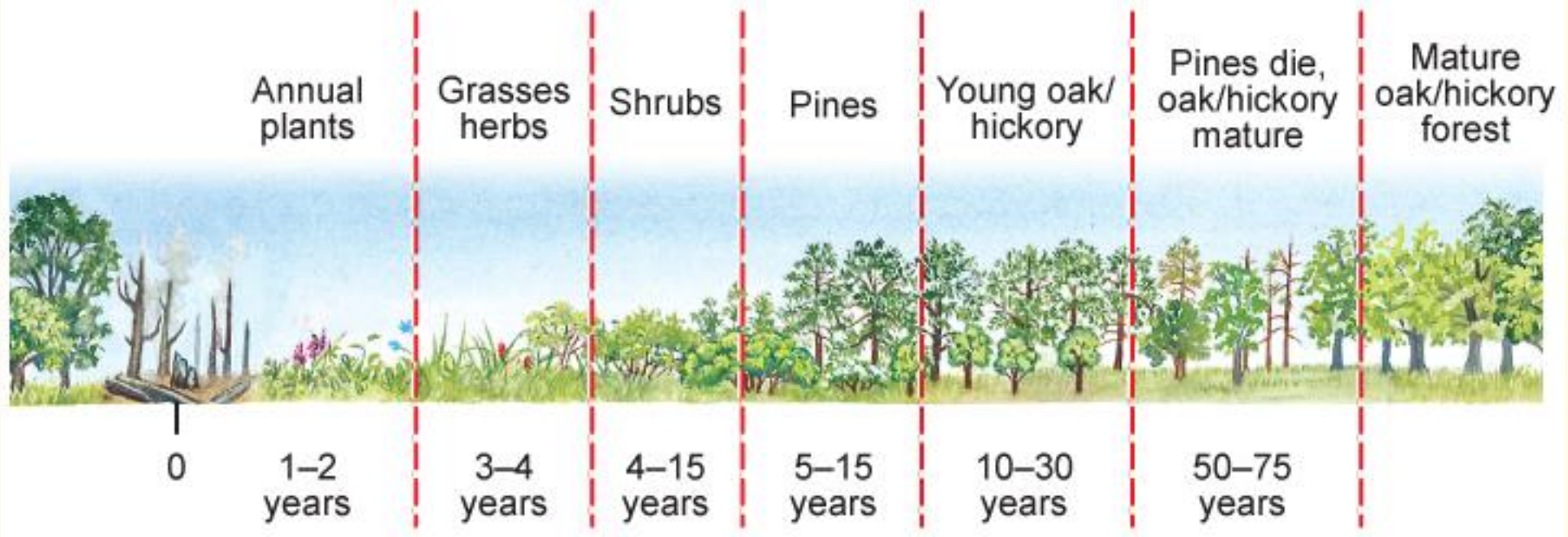


Concepts In Motion

Primary and Secondary Solutions Climax Community

3.1 Community Ecology

- The orderly and predictable change that takes place after a community of organisms has been removed but the soil has remained intact is secondary succession.

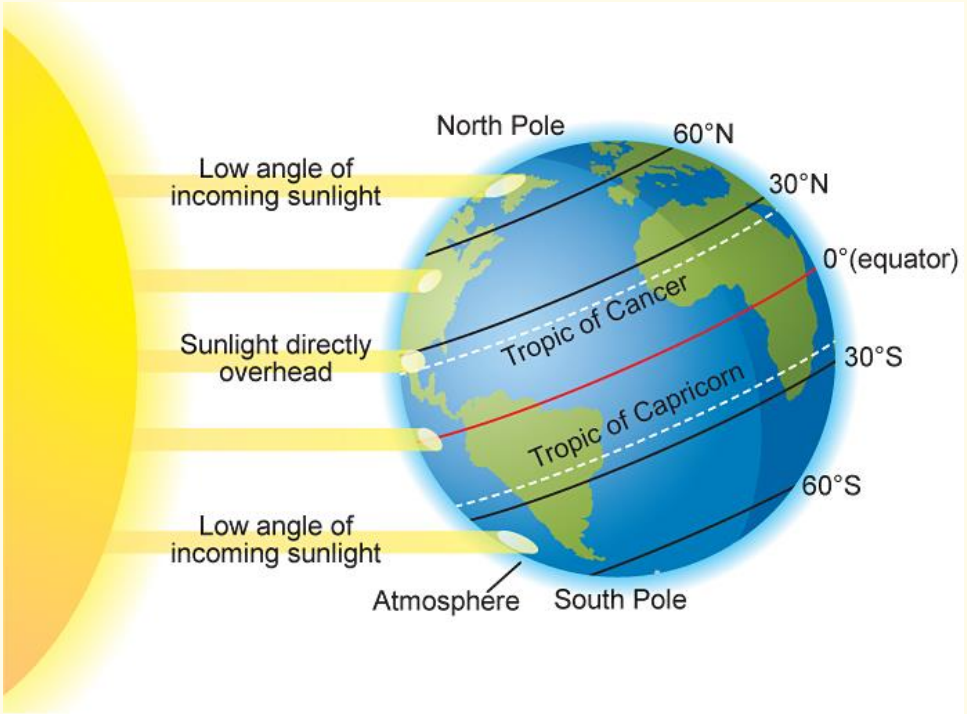


3.2 Terrestrial Biomes

Effects of Latitude and Climate

- Weather is the condition of the atmosphere at a specific place and time.
- One of the keys to understanding these communities is to be aware of latitude and climatic conditions.

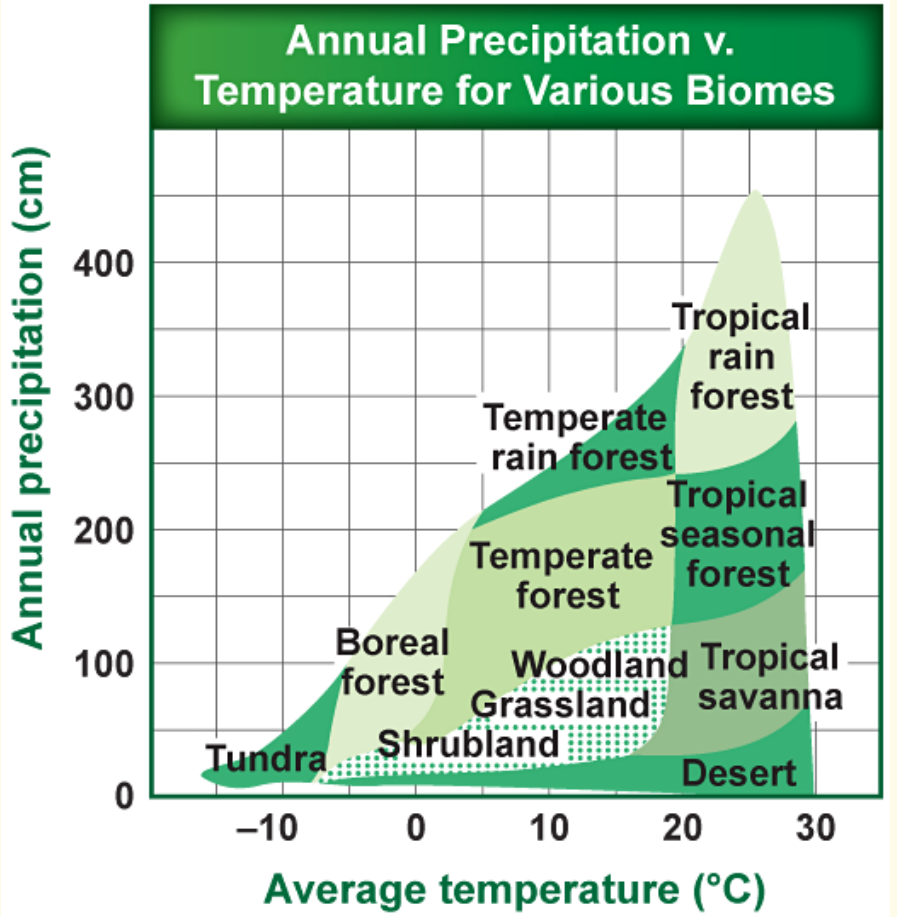
3.2 Terrestrial Biomes



- The distance of any point on the surface of Earth north or south from the equator is latitude.

3.2 Terrestrial Biomes

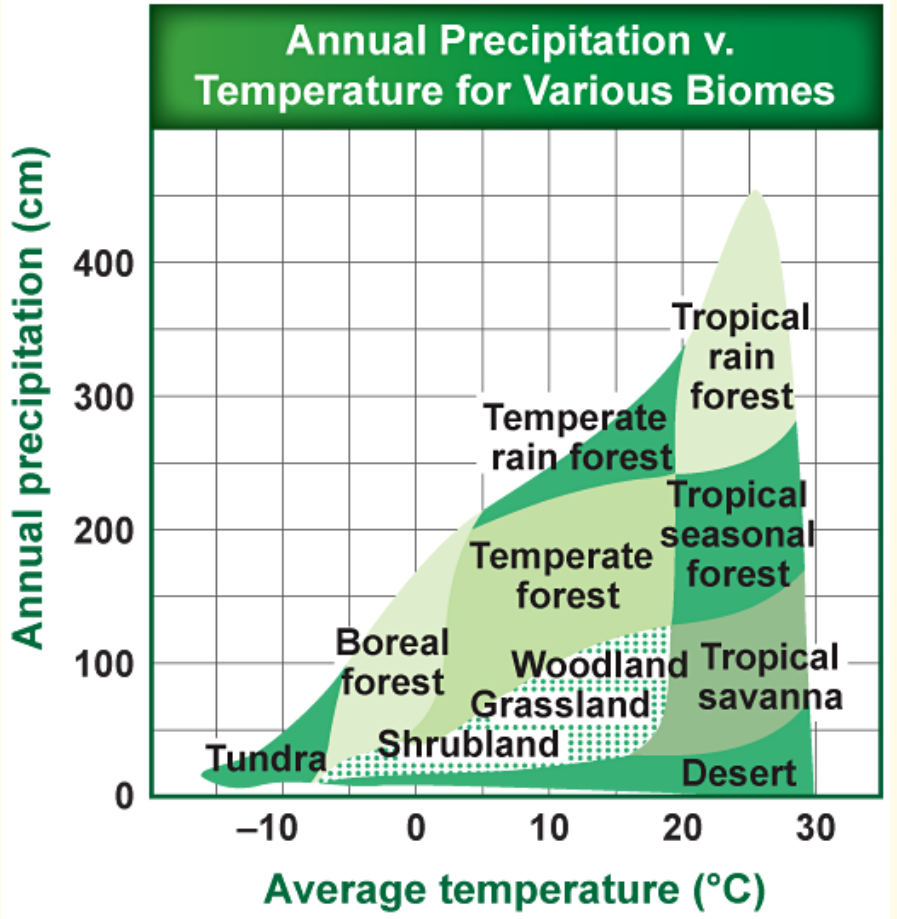
- The average weather conditions in an area, including temperature and precipitation, describe the area's climate.



