

# 7

## BIOMES

*Where do Plants and Animals Live?*

# STUDENT LEARNING OUTCOMES

After reading this chapter, students will be able to

- Explain how specializations limit many species to relatively limited geographical range.
- Describe how the presence or absence of other species influences a species range.
- Describe how many species are able to co-exist within a limited geographical range.
- Explain how temperature, water and light influence the shape and longevity of leaves.
- Explain the separation between light and nutrients in aquatic biomes and how this separation, or lack thereof, affects net primary production in various aquatic biomes.



# A Living Pin Cushion

- The horned lizard lives in American Southwest
- The mountain devil lives in Australia
- Both live in arid regions
- Both live entirely on ants
- Both are flat as a pancake and covered with spines
- Both have similar **adaptations**
- But- they arrived at body shape and diet independently
- Generated by **natural selection**
- **Convergent Evolution**

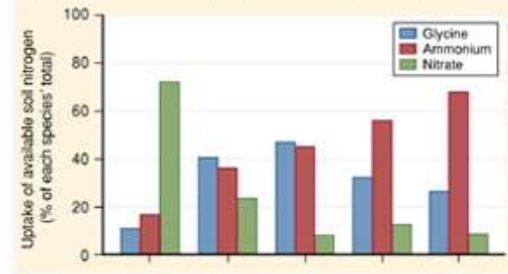
# Where Species Live and Why

- **Community**
- **Ecosystem**
- **Biome**
- **Habitat** is the geographical locations and environmental conditions where species lives
- **Niche** includes the totality of a species' environmental requirements
  - How and where organism gets energy
  - How and where organism gets nutrients
  - Also how an organism may change the environment
  - How an organism interacts with other species

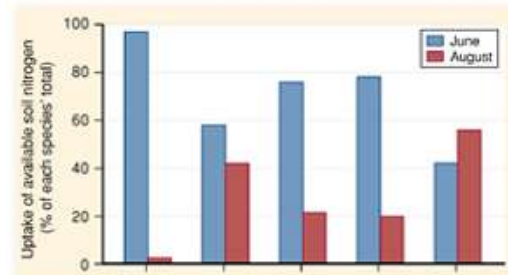
# Competitive Exclusion Principle

- No two species can share the same exact niche indefinitely unless other factors limit the density of the better competitor

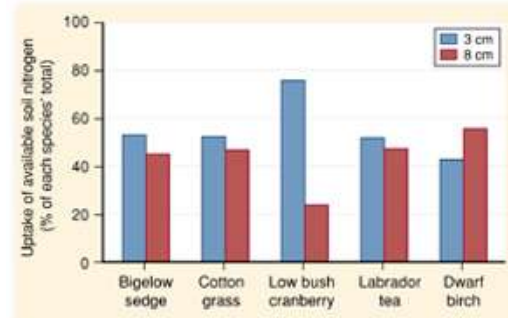
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(a)



(b)



(c)

# Adaptations

- Characteristics that affect an individual's chance to survive and produce offspring.
- Specialization (narrow adaptation)
- Anatomy and physiology often the result of natural selection and therefore adaptations to specific conditions (i.e. leaf shape)

(a)



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(b)



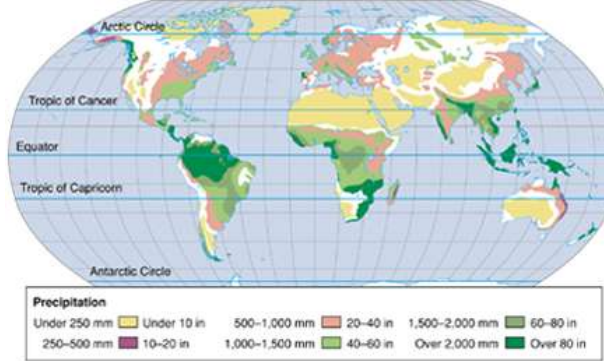
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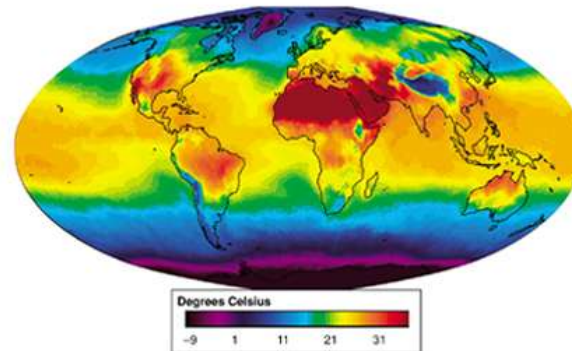
# Environmental Gradients

- Relationship between niche, adaptation, and geographical region
- Environmental gradients

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(a)

