

Chapter 52

An Introduction to Ecology and the Biosphere

PowerPoint® Lecture Presentations for

Biology

Eighth Edition

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Overview: The Scope of Ecology

- **Ecology** is the scientific study of organisms
interactions **between**
themselves and the
environment
- Ecologists work at levels ranging from individual organisms to the planet

Fig. 52-2



**Organismal
ecology**



**Population
ecology**



**Community
ecology**



**Ecosystem
ecology**



**Landscape
ecology**



**Global
ecology**

Ecologists study environmental interactions at the levels of the

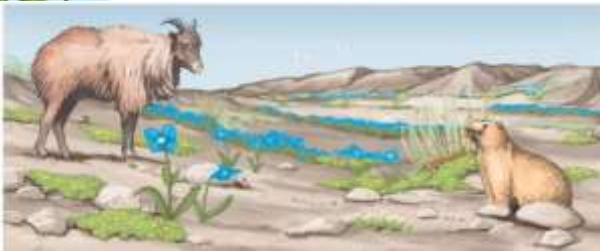
– **Organism**



– **Population**



– **Community**



– **Ecosystem**



- A **population** is a group of individuals of the same species living in an area
- A **community** is a group of populations of different species in an area
- An **ecosystem** is the community of organisms in an area **and** the physical factors with which they interact
- **Biomes** are major types of ecosystems; cover large areas
- The **biosphere** is the global ecosystem, the sum of all the planet's ecosystems

Concept 52.2: Interactions between organisms and the environment limit the distribution of species

- Ecologists recognize **two kinds of factors** that determine distribution: **biotic**, or living factors, and **abiotic**, or nonliving factors
- **Biotic factors** that affect the distribution of organisms may include:
 - Interactions with other species
 - Predation
 - Competition

Abiotic Factors

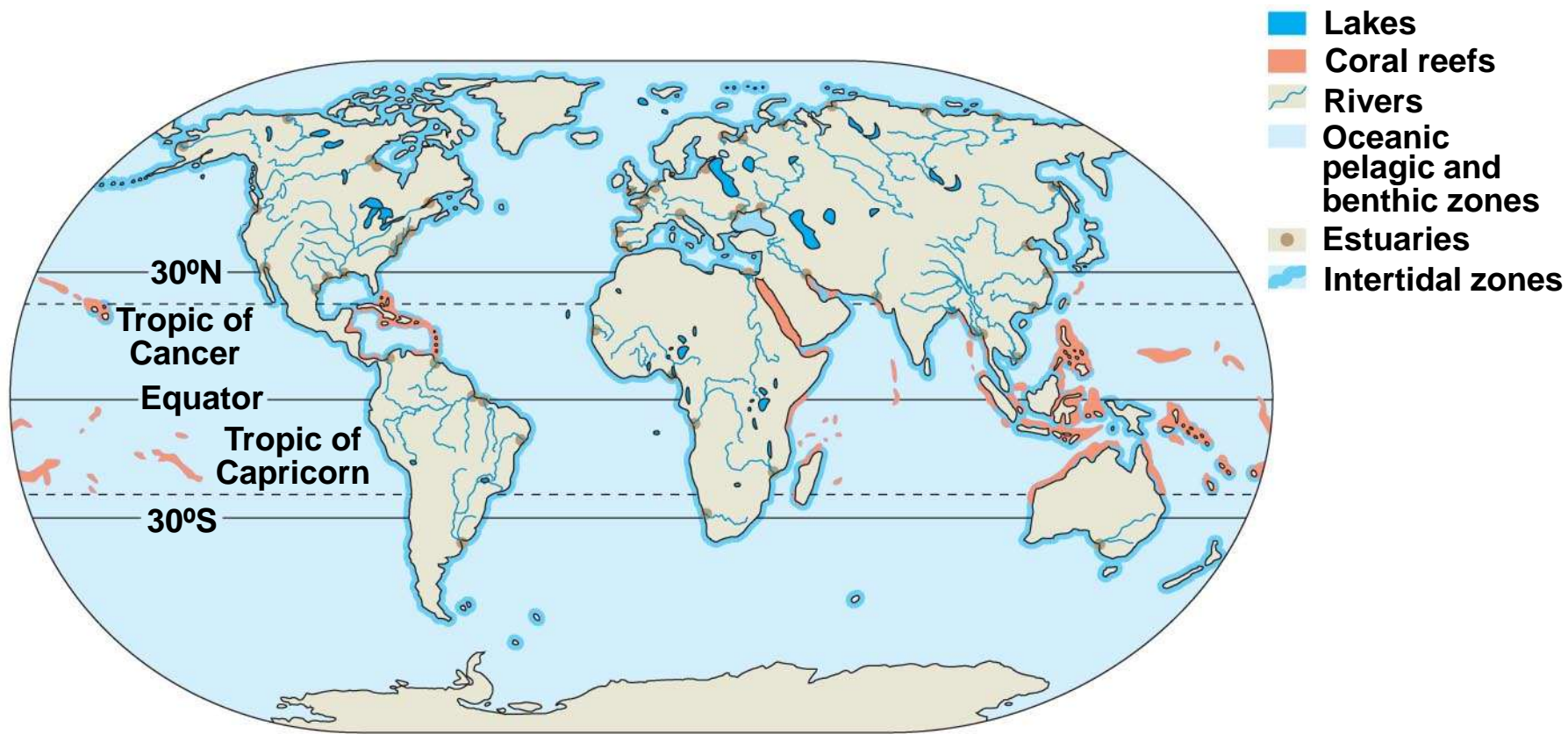
- Abiotic factors affecting distribution of organisms include:
 - Temperature
 - Water
 - Sunlight
 - Wind
 - Rocks and soil
 - Salinity