- The graph shows how temperature and precipitation influence the communities.

3.2 Terrestrial Biomes

- Biomes are classified by their plants, temperature, and precipitation.



Concepts In Motion Animation

Visualizing Global Effects on Climate

Click here to proceed!

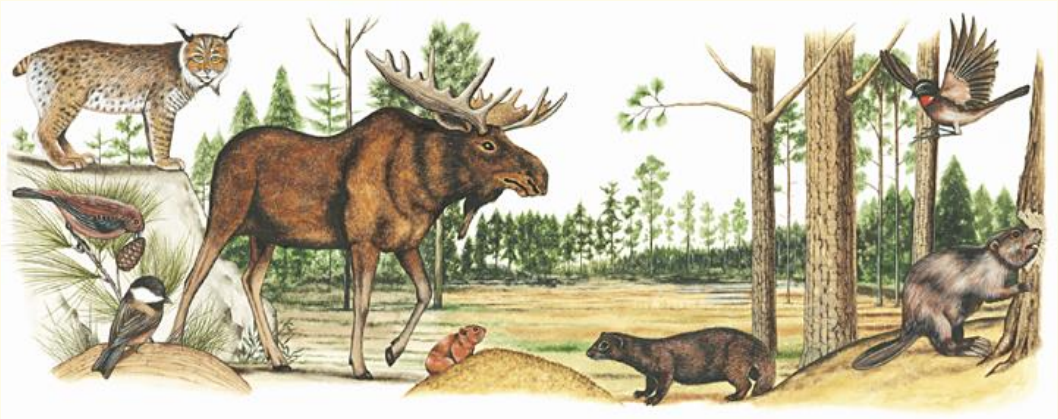
3.2 Terrestrial Biomes

Tundra

- Average precipitation: 15–25 cm per year
- Temperature range: -34°C–12°C
- Geographic location: South of the polar ice caps in the Northern Hemisphere
- Abiotic factors: soggy summers; permafrost; cold and dark much of the year

3.2 Terrestrial Biomes

Boreal Forest



- Average precipitation: 30–84 cm per year
- Temperature range: -54°C–21°C
- Geographic location: northern part of North America, Europe, and Asia
- Abiotic factors: summers are short and moist; winters are long, cold, and dry

3.2 Terrestrial Biomes

Temperate Forest

- Average precipitation: 75–150 cm per year
- Temperature range: -30°C–30°C
- Geographic location: south of the boreal forests in eastern North America, eastern Asia, Australia, and Europe
- Abiotic factors: well-defined seasons; summers are hot, winters are cold

3.2 Terrestrial Biomes

Temperate Woodland and Shrubland

- Average precipitation: 38–100 cm per year
- Temperature range: 10°C–40°C
- Geographic location: surrounds the Mediterranean Sea, western coast of North and South America, South Africa, and Australia
- Abiotic factors: summers are very hot and dry; winters are cool and wet

3.2 Terrestrial Biomes

Temperate Grassland

- Average precipitation: 50–89 cm per year
- Temperature range: -40°C–38°C
- Geographic location: North America, South America, Asia, Africa, and Australia
- Abiotic factors: summers are hot; winters are cold; moderate rainfall; fires possible

3.2 Terrestrial Biomes

Desert

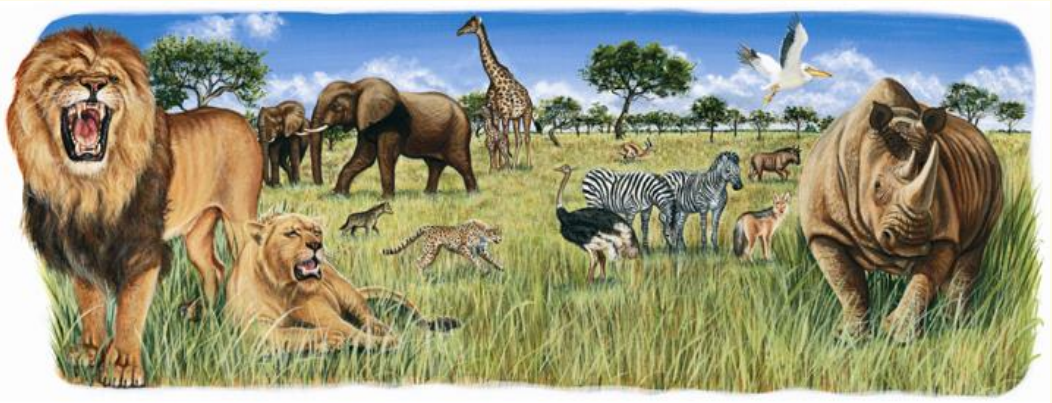
- Average precipitation: 2–26 cm per year
- Temperature range: high: 20°C–49°C; low: -18°C–10°C

- Geographic location: every continent except Europe
- Abiotic factors: varying temperatures; low rainfall

3.2 Terrestrial Biomes

Tropical Savanna

- Average precipitation: 50–130 cm per year
- Temperature range: 20°C–30°C



- Geographic location: Africa, South America, and Australia
- Abiotic factors: summers are hot and rainy; winters are cool and dry

3.2 Terrestrial Biomes

Tropical Seasonal Forest

- Average precipitation: >200 cm per year
- Temperature range: 20°C–25°C
- Geographic location: Africa, Asia, Australia, and South and Central America
- Abiotic factors: rainfall is seasonal

3.2 Terrestrial Biomes

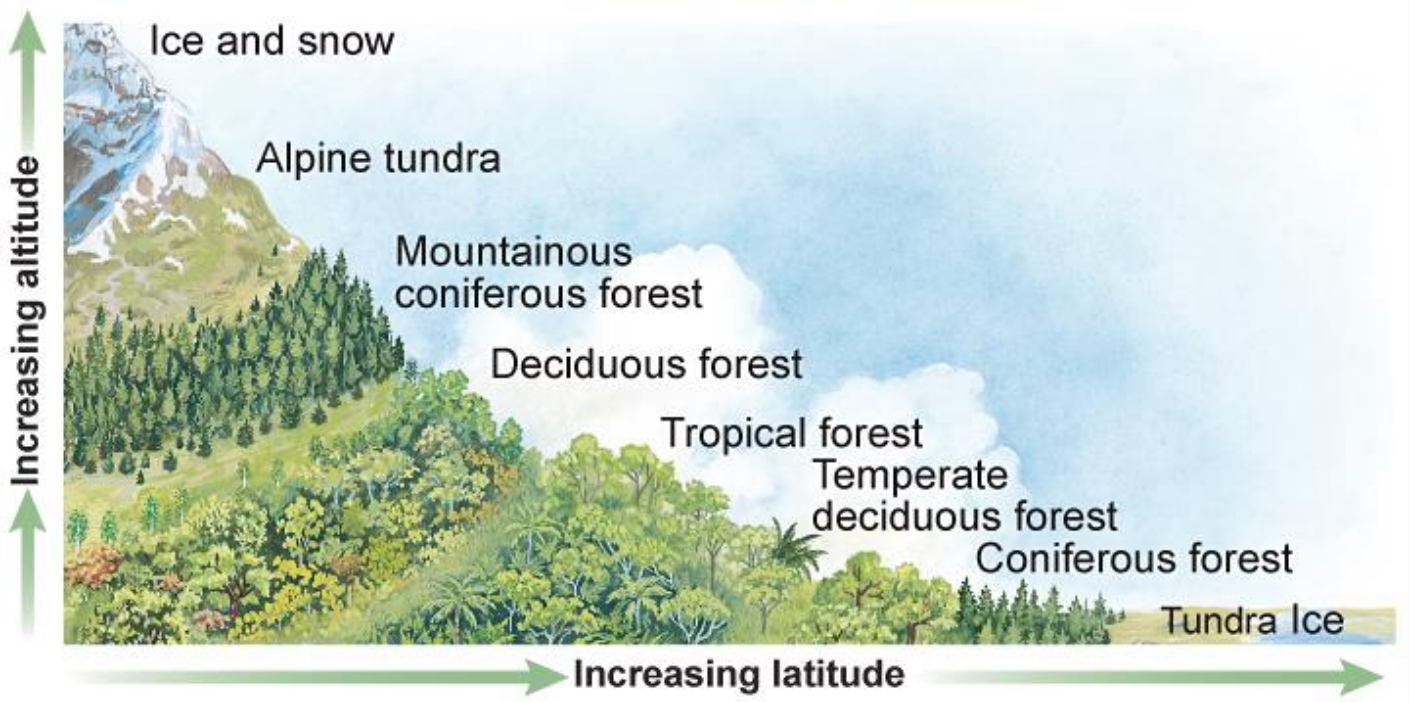
Tropical Rain Forest

- Average precipitation: 200–1000 cm per year
- Temperature range: 24°C–27°C
- Geographic location: Central and South America, southern Asia, western Africa, and northeastern Australia
- Abiotic factors: humid all year; hot and wet

3.2 Terrestrial Biomes

Mountains

- If you go up a mountain, you might notice that abiotic conditions, such as temperature and precipitation, change with increasing elevation.