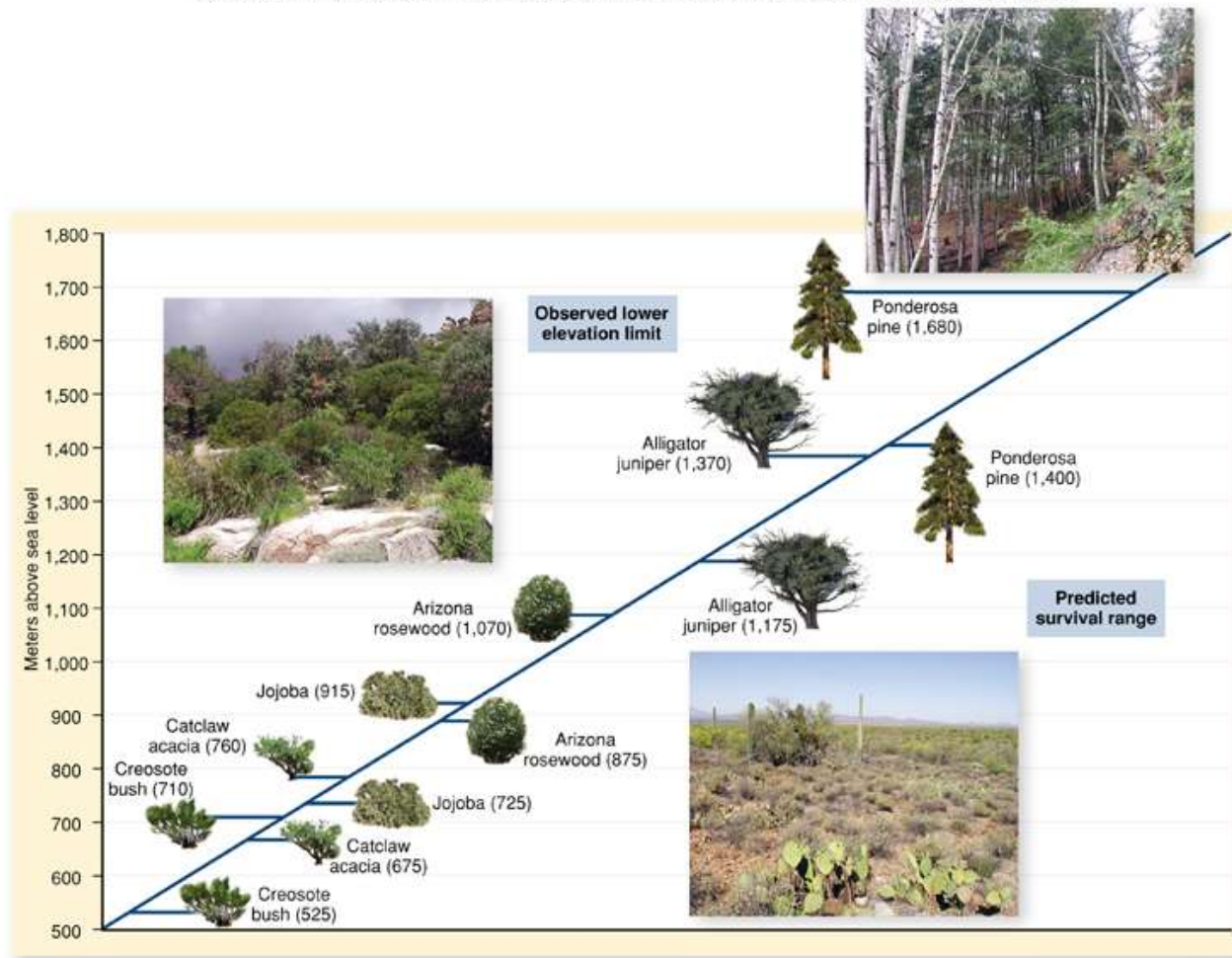


(b)

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# Precipitation Gradients

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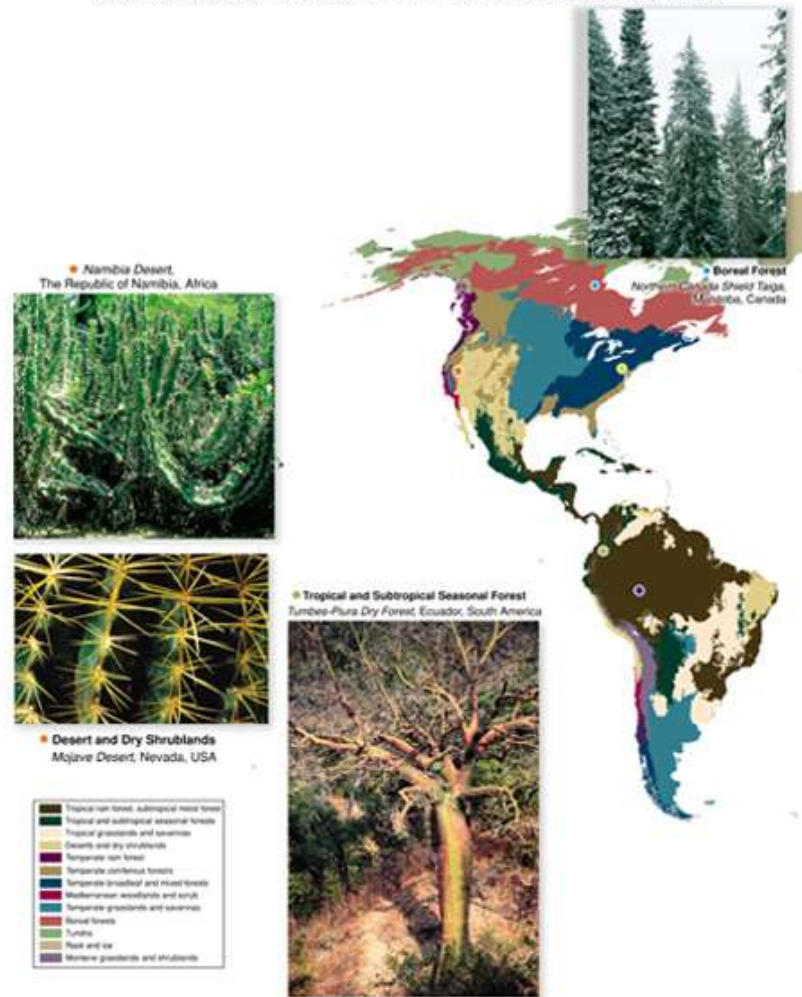


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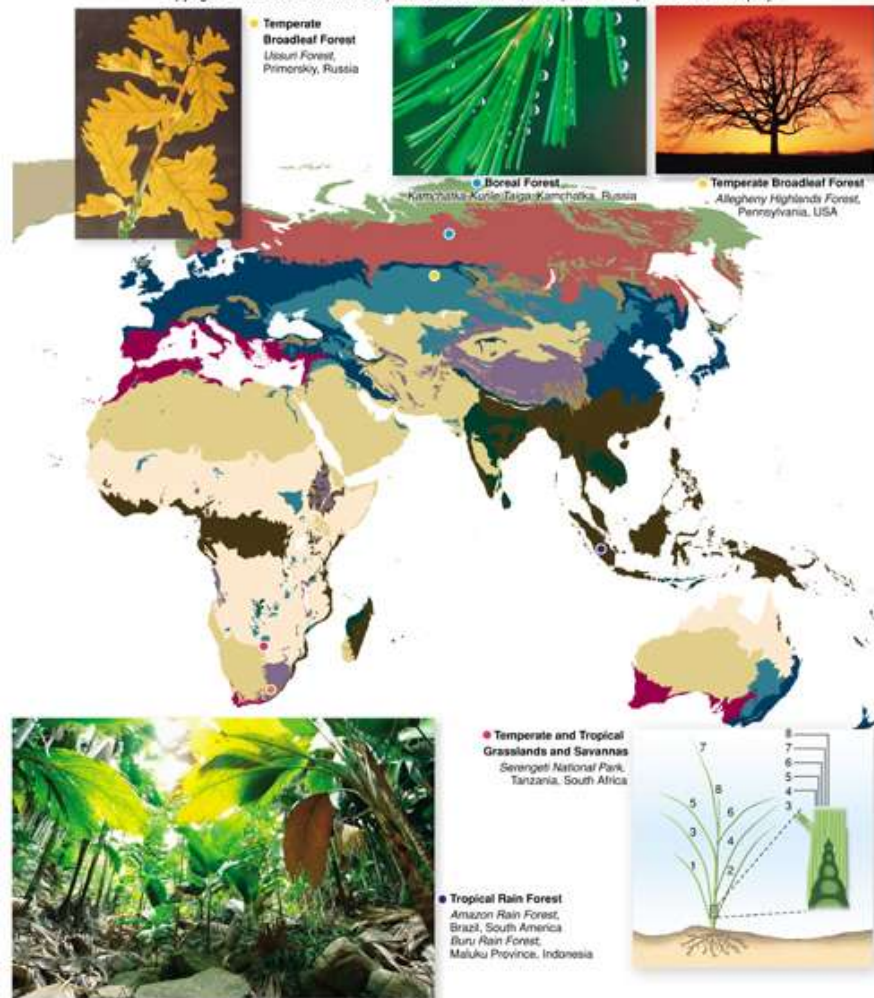
# Terrestrial Biomes

- Terrestrial biomes appear as broad latitudinal bands
- Distribution determined by
  - Temperature (growing season)
  - Moisture (precipitation versus potential evaporation)
  - Sunlight (latitude and local climate)