Climate

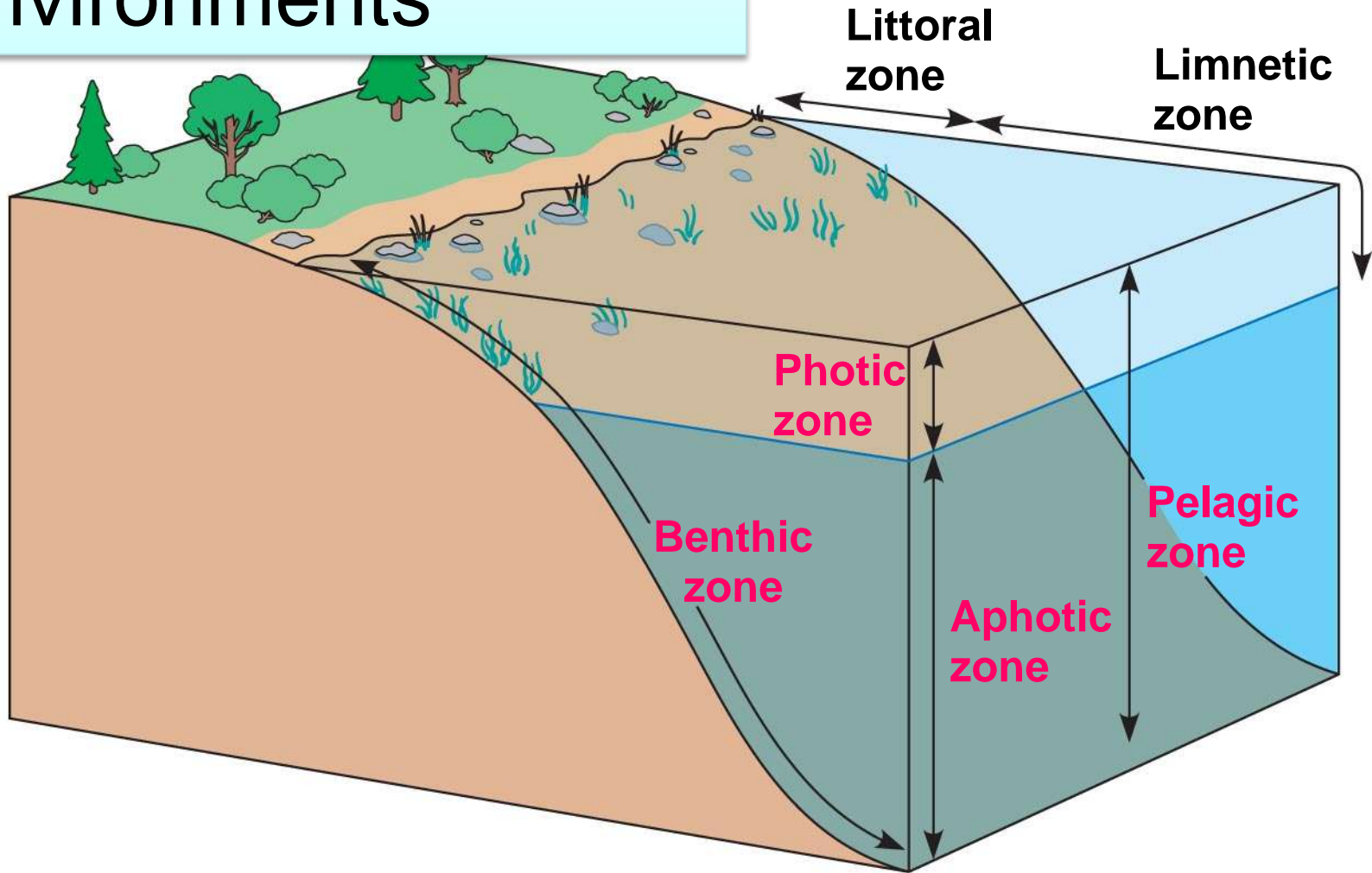
- Four major abiotic components of **climate** are temperature, water, sunlight, and wind
- The long-term prevailing weather conditions in an area constitute its climate
- **Macroclimate** consists of patterns on the global, regional, and local level
- **Microclimate** consists of very fine patterns, such as those underneath a fallen log