3.2 Terrestrial Biomes

Penguins in Antarctica

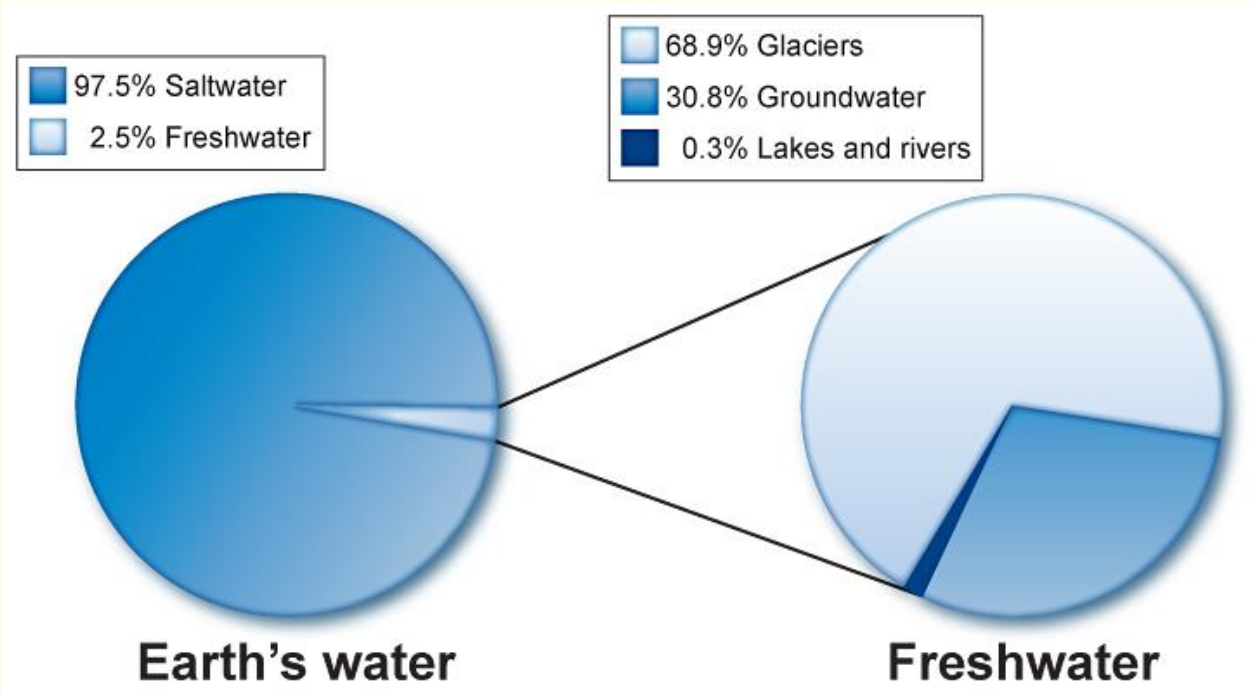
Polar Regions

- Border the tundra at high latitudes
- Polar regions are cold all year.

3.3 Aquatic Ecosystems

Freshwater Ecosystems

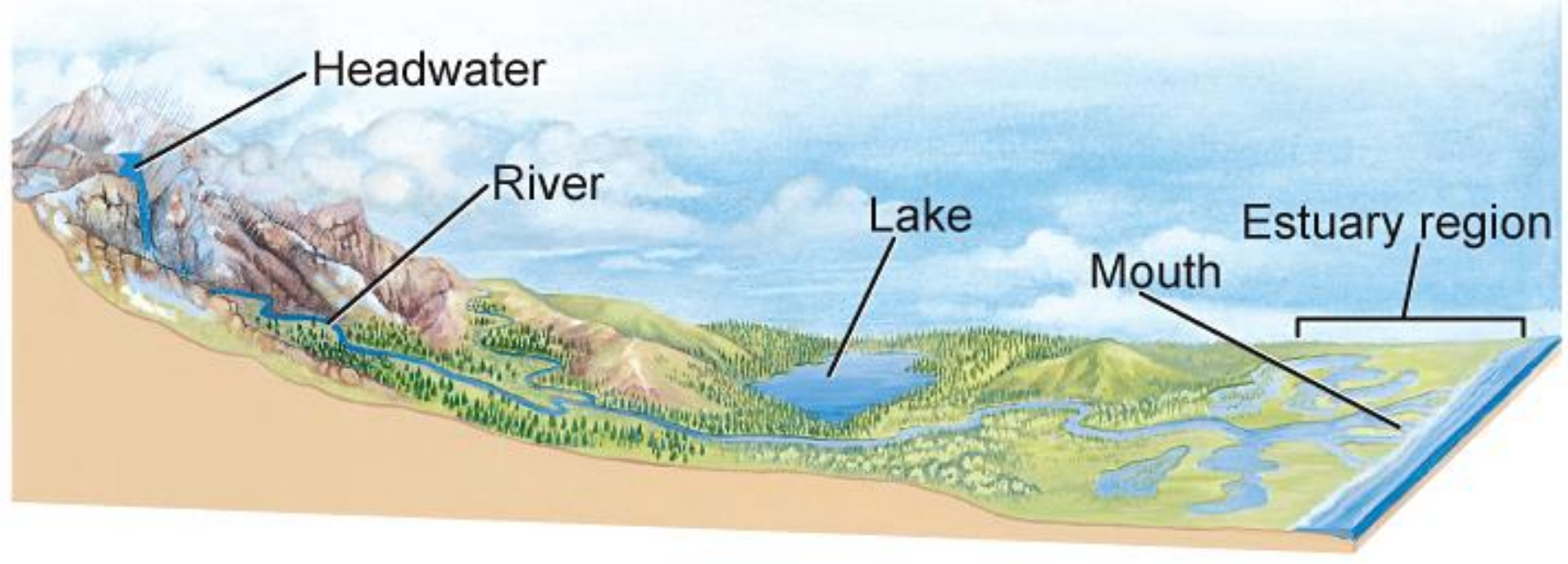
- Only about 2.5 percent of the water on Earth is freshwater.



3.3 Aquatic Ecosystems

Rivers and Streams

- The characteristics of rivers and streams change during the journey from the source to the mouth.



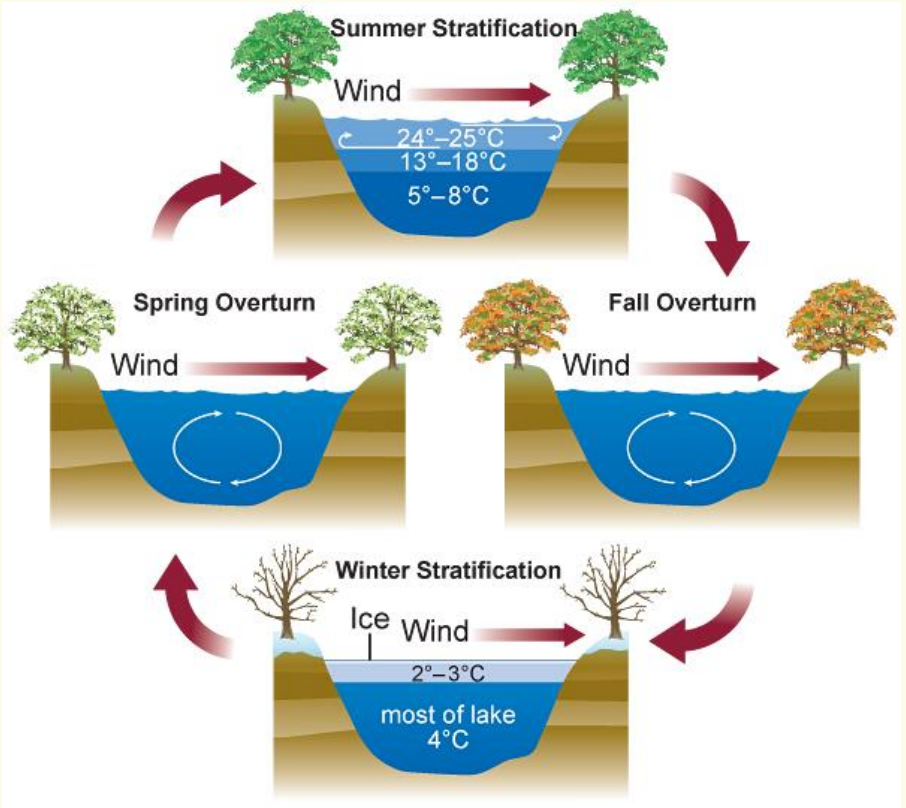
3.3 Aquatic Ecosystems

- Fast-moving rivers and streams prevent much accumulation of organic materials and sediment.
- Usually, there are fewer species living in the rapid waters.
- In slow-moving water, insect larvae are the primary food source for many fish, including American eel, brown bullhead catfish, and trout.

3.3 Aquatic Ecosystems

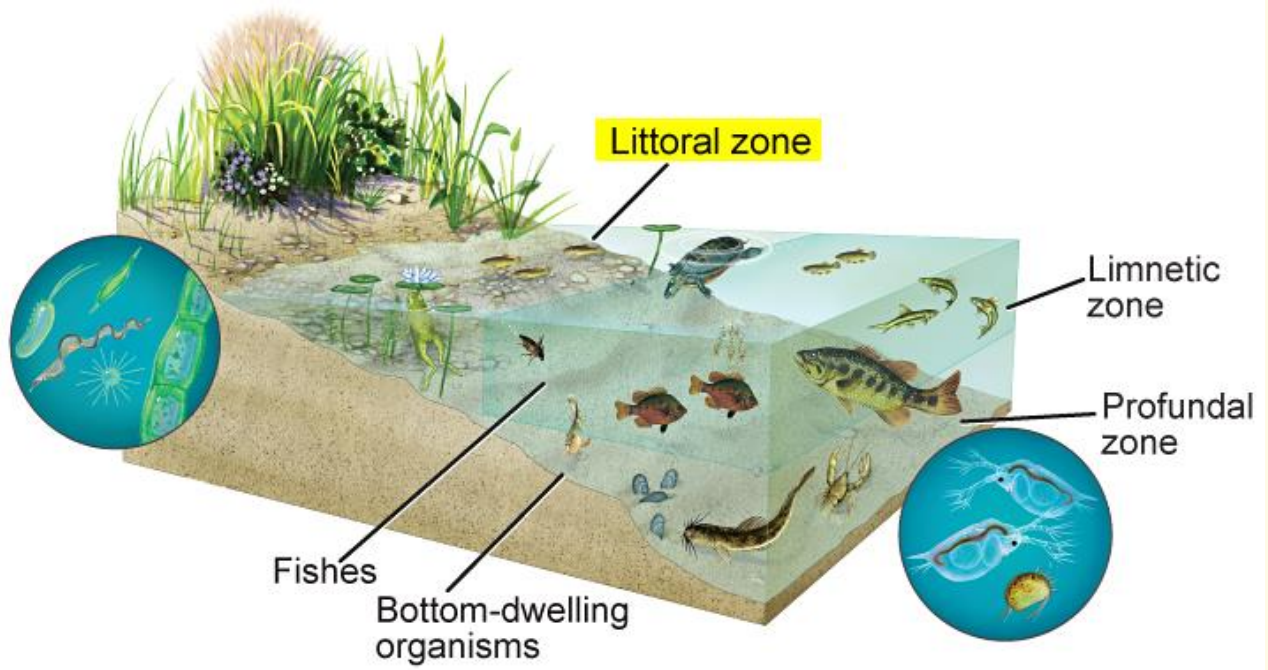
Lakes and Ponds

- The temperature of lakes and ponds varies depending on the season.