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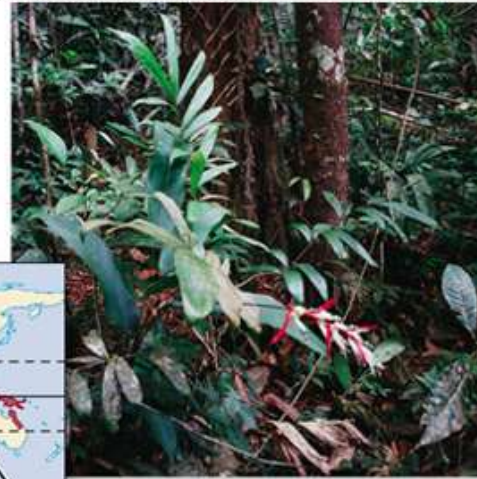
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# Tropical Rain Forest

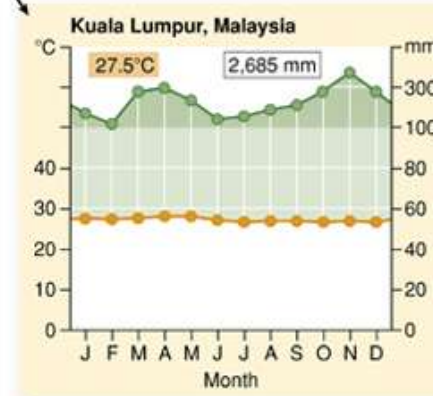
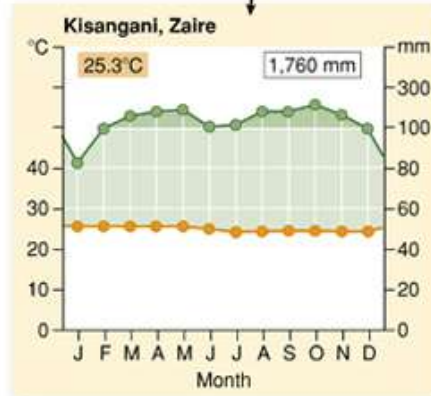
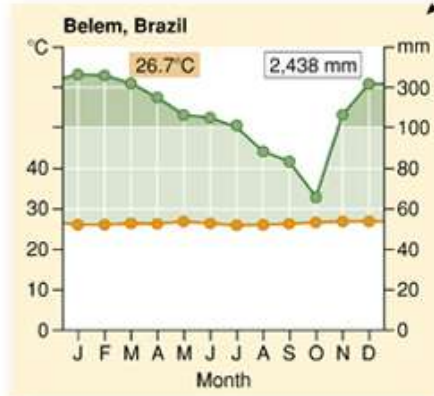
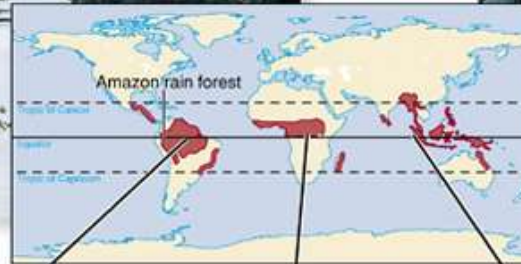
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Amazon rain forest



Amazon rain forest

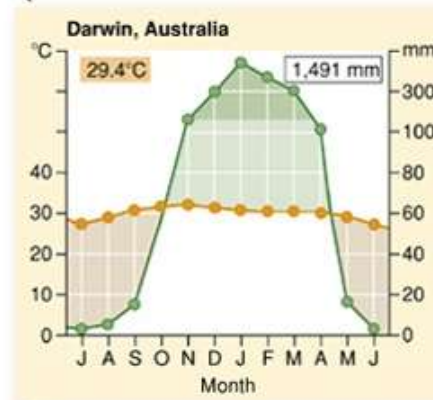
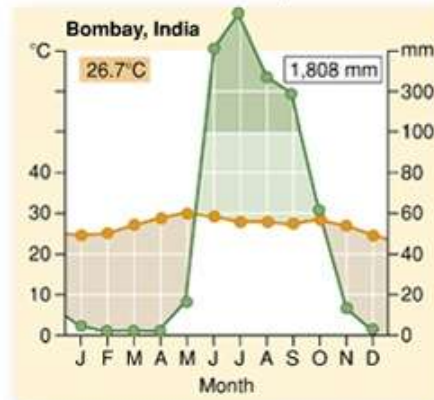
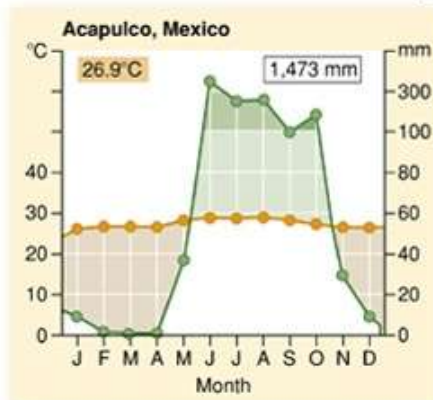
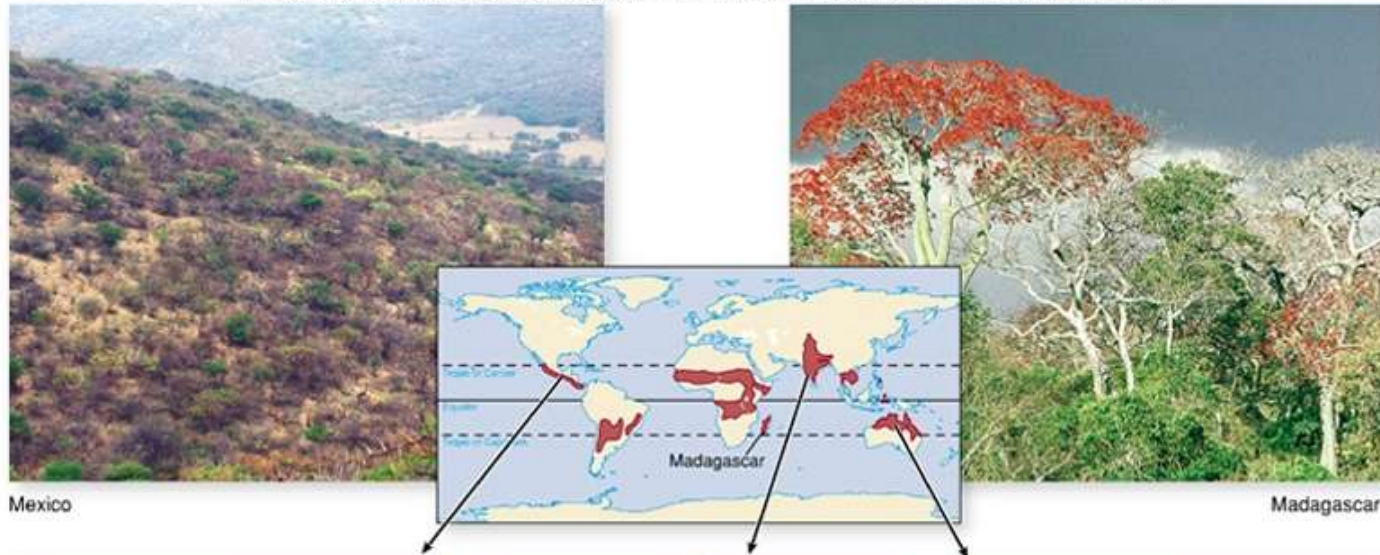