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- During the day, air rises over warm land and draws a cool breeze from the water across the land
 - As the land cools at night, air rises over the warmer water and draws cooler air from land back over the water, which is replaced by warm air from offshore

Fig. 52-15

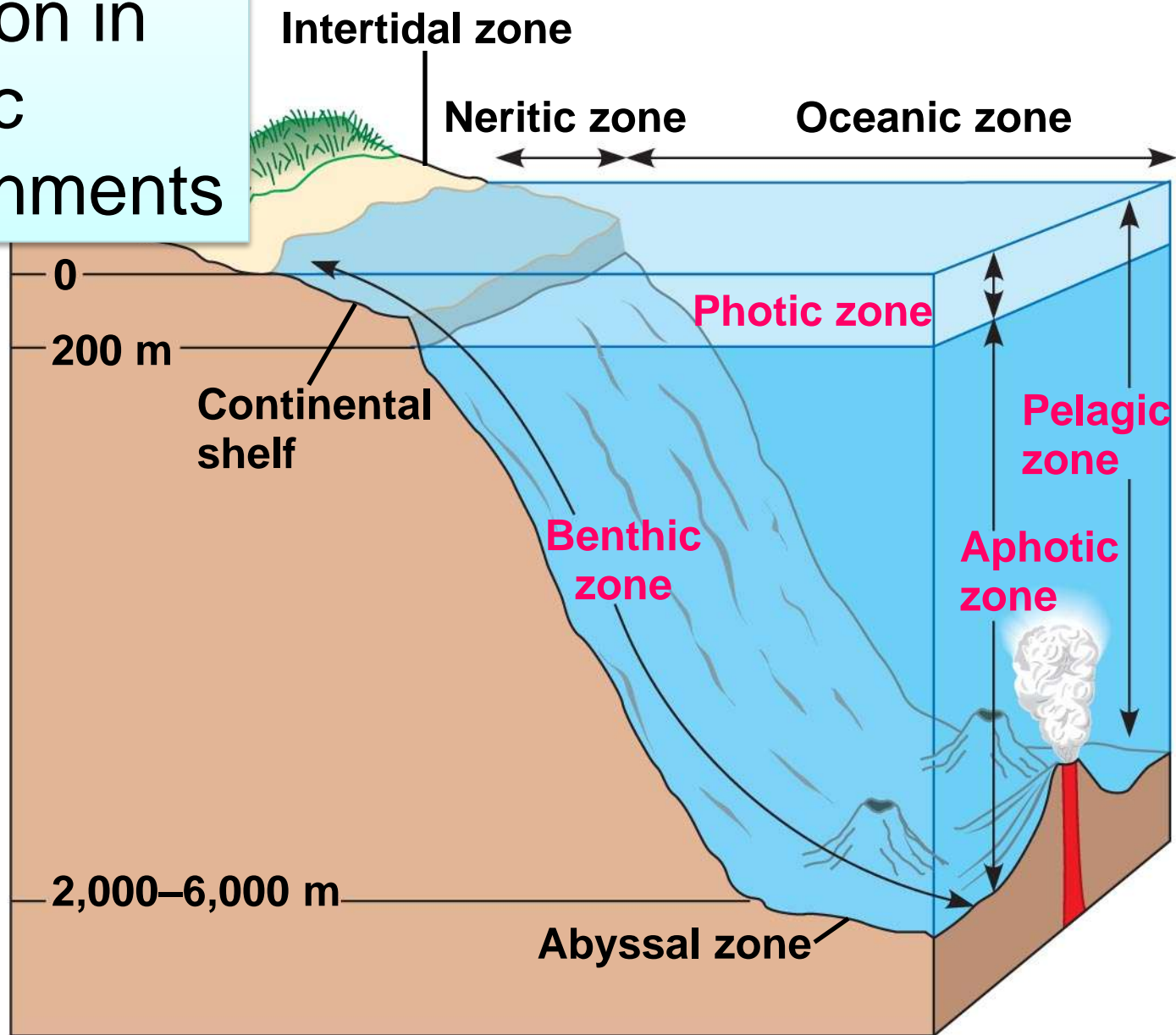


Zonation in aquatic environments



(a) Zonation in a lake

Zonation in aquatic environments



(b) Marine zonation

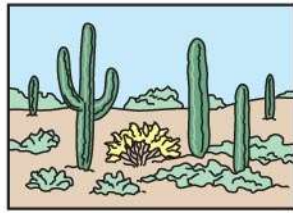
Aquatic Biomes

- Major aquatic biomes:
- Lakes
- Wetlands
- Streams and rivers
- Estuaries
- Intertidal zones
- Oceanic pelagic zone
- Coral reefs
- Marine benthic zone