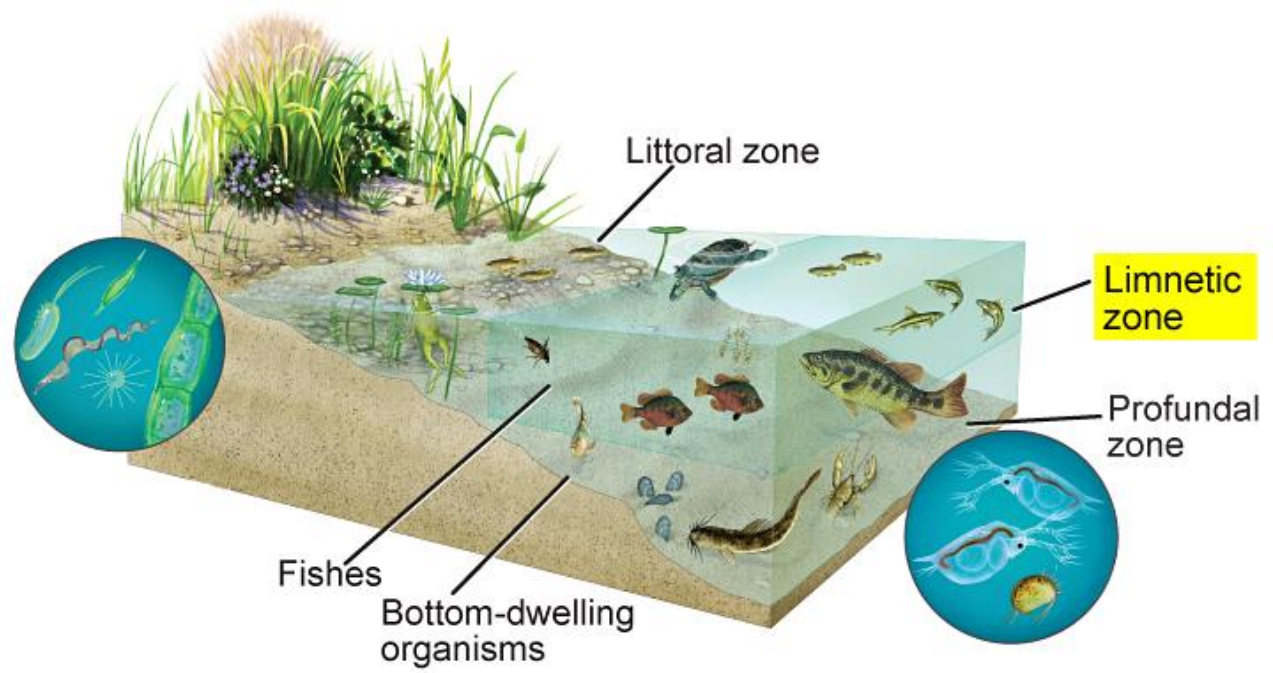
3.3 Aquatic Ecosystems

- Lakes and ponds are divided into three zones based on the amount of sunlight that penetrates the water.
- The area closest to the shore is the littoral zone.



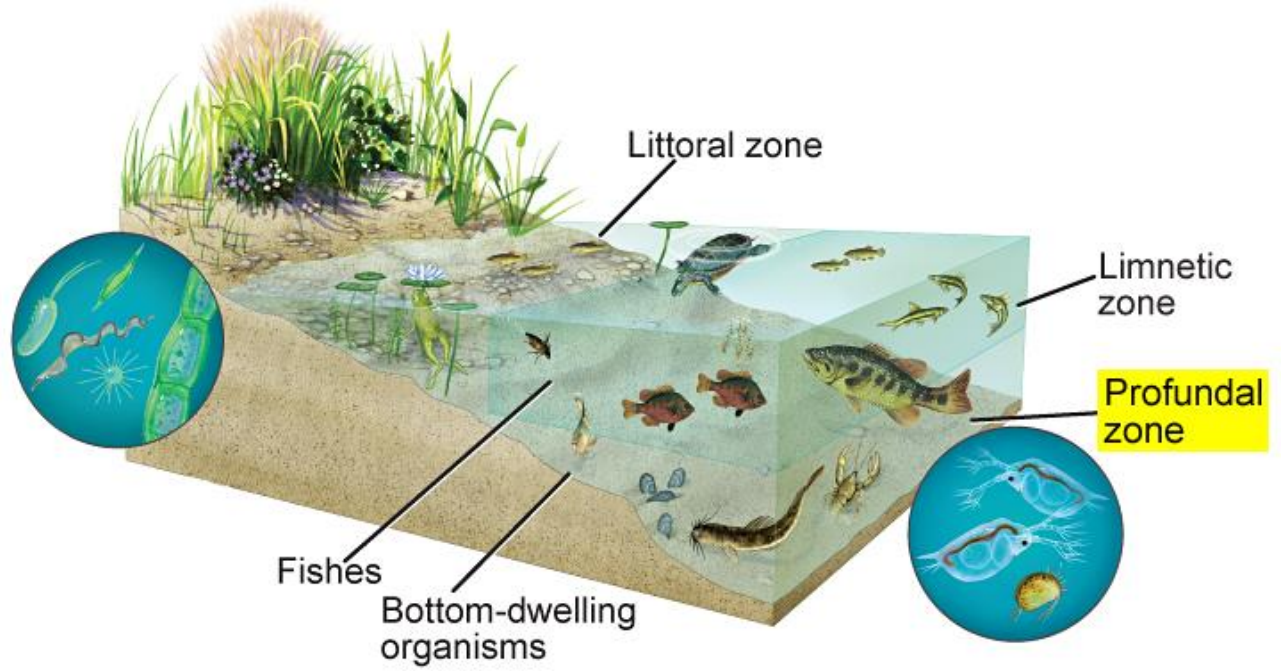
3.3 Aquatic Ecosystems

- The limnetic zone is the open water area that is well lit and is dominated by plankton.



3.3 Aquatic Ecosystems

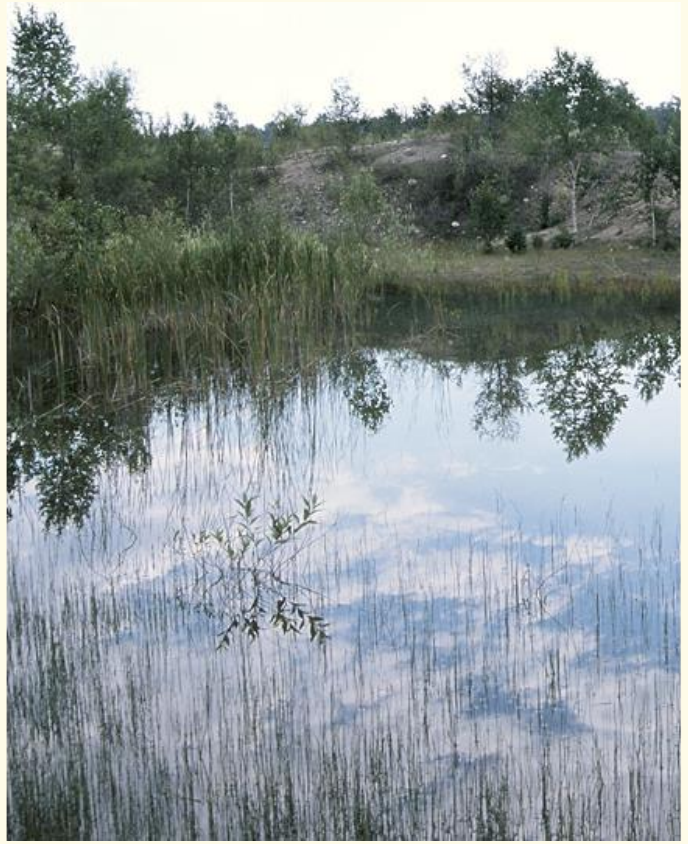
- The profundal zone is the deepest areas of a large lake.
- It is much colder and lower in oxygen than the other two zones.



3.3 Aquatic Ecosystems

Transitional Aquatic Ecosystems

- Areas of land such as marshes, swamps, and bogs that are saturated with water and that support aquatic plants are called wetlands.