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# Tropical Dry Forest

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July Climate diagrams for sites in June  
Southern Hemisphere order months from July to June

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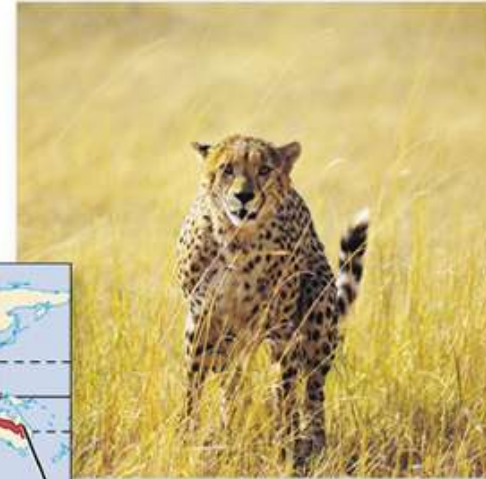
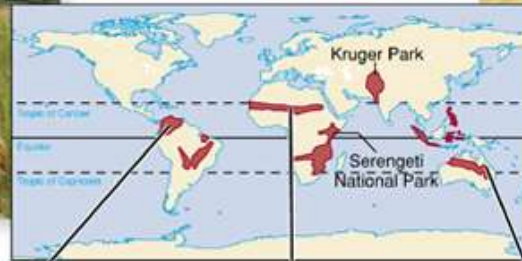


# Tropical Savannas

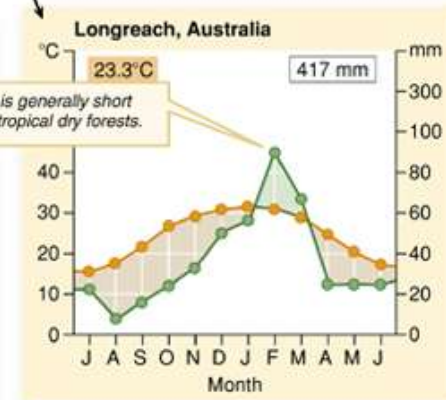
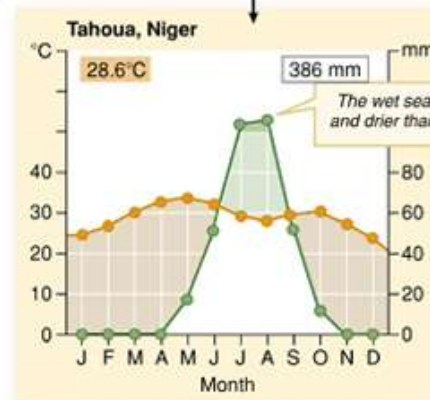
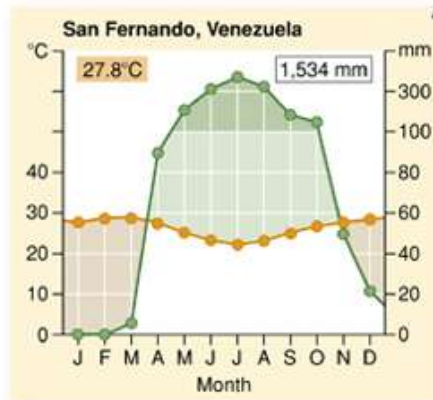
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Venezuela



Cheetah



■ Wet season 
 ■ Dry season 
 — Mean annual temperature 
  Mean annual precipitation

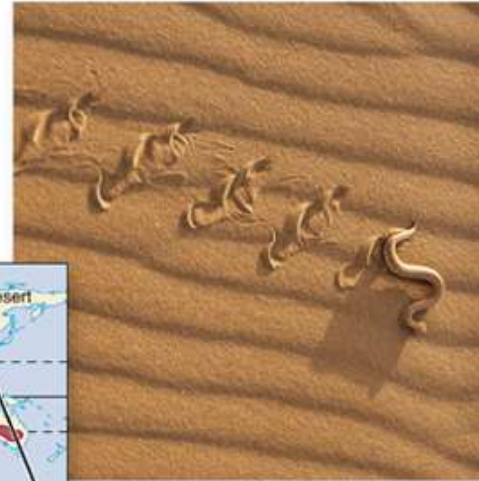
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# Deserts

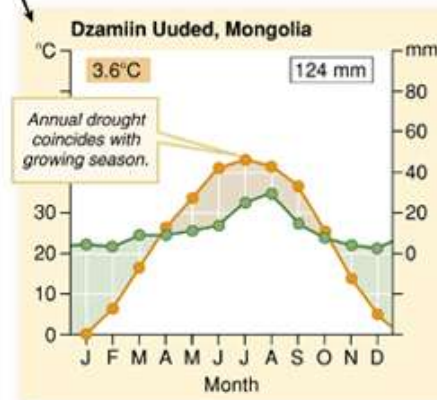
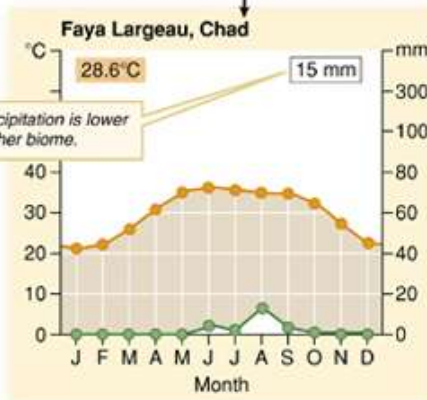
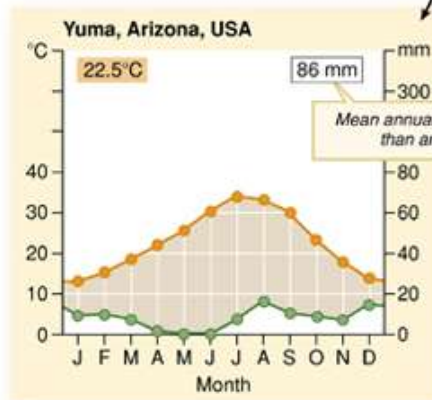
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Sonoran desert, USA



Puff adder



Wet season Dry season Mean annual temperature Mean annual precipitation

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# Mediterranean Woodland and Scrubland

