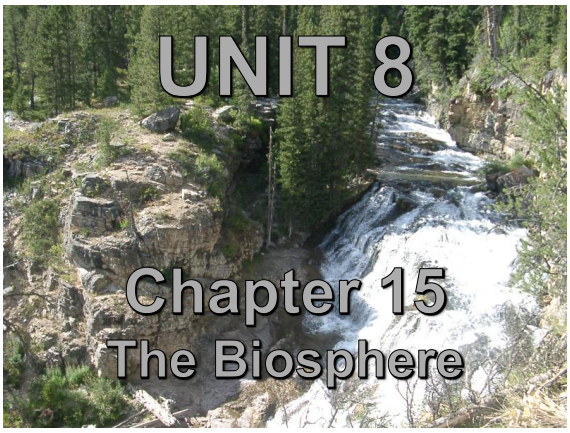


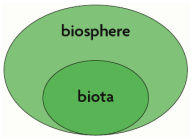
UNIT 5: ECOLOGY
Chapter 15: The Biosphere

I. Life in the Earth System (15.1)

A. The biosphere is the portion of the Earth that is inhabited by life

1. **Biosphere**- part of Earth where life exists

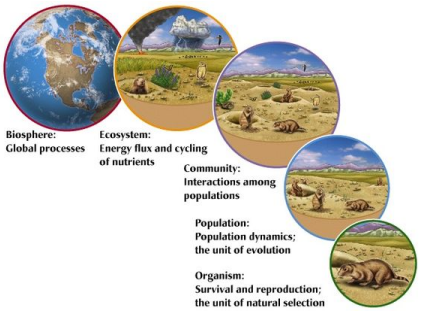
a [illegible] all living and non-



[illegible]ection of just
[illegible]n biosphere

2. Earth has 4 major connected systems

a. **Biosphere**



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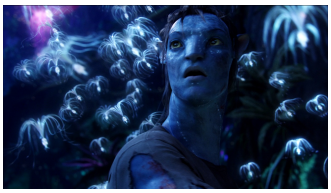
B. Biotic and Abiotic factors interact in the biosphere

1. All four of Earth's systems are **connected** to another
2. **Gaia hypothesis**- Earth itself is kind of a "living organism"

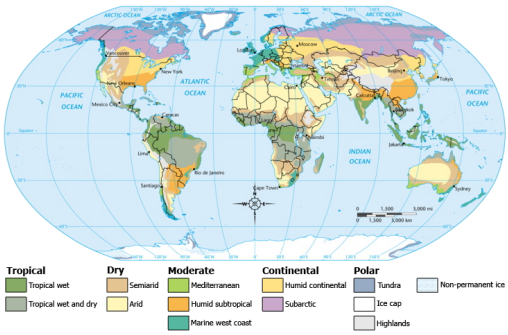


II. Climate (15.2)

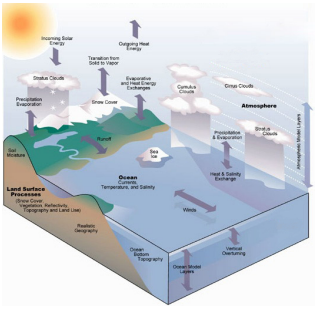
A. **Climate** is the prevailing weather of a region

1. **Weather**- day to day conditions

2. **Climate**- long term pattern of weather conditions



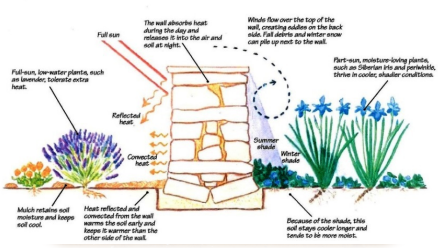
B. Four key factors that shape an area's **climate**



1. **temperature**- key factor
2. **sunlight**
3. **water** (moisture)- key factor
4. **wind**

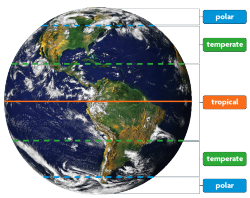
C. **Microclimate**- climate of a small specific place within larger area.

1. Can be very important to living things
2. Can be very small or large area



D. Earth has three main **climate zones**

1. Use average **temperature** and **precipitation** to categorize



a. **Polar zone** -in far northern and southern regions

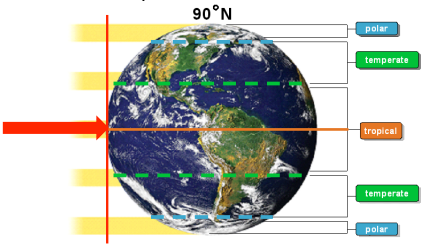
b. **Tropical zone**- surrounds the equator

c. **Temperate zone**- wide area between polar and tropical zones

2. Influence of sunlight

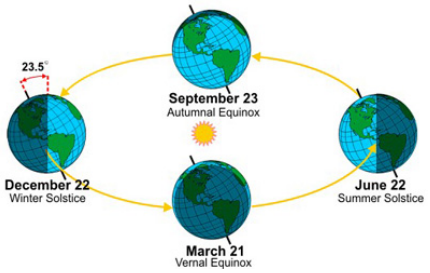
a. Earth's surface **heated** <u>unevenly</u>