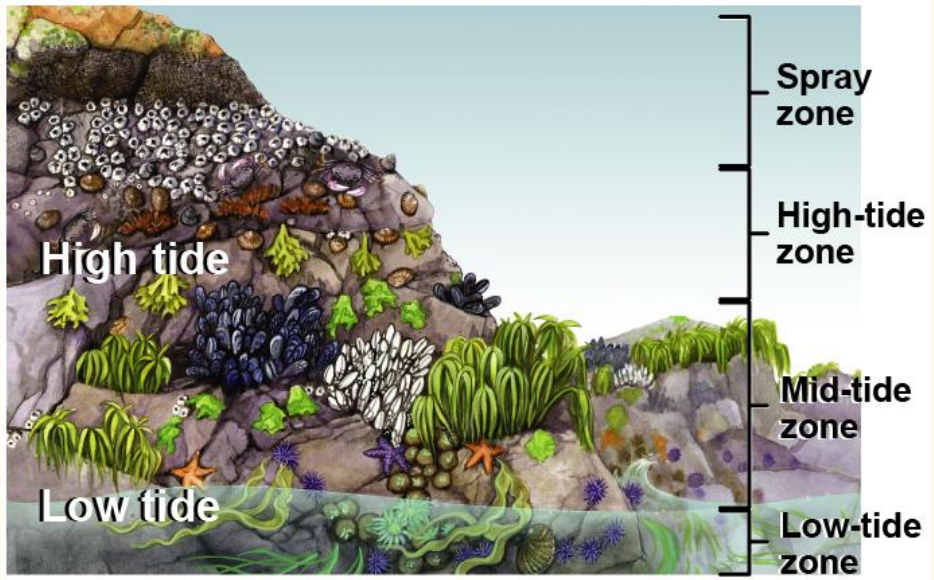


Bog

3.3 Aquatic Ecosystems

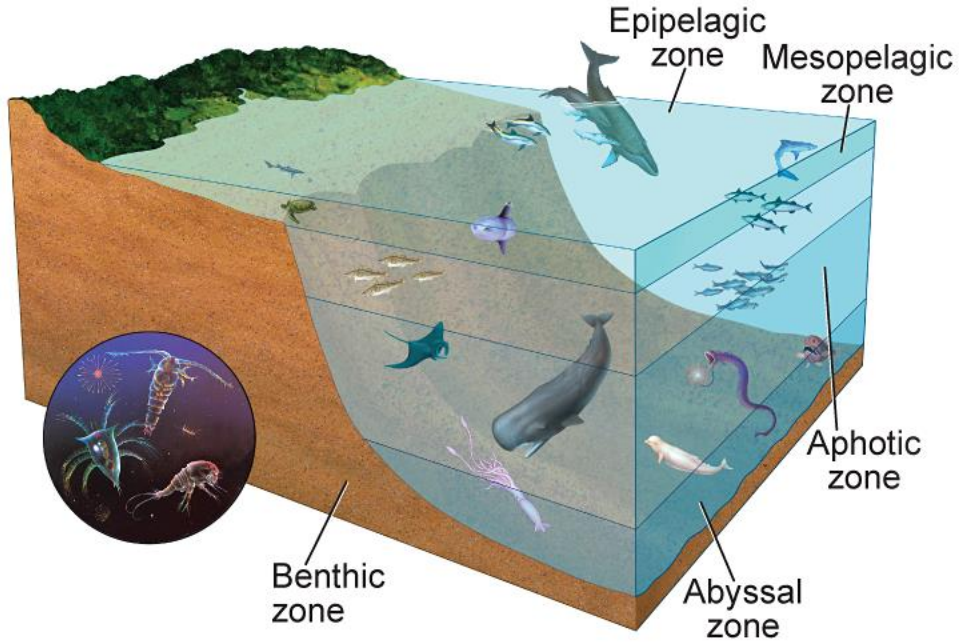
Marine Ecosystems

- The intertidal zone is a narrow band where the ocean meets land.
- Communities are constantly changing in this environment as a result of disturbance.



3.3 Aquatic Ecosystems

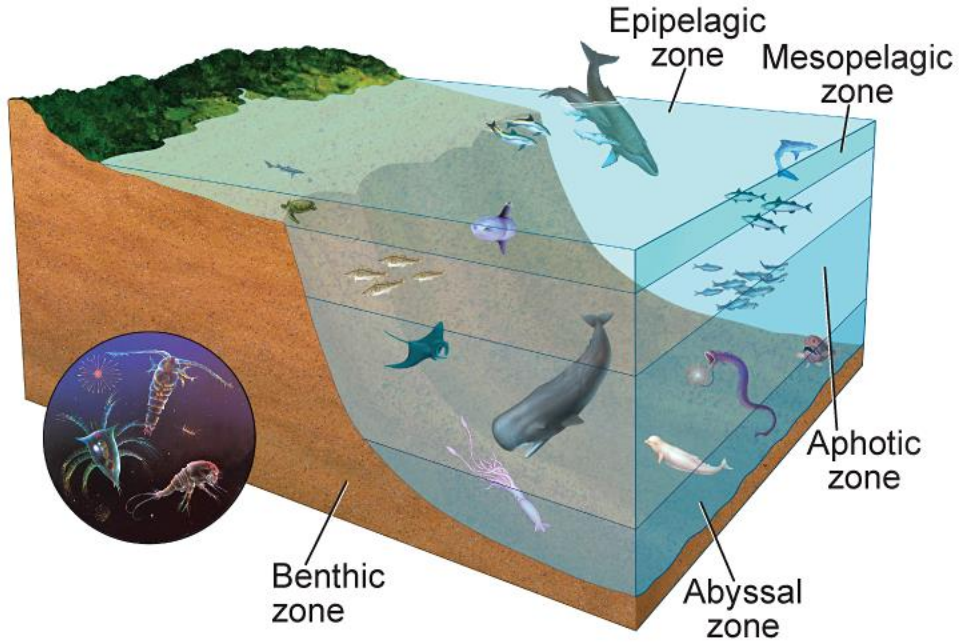
Open Ocean Ecosystems



- The photic zone is shallow enough that sunlight is able to penetrate.

3.3 Aquatic Ecosystems

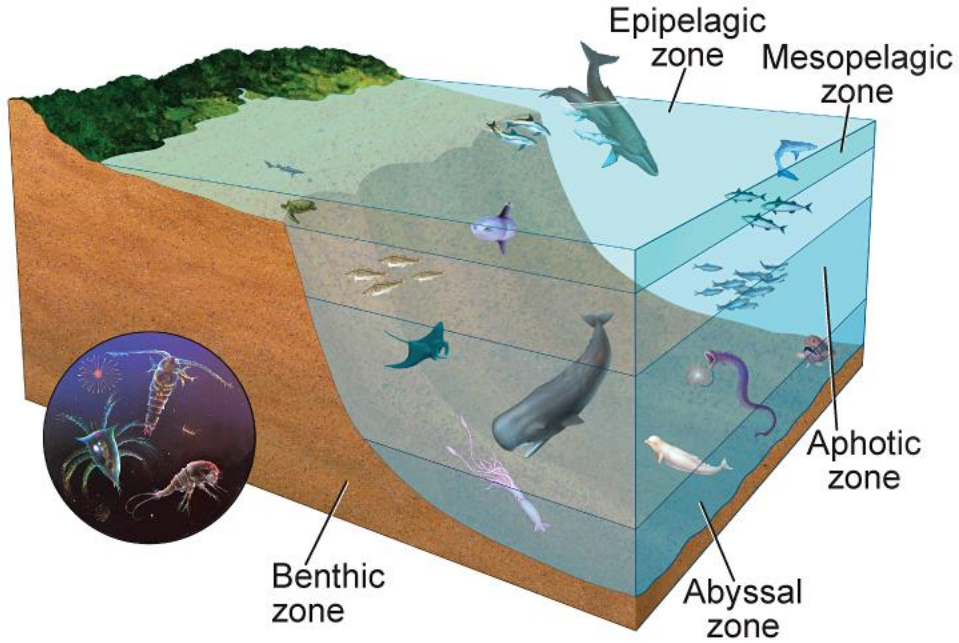
Open Ocean Ecosystems



- Below the photic zone lies the aphotic zone—an area where sunlight is unable to penetrate.

3.3 Aquatic Ecosystems

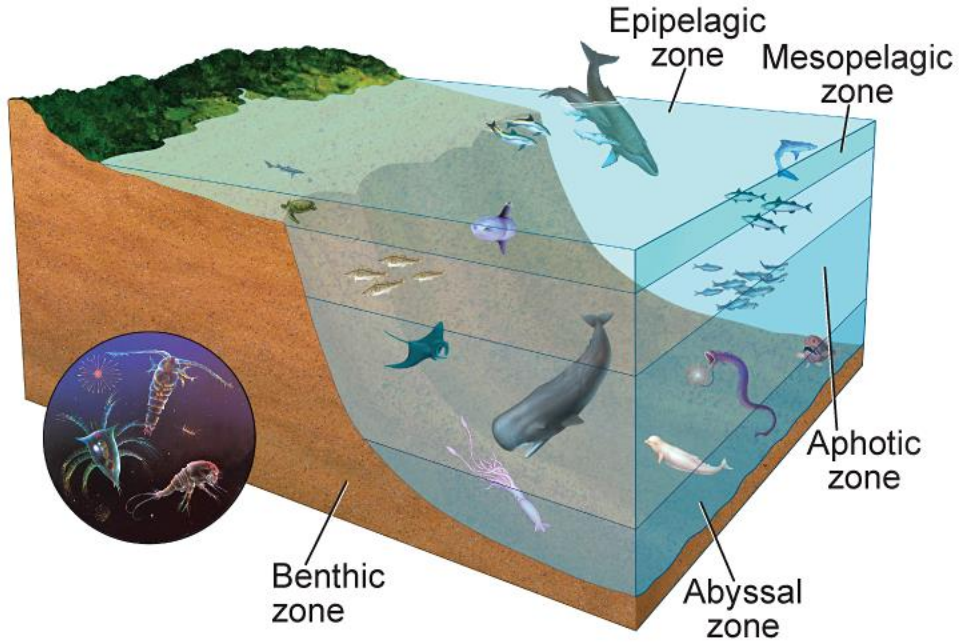
Open Ocean Ecosystems



- The benthic zone is an area along the ocean floor that consists of sand, silt, and dead organisms.

3.3 Aquatic Ecosystems

Open Ocean Ecosystems



- The deepest region of the ocean is called the abyssal zone.

Online Virtual Lab

Communities and Biomes

Click here to proceed!

Chapter Resource Menu

Click on a hyperlink to view the corresponding lesson.

Chapter Diagnostic Questions

CheckPoint

Mosses and lichens are the first organisms to appear during which ecological stage of an ecosystem?

A. primary succession
B. secondary succession
C. climax community
D. end succession

Chapter Diagnostic Questions

CheckPoint

Which biome is the most diverse?

A. tundra

B. tropical savanna

C. tropical seasonal forest

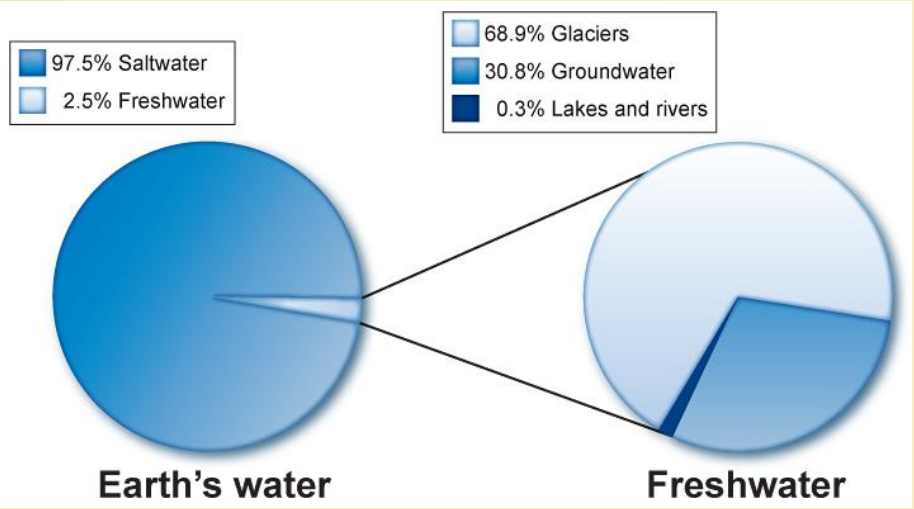
D. tropical rainforest

Chapter Diagnostic Questions

CheckPoint

Where is most of Earth's freshwater supply contained?