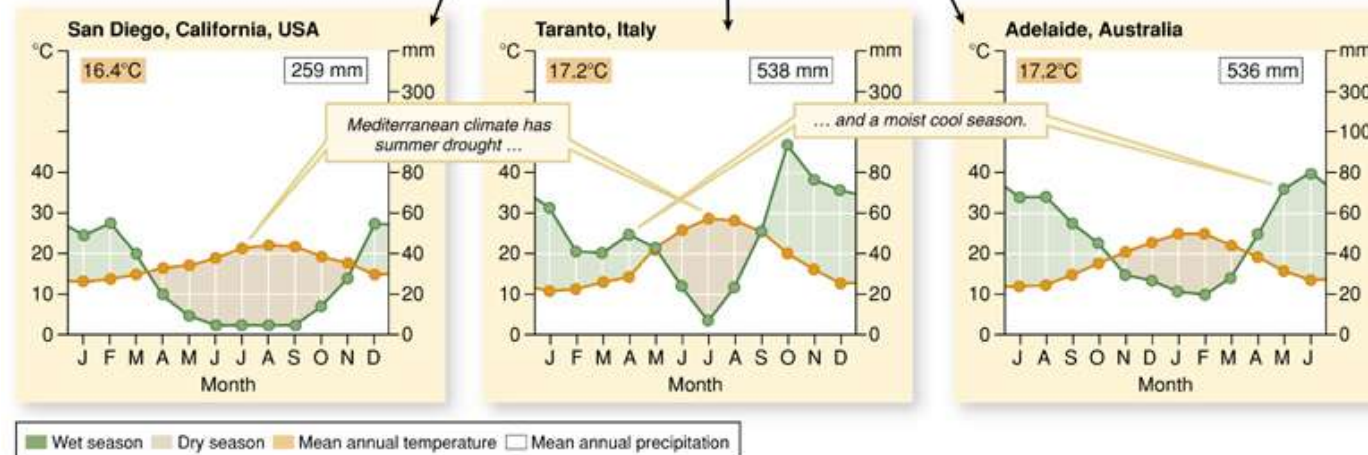
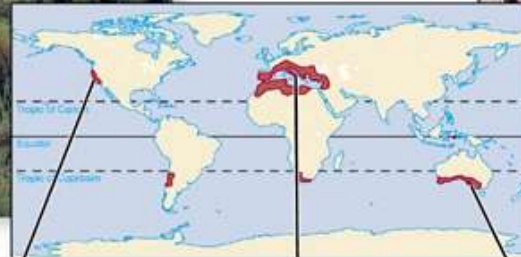
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California, USA



Cork tree



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# Temperate Grasslands

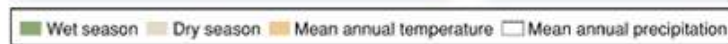
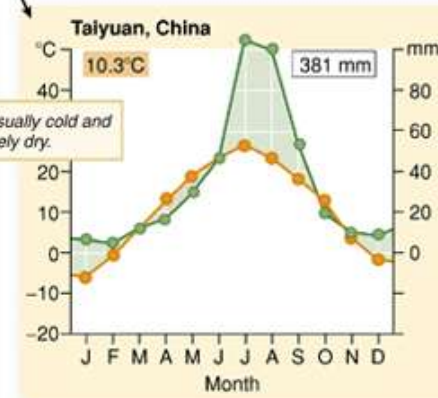
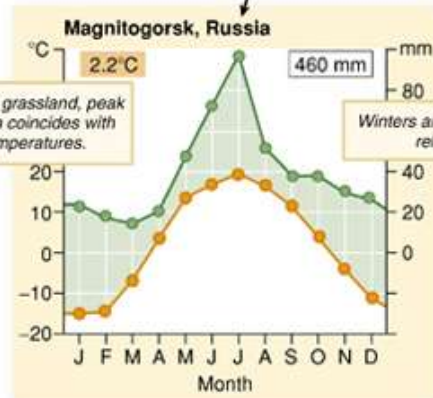
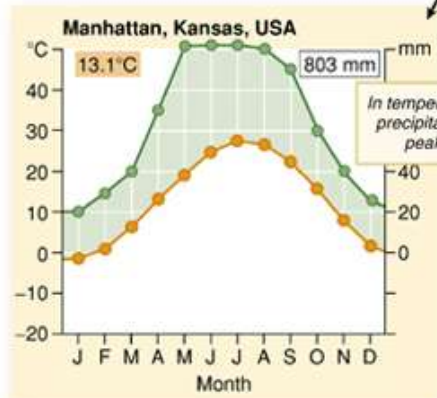
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Bison



Mongolia

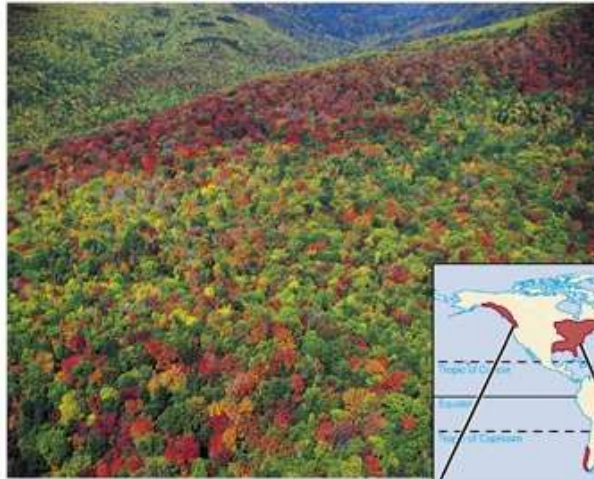


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# Temperate Forests

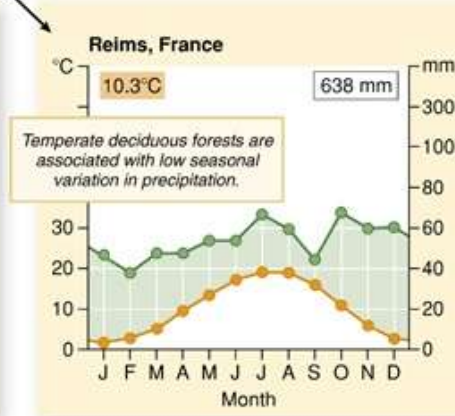
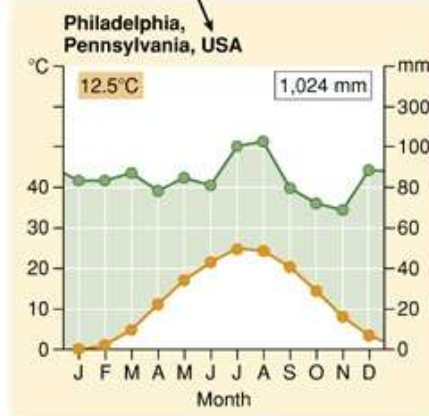
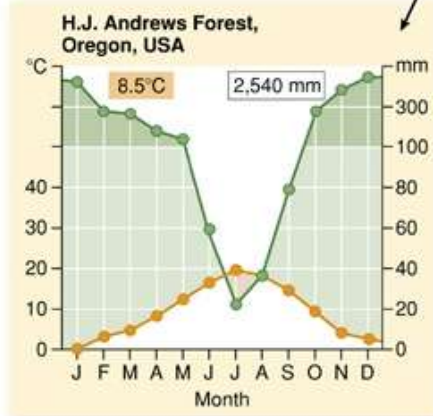
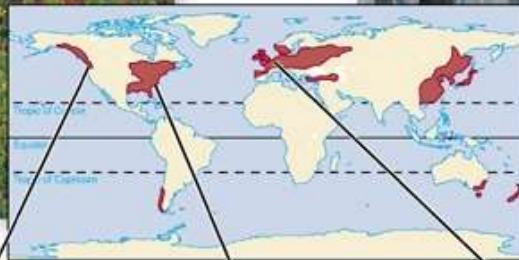
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New Hampshire, USA