Concept 52.4: The structure and distribution of terrestrial biomes are controlled by climate and disturbance

- Climate is very important in determining why **terrestrial biomes** are found in certain areas

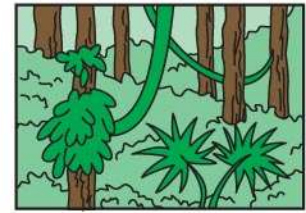
Fig. 52-20



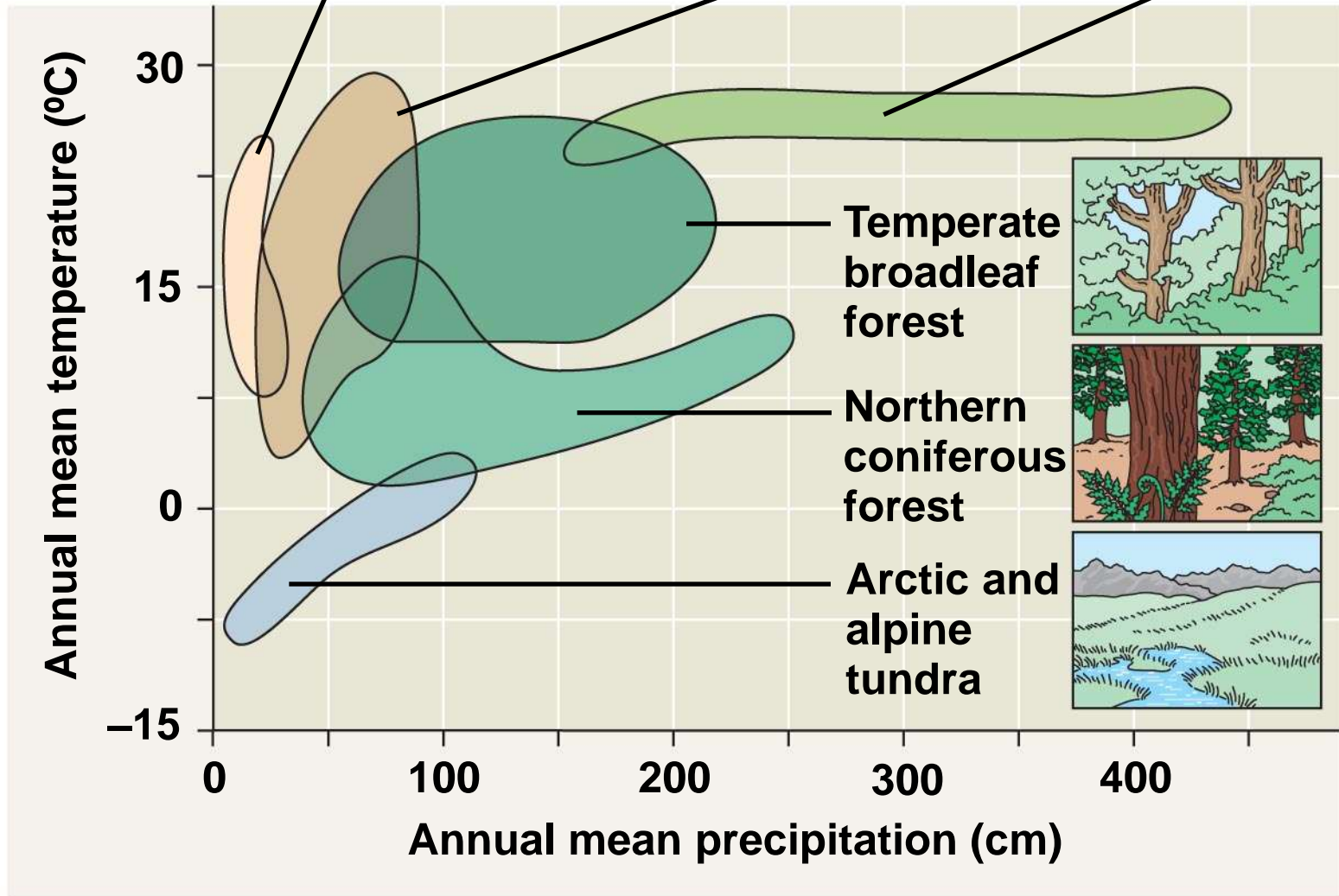
Desert

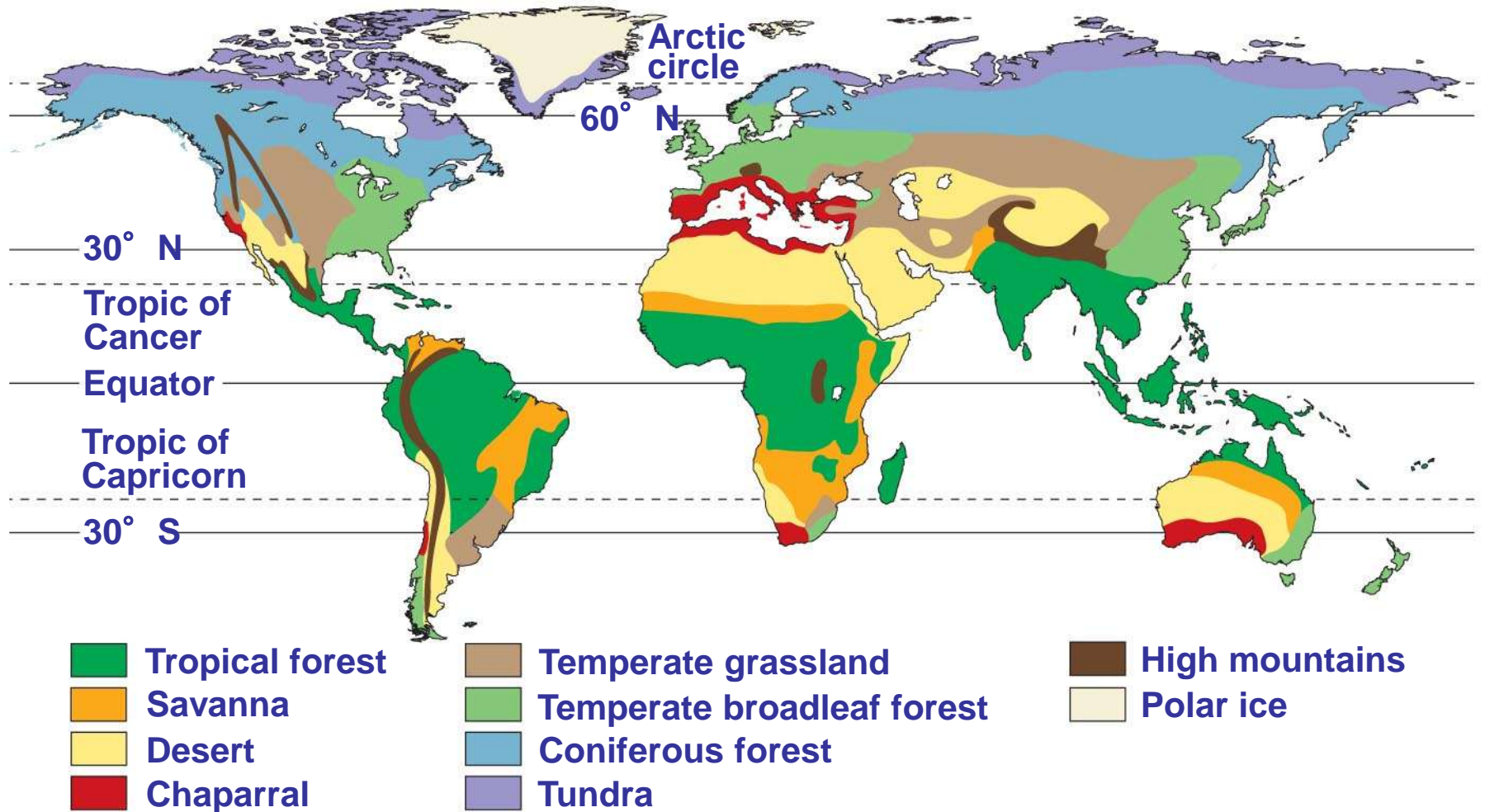


Temperate grassland



Tropical forest