A. in groundwater
B. in streams
C. in glaciers
D. in wetlands



3.1 Formative Questions

CheckPoint

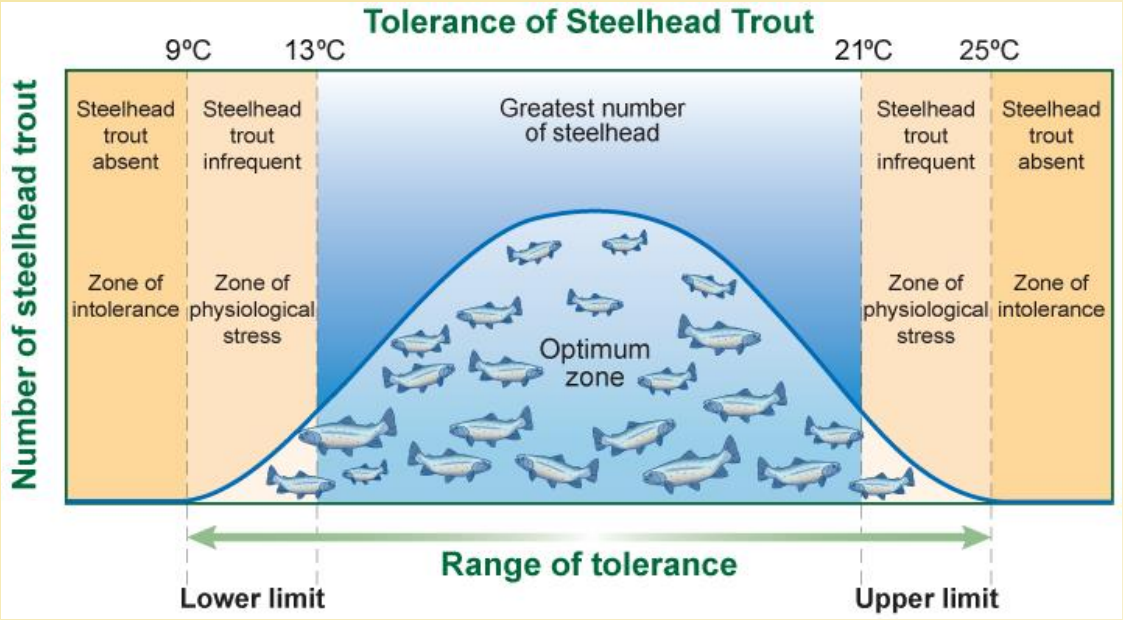
What is a group of interacting populations that occupy the same area at the same time?

A. a biome
B. a community
C. an ecosystem
D. an environment

3.1 Formative Questions

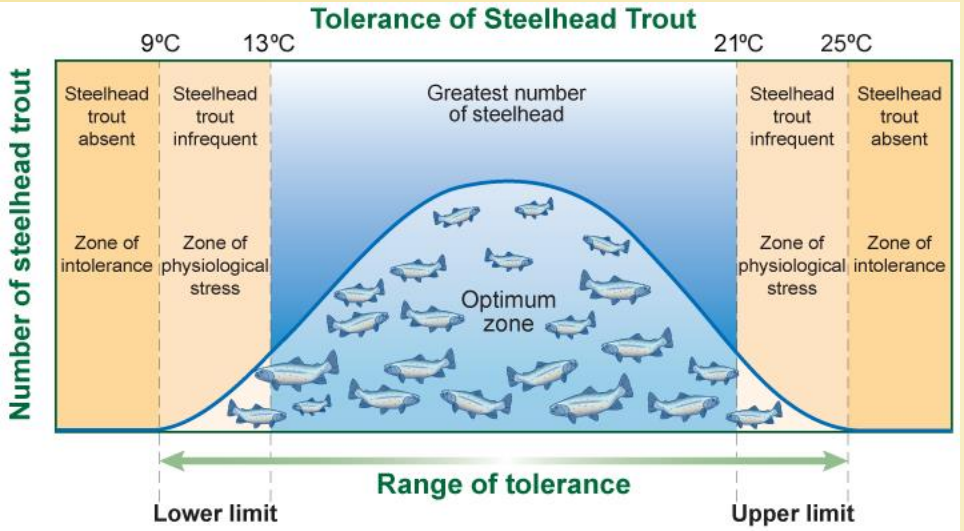
CheckPoint

Which is true of the zone of physiological stress?



3.1 Formative Questions

CheckPoint



A. It is outside the range of tolerance.

B. It is the optimum zone for survival.

C. Organisms are unable to survive in this zone.

D. There are fewer organisms in this zone.

3.1 Formative Questions

CheckPoint

What occurs in the process of ecological succession?

A. Environmental factors affect the survival of organisms.
B. One biological community replaces another in the ecosystem.
C. Organisms adapt to new biotic and abiotic factors.
D. Pioneer species move in and replace existing species.

3.2 Formative Questions

CheckPoint

By what characteristics are biomes primarily classified?

A. by their average weather conditions

B. by their latitudes and climates

C. by the type of animal communities within them

D. by the type of plant communities within them

3.2 Formative Questions

CheckPoint

Which biome contains short grasses, caribou, polar bears, and has a layer of permafrost below the surface of the soil?

A. taiga

B. tundra

C. arctic grassland

D. polar regions

3.2 Formative Questions

CheckPoint

Which biome is called a steppe in Asia, a prairie in North America, and a rangeland in Australia?

A. boreal shrubland

B. moderate meadowland

C. temperate grassland

D. tropical savanna

3.2 Formative Questions

CheckPoint

Which is the most diverse of all biomes?

A. desert

B. tundra

C. woodland

D. tropical rainforest

3.3 Formative Questions

CheckPoint

Why do oligotrophic lakes contain fewer plant and animal species than eutrophic lakes?

A. They have swifter currents.

B. They exist near urban areas.

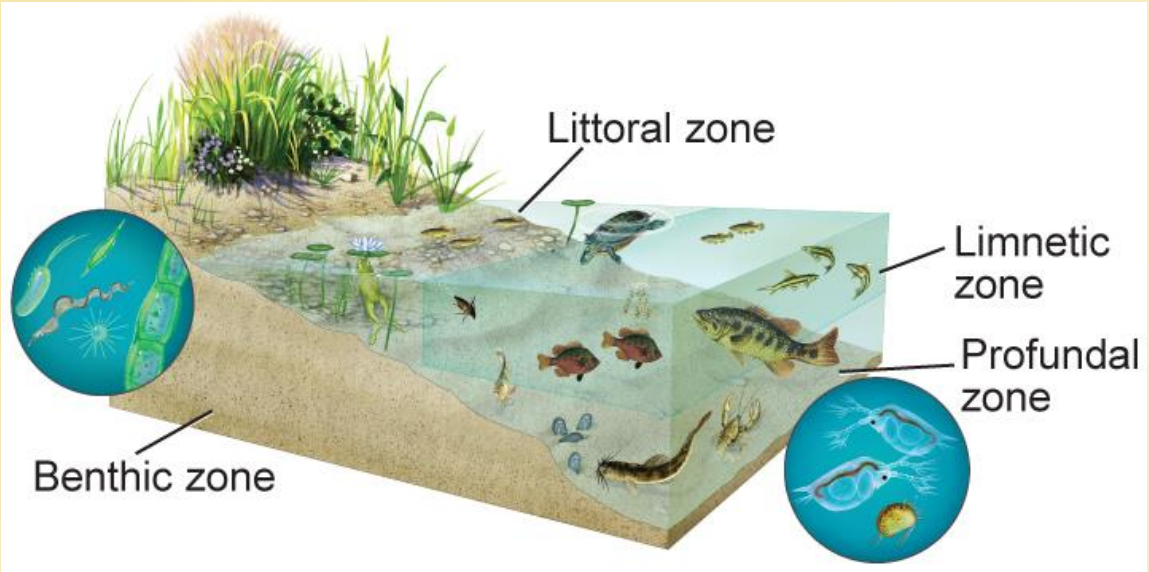
C. They exist at higher latitudes.

D. They contain less organic matter.

3.3 Formative Questions

CheckPoint

Which region of the lake has the highest biodiversity?



3.3 Formative Questions

CheckPoint

A. littoral zone

B. limnetic zone

C. profundal zone

D. benthic zone

3.3 Formative Questions

CheckPoint

Which is the most diverse ecosystem?

A. estuary

B. salt marsh

C. swamp

D. wetland

3.3 Formative Questions

CheckPoint

What makes an estuary such a unique ecosystem?

A. the accumulation of nutrient-rich sediments and detritus

B. the mixture of waters with different salt concentrations

C. the variety of species adapted to live in slow currents

D. the wide variety of waterfowl that nest and feed

Chapter Assessment Questions

CheckPoint

Look at the figure. Which is *not* true of the profundal zone?