Pennsylvania, USA

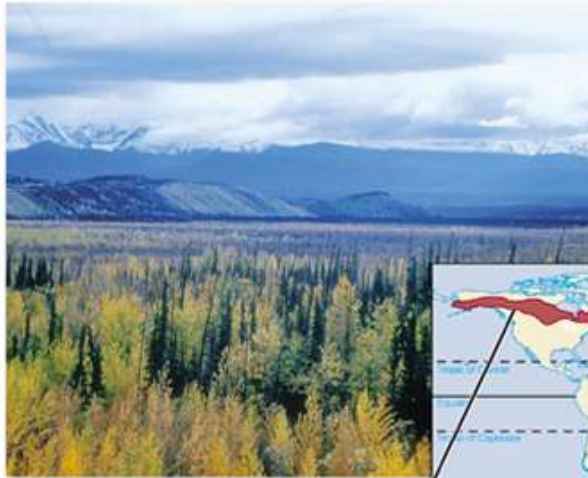


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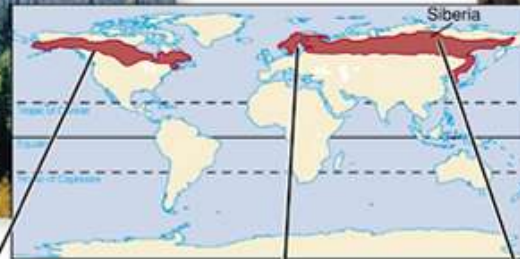


# Boreal Forest

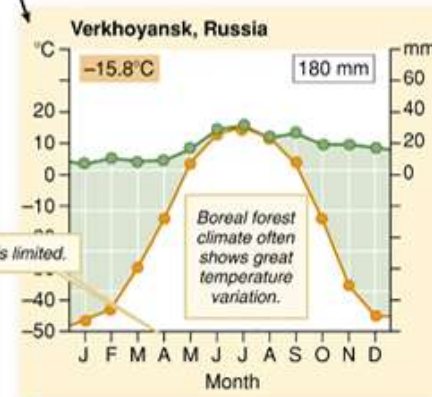
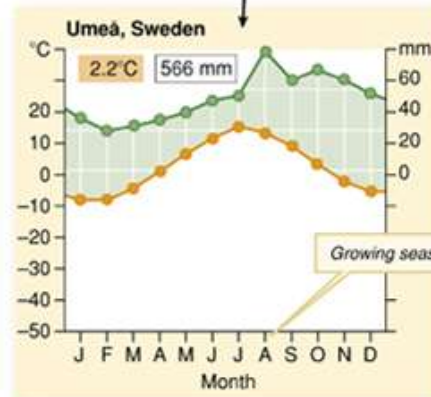
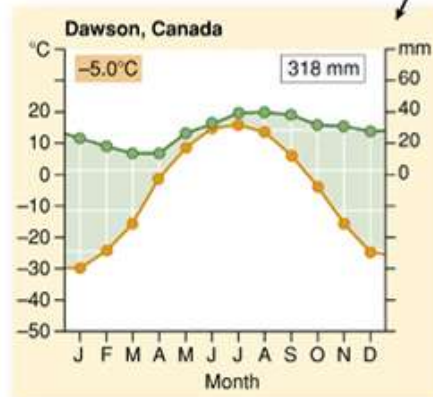
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Alaska, USA



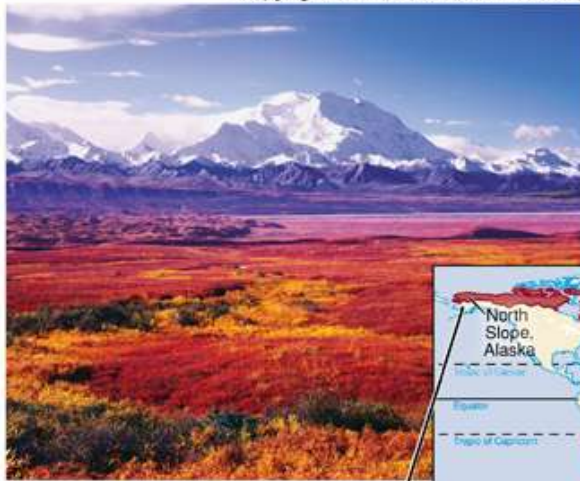
Siberian tiger



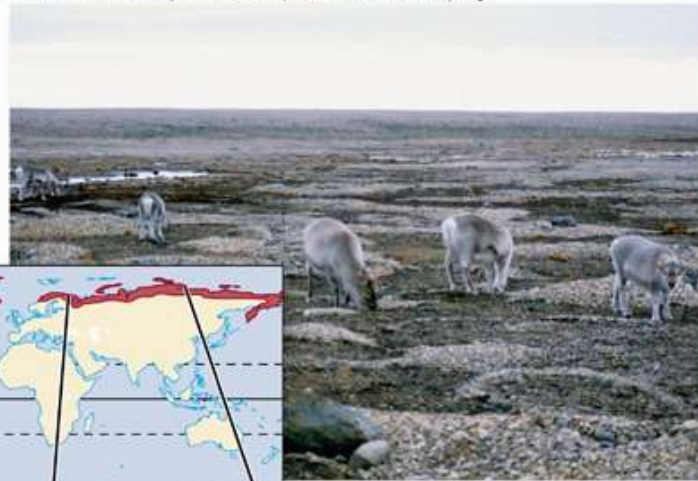
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# Tundra

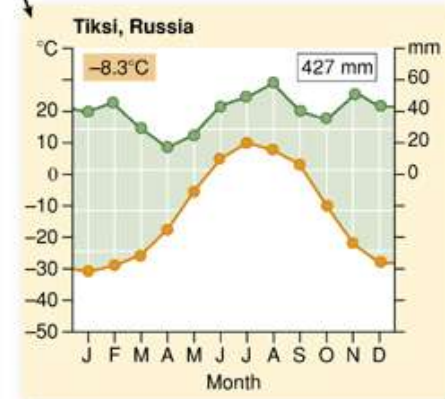
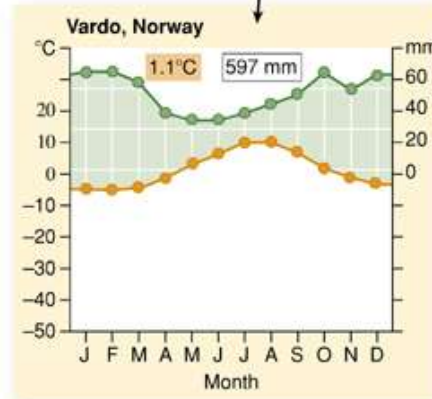
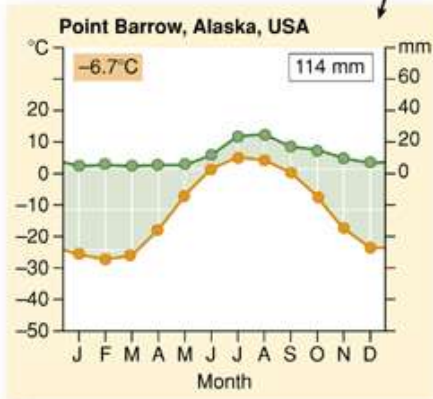
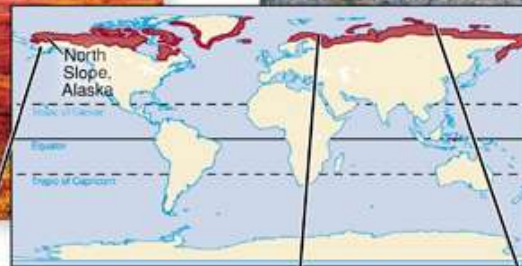
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Alaska, USA