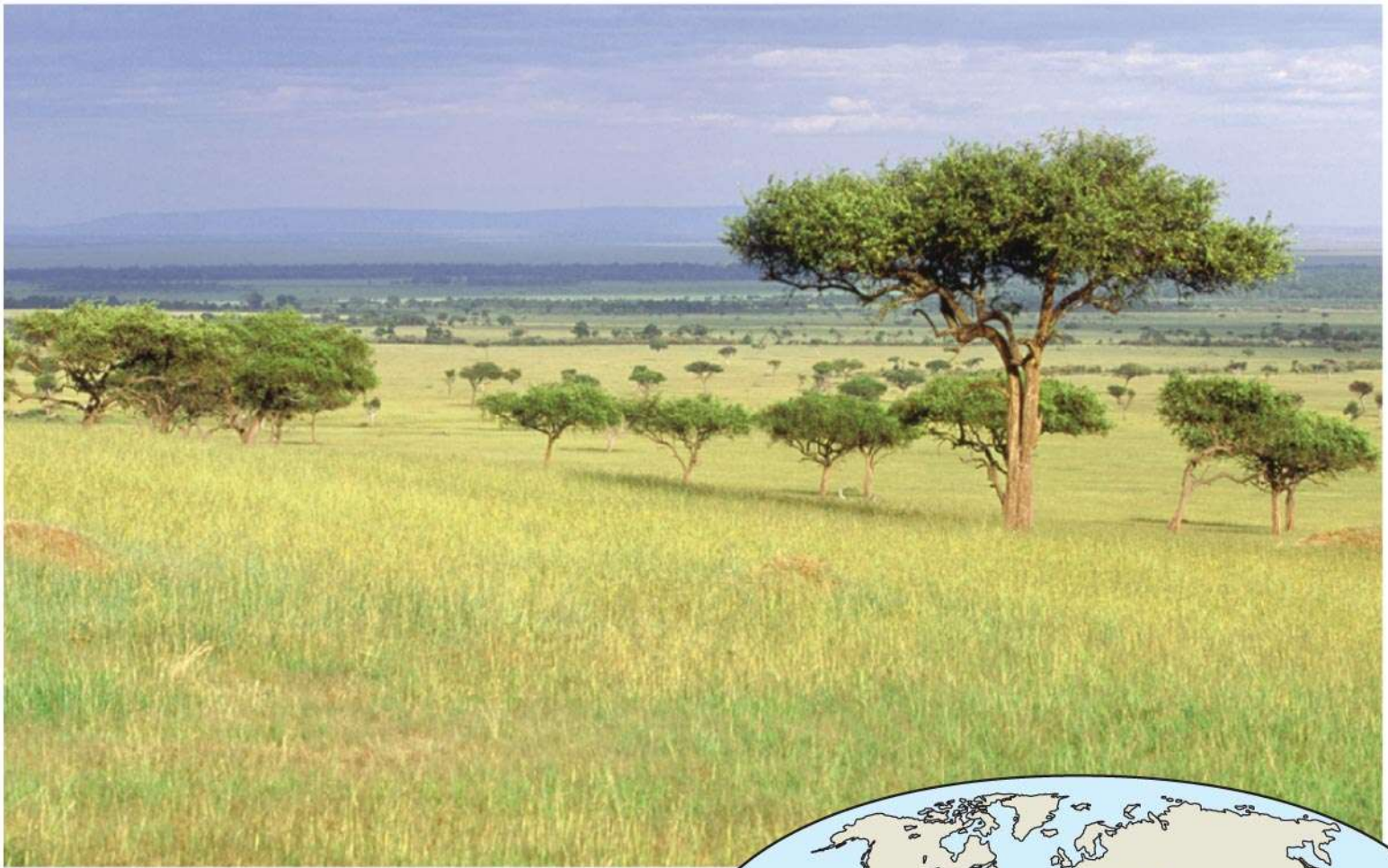




Major terrestrial biomes

- Tropical forest
- Desert
- Savanna
- Chaparral
- Temperate grassland (step')
- Coniferous forest (taiga)
- Temperate broadleaf forest
- Tundra