Chapter Assessment Questions

CheckPoint

A. dominated by plankton

B. deepest area of the lake

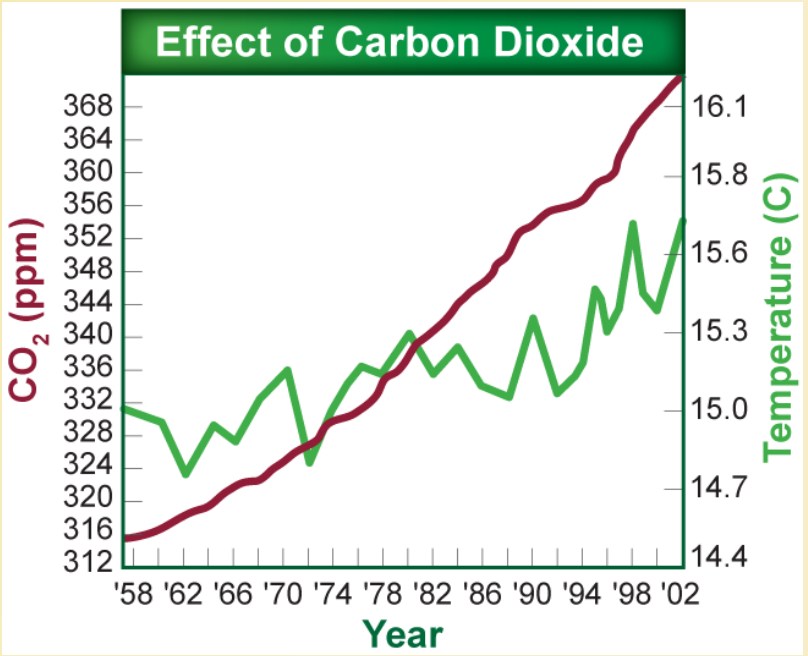
C. very little light penetrates

D. lower in oxygen

Chapter Assessment Questions

CheckPoint

Based on the information in the graph, what can be inferred about carbon dioxide in the atmosphere?



Chapter Assessment Questions

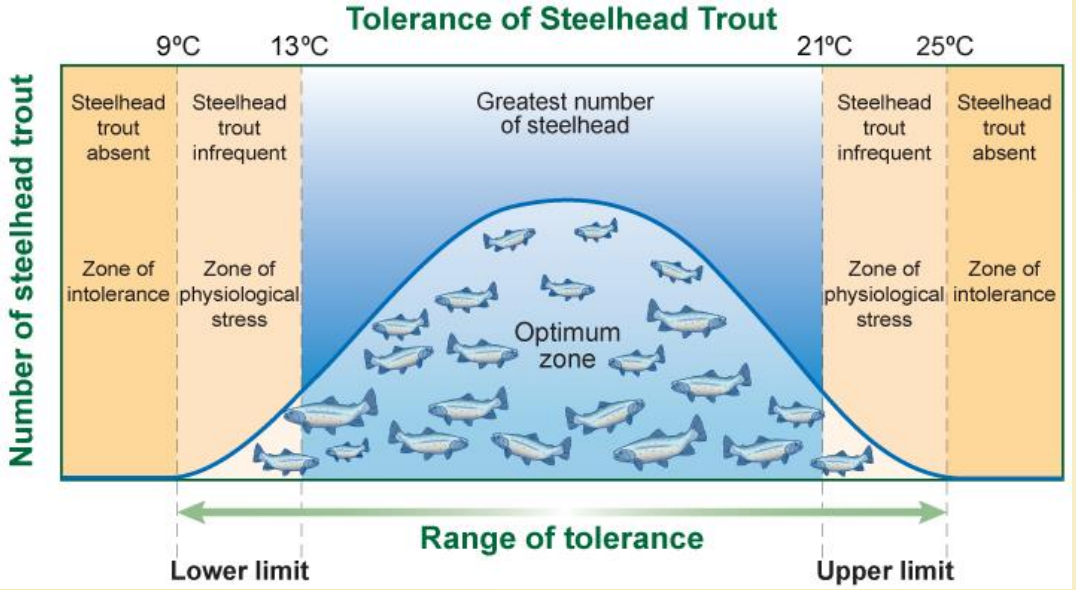
CheckPoint

Answer: The measured increase of carbon dioxide (CO_2) in the atmosphere is mainly due to the burning of fossil fuels. As carbon dioxide levels have increased, the average global temperature has increased.

Chapter Assessment Questions

CheckPoint

Use the figure below to infer which abiotic factor might limit the survival of steelhead trout.



Answer: Temperature

Standardized Test Practice

CheckPoint

What is the most critical limiting factor for a polar bear?

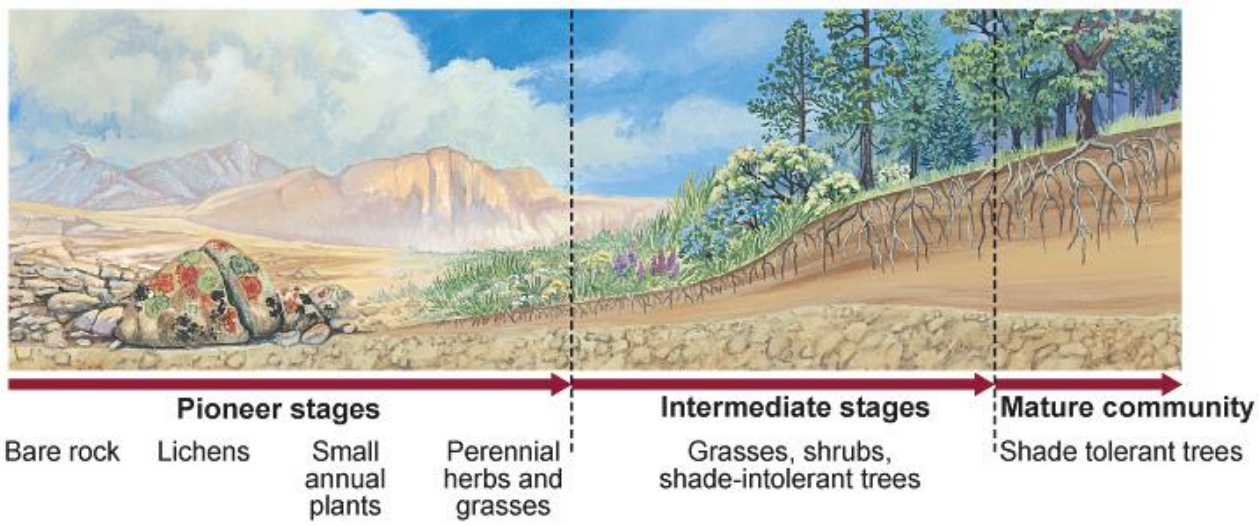
A. precipitation
B. soil type
C. sunlight
D. temperature

Standardized Test Practice

CheckPoint

True or False

The mature community in this diagram is a true climax community.



Standardized Test Practice

CheckPoint

For which biome was this data collected?

Average precipitation: 38–100 cm per year

Temperature range: 10°C–40°C

Abiotic factors: summers are very hot and dry; winters are cool and wet

A. desert

B. boreal forest

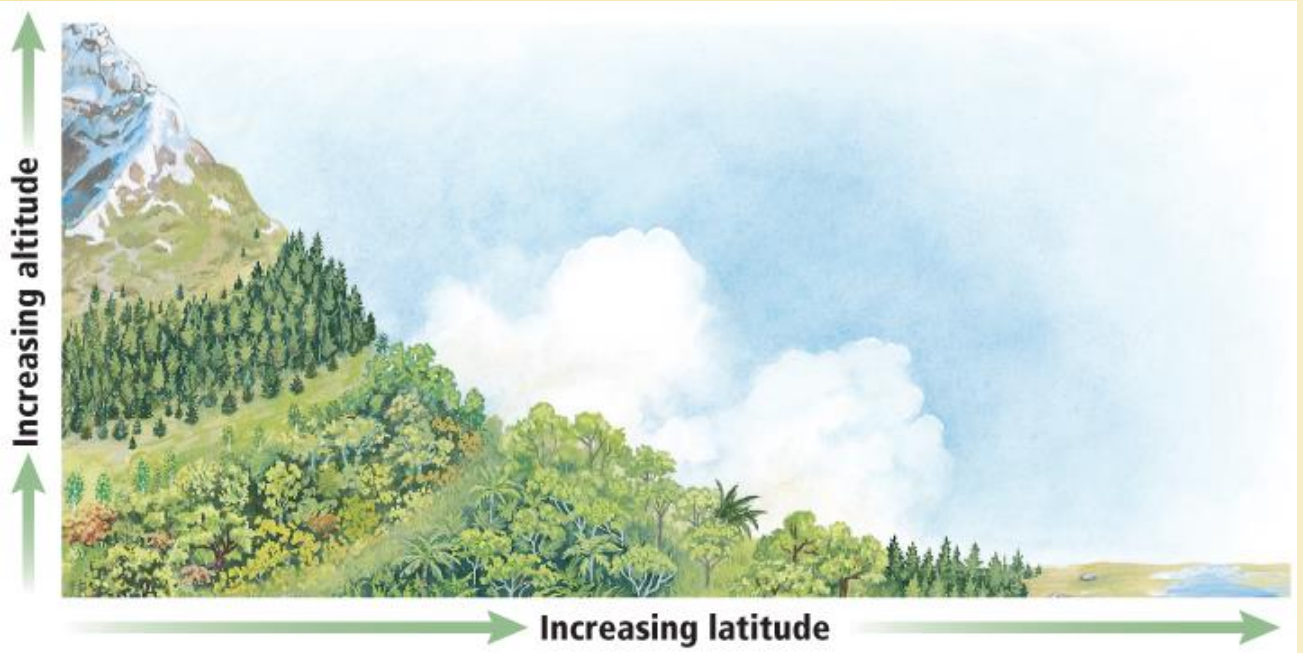
C. temperate woodland

D. tropical seasonal forest

Standardized Test Practice

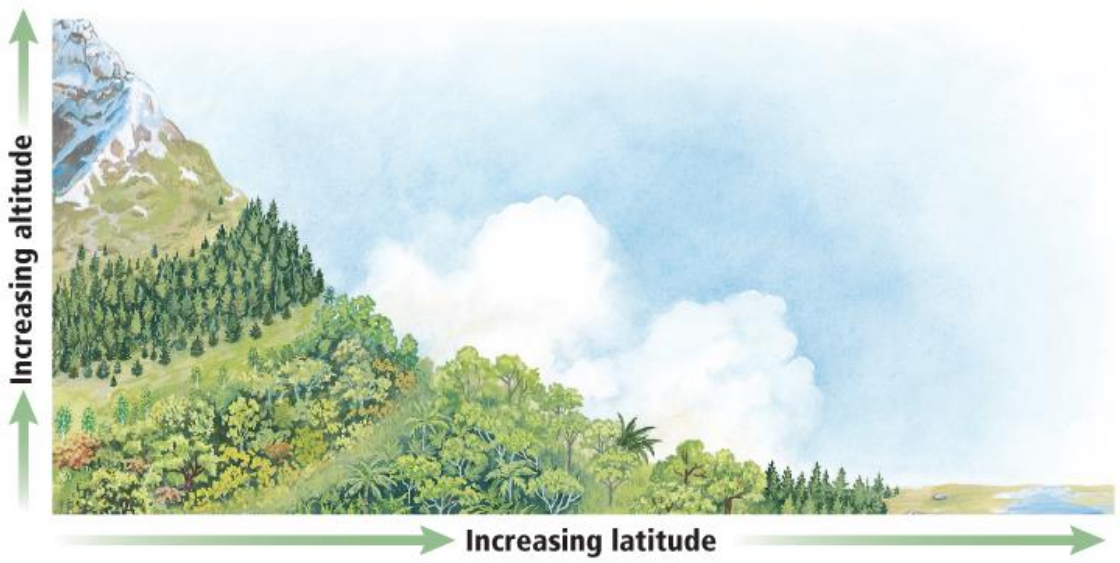
CheckPoint

What type of community is likely to exist near the top of a mountain?