Reindeer

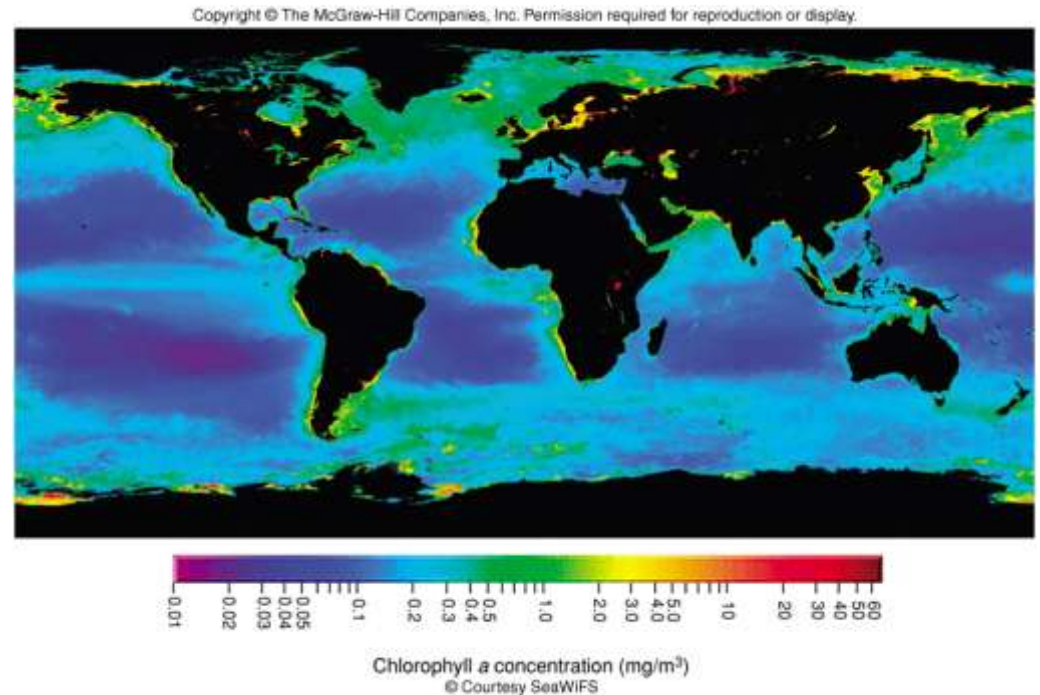


■ Wet season 
 ■ Dry season 
 — Mean annual temperature 
    Mean annual precipitation

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# Aquatic Biomes

- Salinity
- Temperature
- Availability of Light
- Availability of Oxygen
- Availability of Nutrients





# Rivers and Streams

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(a)

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(b)

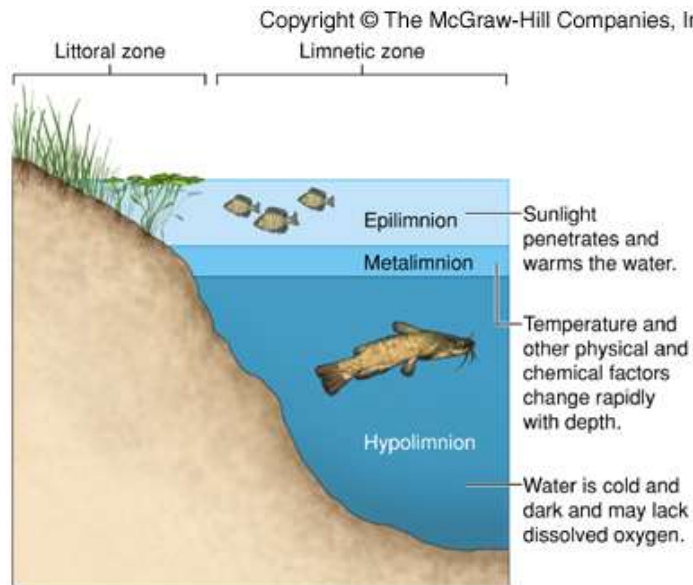
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# Lakes