Fig. 52-21c



A savanna in Kenya

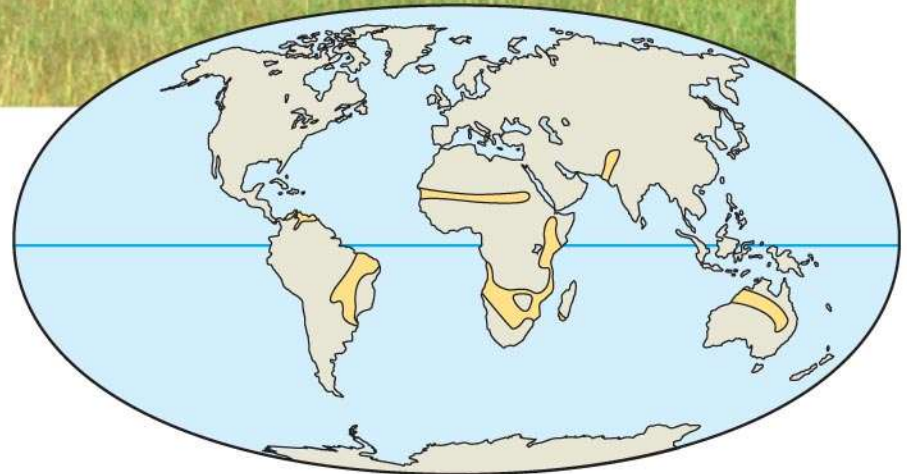


Fig. 52-21d



**An area of chaparral
in California**

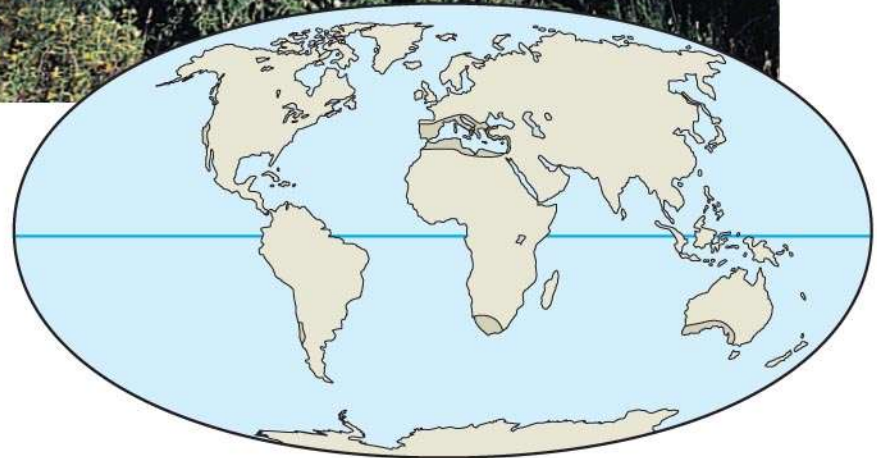
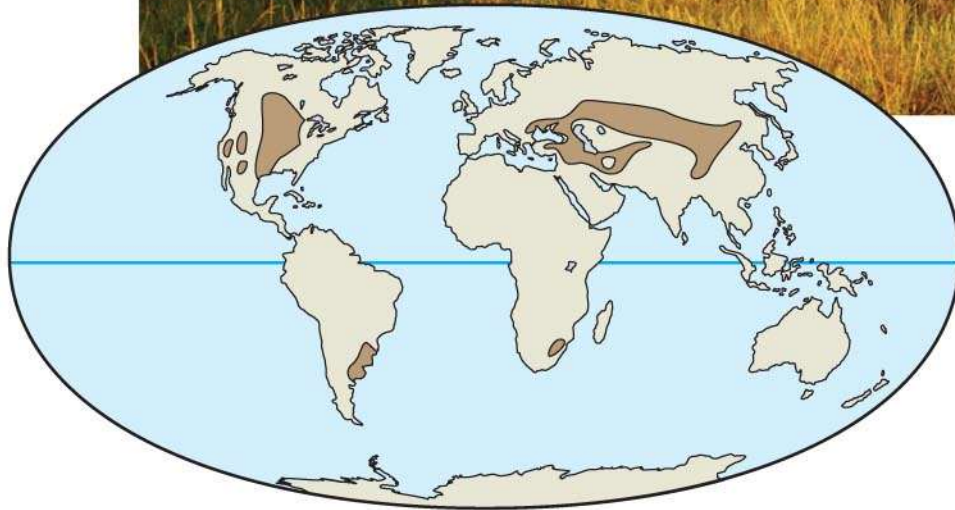
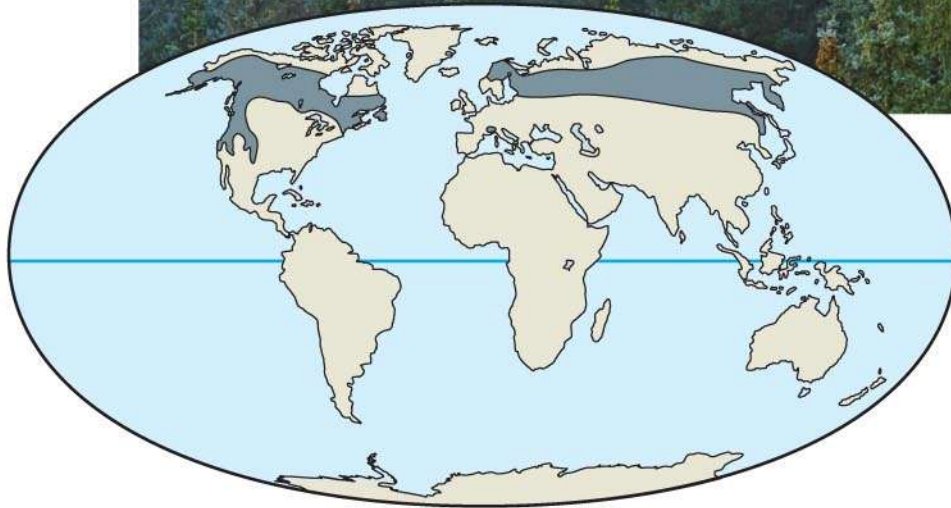