Standardized Test Practice

CheckPoint



A. tundra

B. arctic desert

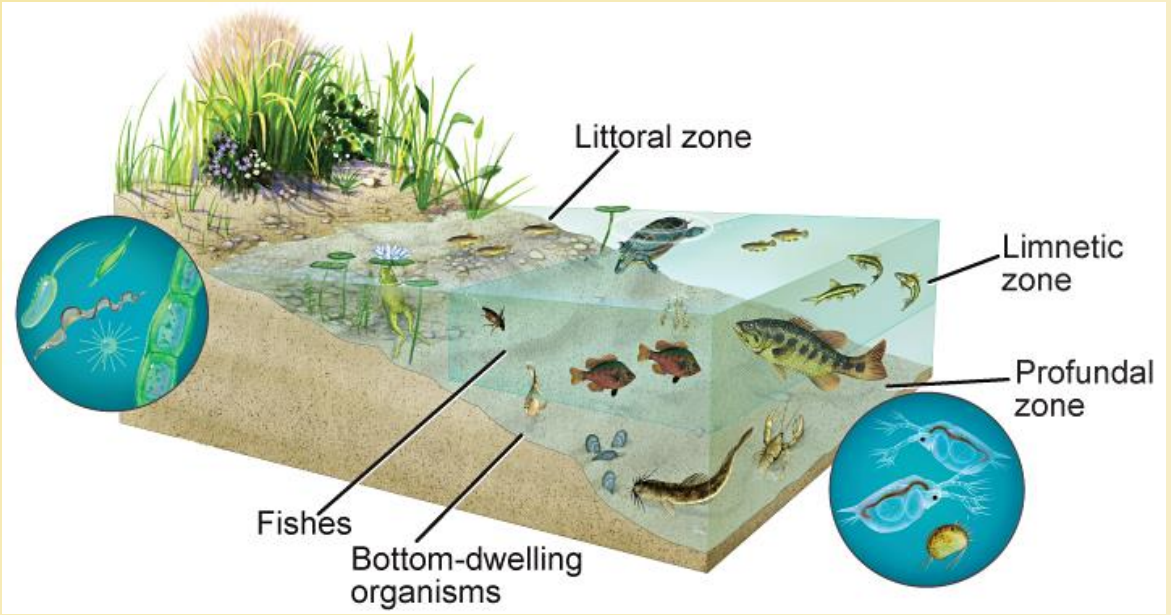
C. coniferous forest

D. temperate grassland

Standardized Test Practice

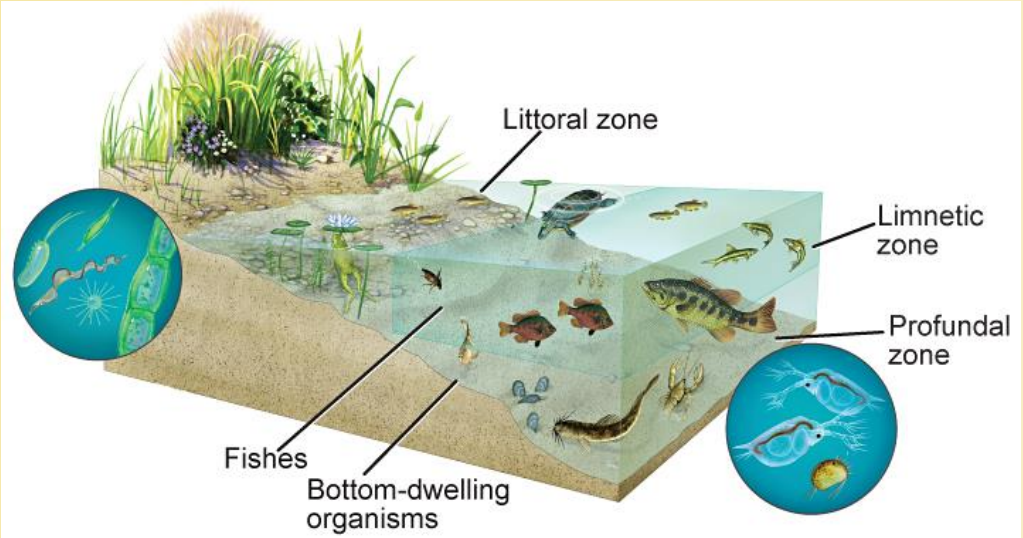
CheckPoint

What type of organisms enables fish to live in the limnetic zone?



Standardized Test Practice

CheckPoint



A. bottom dwellers

B. crustaceans

C. insects

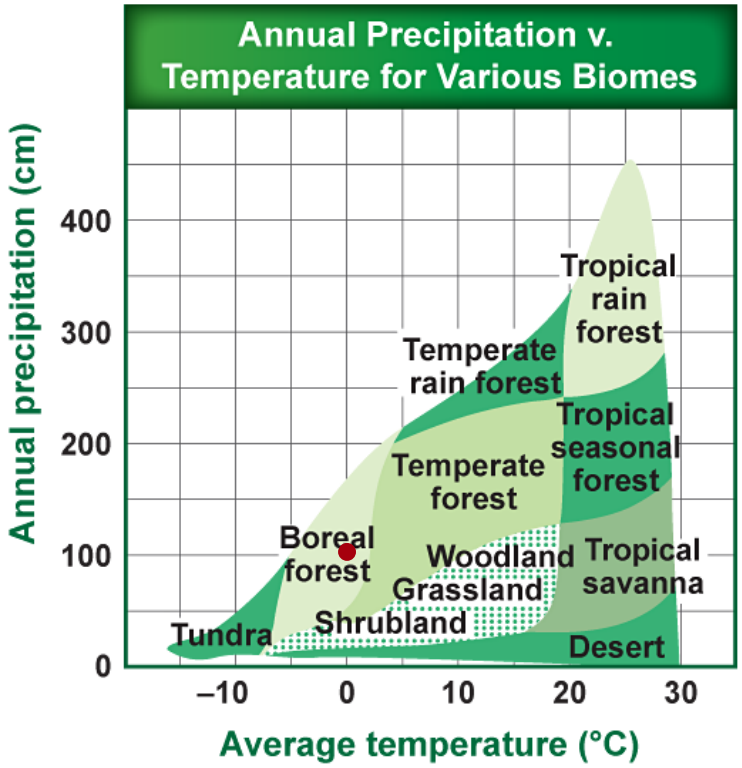
D. plankton

Standardized Test Practice

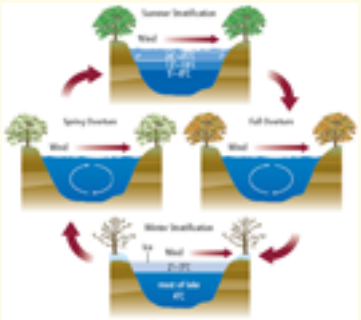
CheckPoint

What is the approximate average temperature and annual precipitation in the boreal forest biome?

	Average temperature (°C)	Average precipitation (cm)
A.	0	100
B.	10	150
C.	20	100
D.	25	200



Glencoe Biology Transparencies



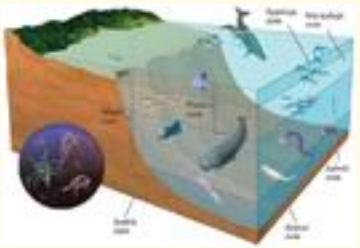
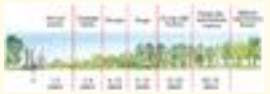
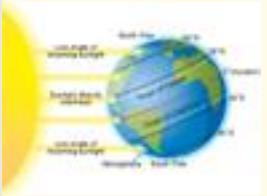


Image Bank





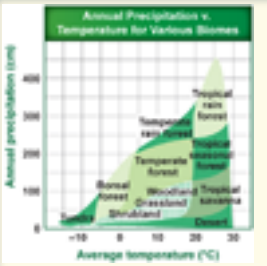
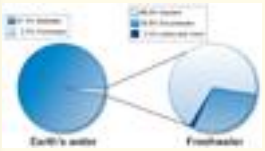
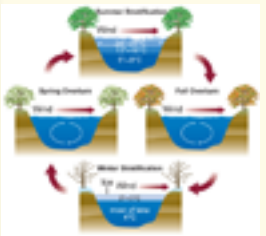

Annual Precipitation v. Temperature for Various Biomes
Annual precipitation (cm)
Average temperature (°C)
Tropical rain forest
Temperate rain forest
Temperate forest
Tropical savanna/ forest
Boreal forest
Woodland/ Shrubland
Tropical savanna
Desert
Tundra

Image Bank

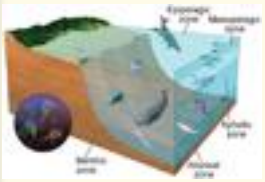












Vocabulary

Section 1

- community
- limiting factor
- tolerance
- ecological succession
- primary succession
- climax community
- secondary succession

Vocabulary

Section 2

- weather
- latitude
- climate
- tundra
- boreal forest
- temperate forest
- woodland
- grassland
- desert
- tropical savanna
- tropical seasonal forest
- tropical rain forest

Vocabulary

Section 3

- sediment
- littoral zone
- limnetic zone
- plankton
- profundal zone
- wetlands
- estuary
- intertidal zone
- photic zone
- aphotic zone
- benthic zone
- abyssal zone

Animation

Concepts In Motion

- Primary and Secondary Solutions: Climax Community
- Visualizing Global Effects on Climate