Oligotrophic



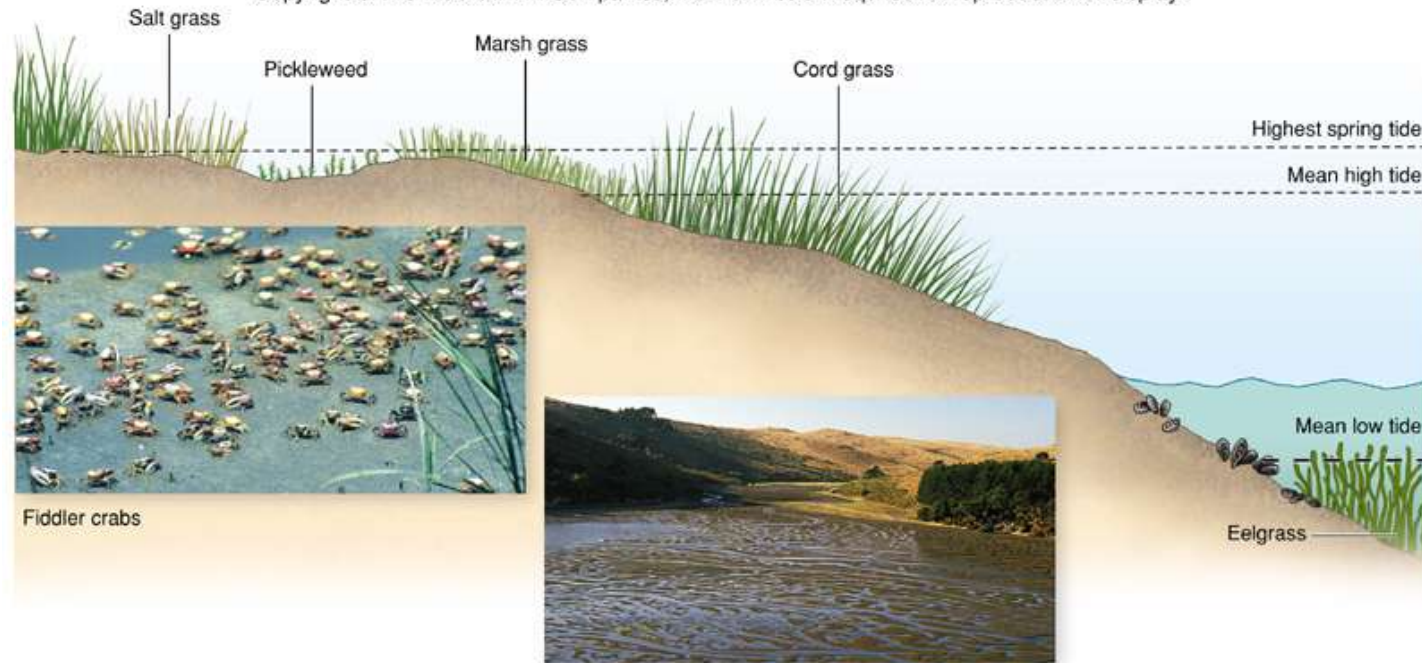
Eutrophic

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# Estuaries

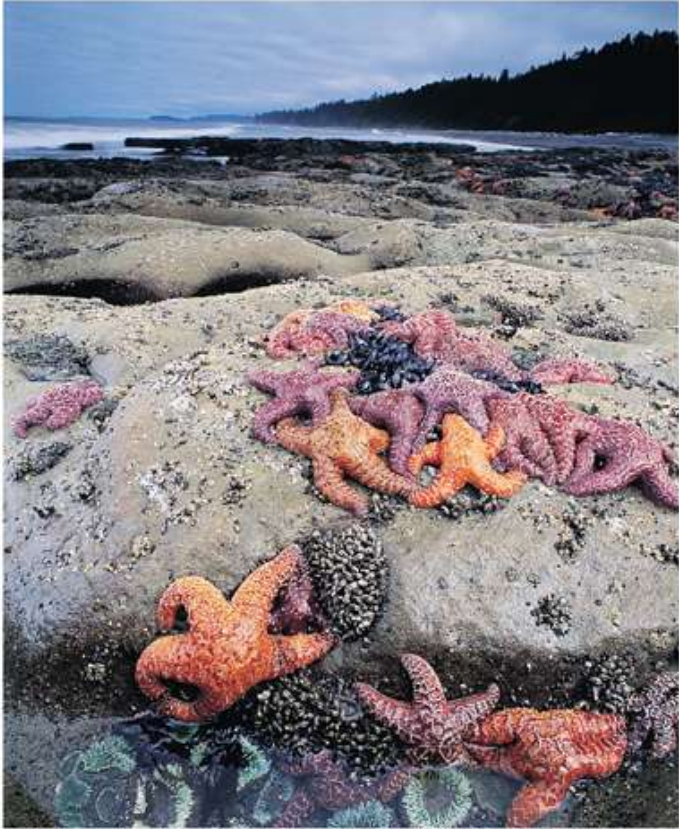
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# Temperate Coastal Seas

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(a)

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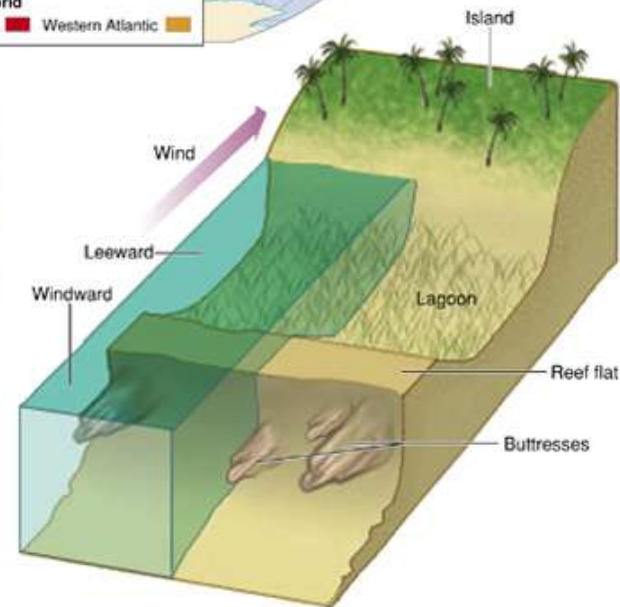
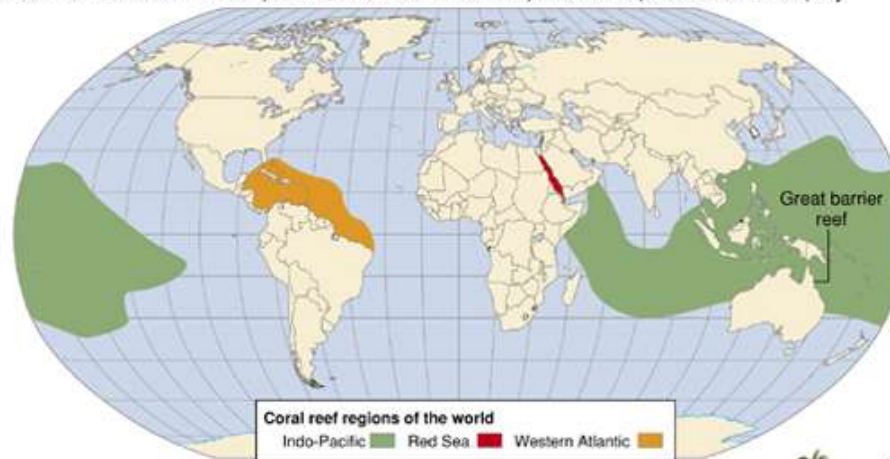


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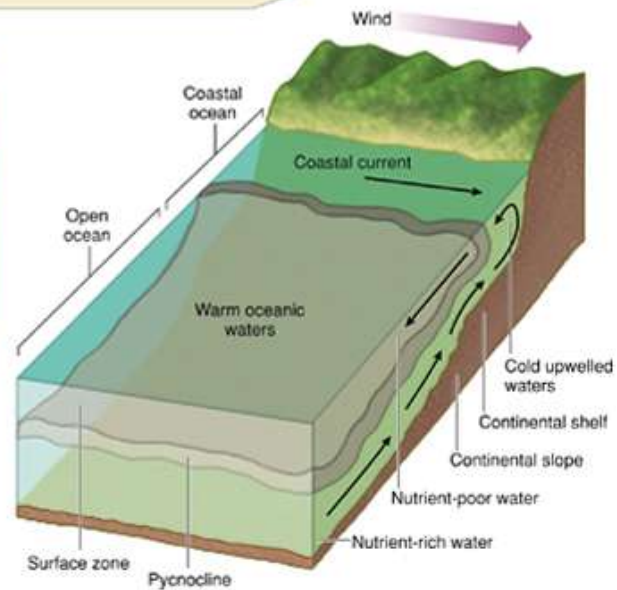
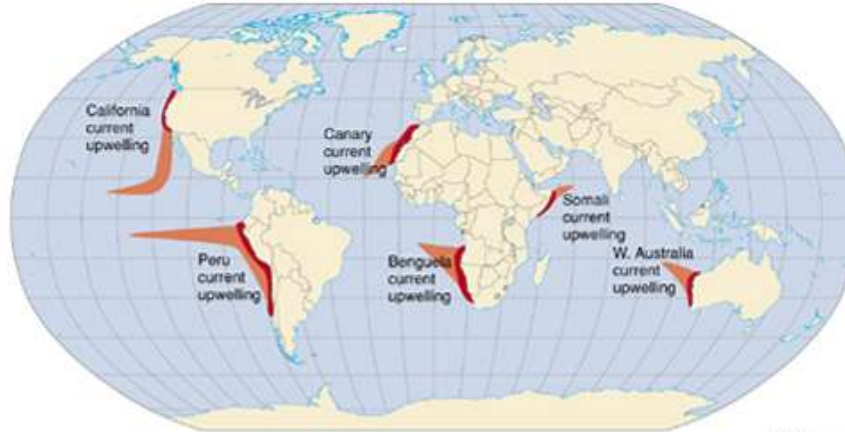


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# The Open Ocean

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