Fig. 52-21e



Sheyenne National Grassland in North Dakota



Rocky Mountain National Park in Colorado



Great Smoky Mountains National Park in North Carolina

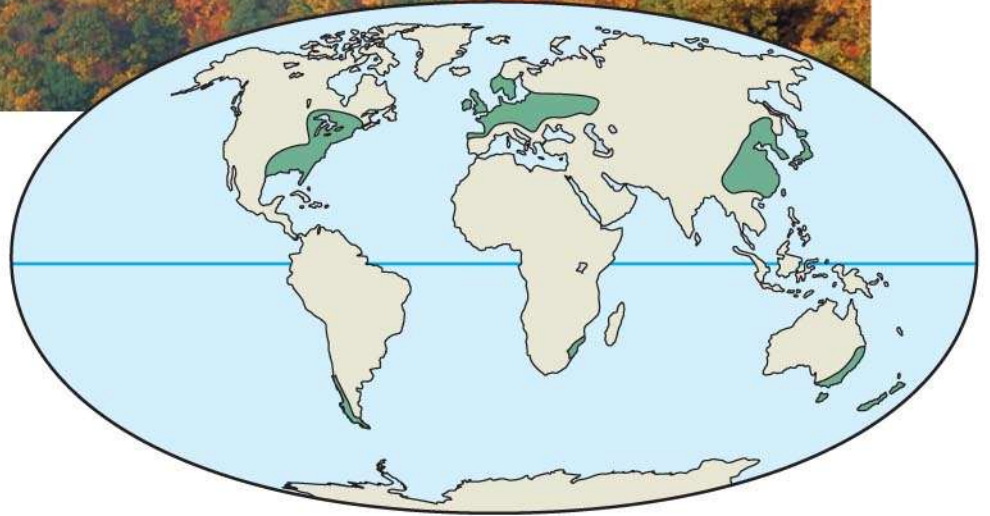
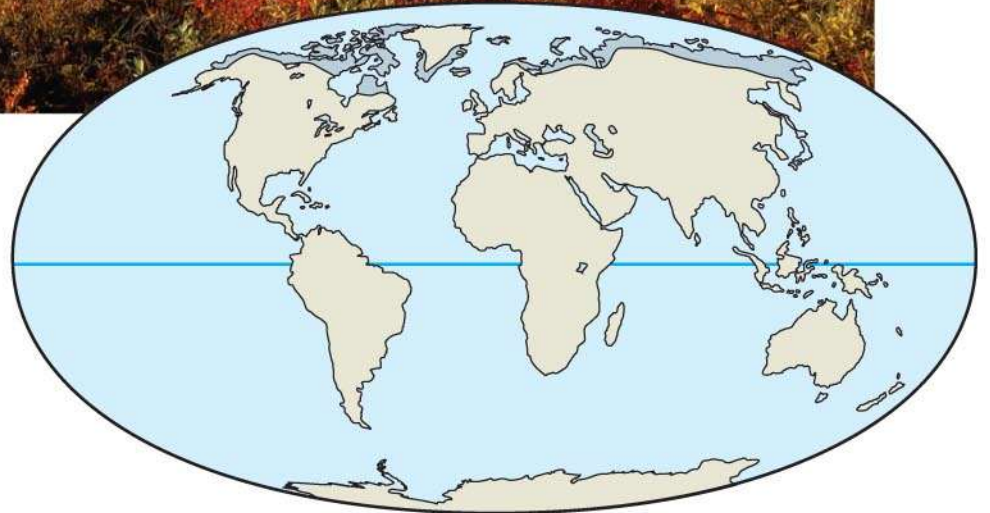


Fig. 52-21h



**Denali National Park, Alaska,
in autumn**





Thank you for
your attention and
participation!



You should now be able to:

1. Distinguish among the following types of ecology: organismal, population, community, ecosystem, and biome
2. Distinguish between the following pairs of terms: biotic and abiotic factors, macroclimate and microclimate
3. Define the following terms: photic zone, aphotic zone, benthic zone, pelagic zone

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4. List and describe the characteristics of the major aquatic biomes
 5. List and describe the characteristics of the major terrestrial biomes