1). Hottest portion where sun strikes directly



2). **Curved** shape causes uneven heating

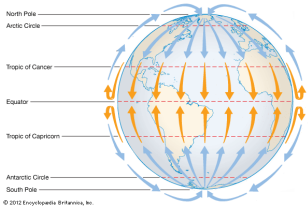
3). Earth **tilts** on its axis and this also plays a role in seasonal changes



3. Air and Water Movement

a. Sun also warms **water** and **air**

b. <u>Uneven</u> heating causes wind and water **currents**

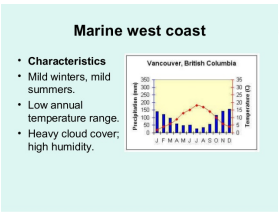


c. Warm air (and water) <u>rises</u> and cold air (and water) <u>sinks</u>

d. Also affects amount of **precipitation** (warm air holds more water than cold air)

4. **Landmasses**- also shape climate

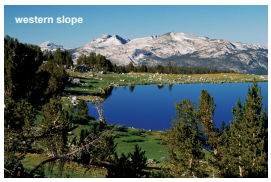
a. **Coastal** areas tend to have smaller changes in temperature (moderated by oceans)



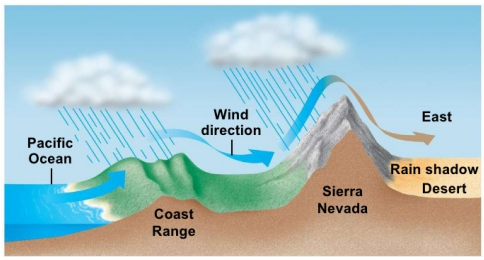
4. **Landmasses**- also shape climate

a. **Coastal** areas tend to have smaller changes in temperature (moderated by oceans)

b. **Mountains** have large effect on climate- causes precipitation



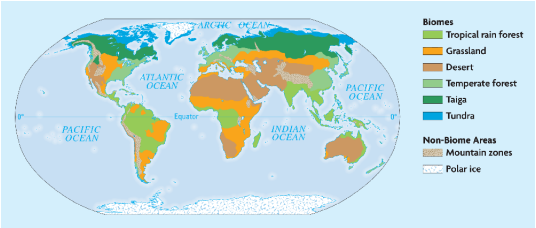
c. **Orographic Effect** (Rain Shadow effect)- a dry area on the leeward side of a mountainous area (away from the wind). The mountains block the passage of rain-producing weather systems and cast a "shadow" of dryness behind them.



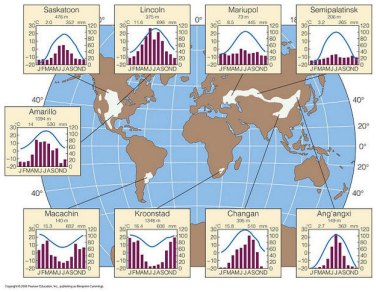
5. Adaptation to Climate- Many organisms **adapted** to survive in specific climate

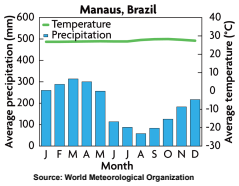
III. Biomes (15.3)

A. Earth has **6** major biomes- Each biome characterized by certain set of **abiotic factors**, **ecosystems**

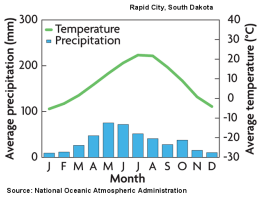


A **climatogram** is a bar graph with a double-Y axis that plots **temperate** and **rainfall** amounts over time. The climatogram provides a fast and simple method for comparing climates based on the two most influential factors: rainfall and temperature.

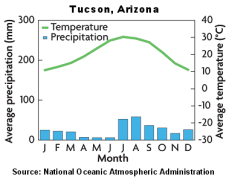




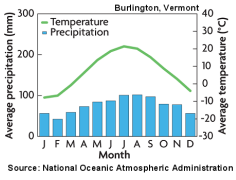
1. **Tropical Rain Forest Biome**- warm temperatures, abundant precipitation all year, lush forests

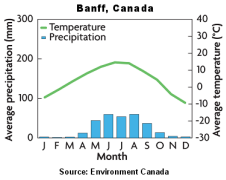
2. **Grassland Biome**- primary plant life is grass. Occurs in variety of climates

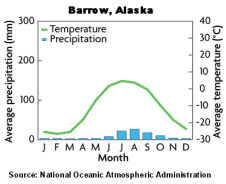
3. **Desert Biome**- arid environment, little precipitation, four types: hot, semi-arid, coastal, and cold

4. **Temperate Forests**- Include <u>deciduous forests</u> and rain forests. Temperate deciduous forests have hot summers and cold winters. Deciduous trees are the dominant plant species

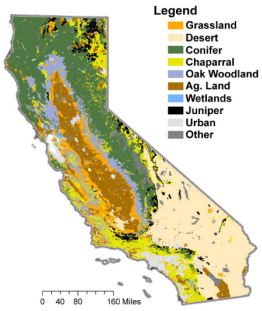


5. **Taiga**- Found in cool <u>northern climates</u>. Long winters, short summers. Small amount of precipitation



6. **Tundra**- Far northern latitudes with long winters (10 months) limited precipitation, <u>permafrost</u>

7. **Minor biomes**- example: **chaparral**- hot, dry summers and cool, moist winters



B. Polar ice caps and mountains are not considered biomes

1. **Polar ice caps**- have no soil and do not have specific plant community

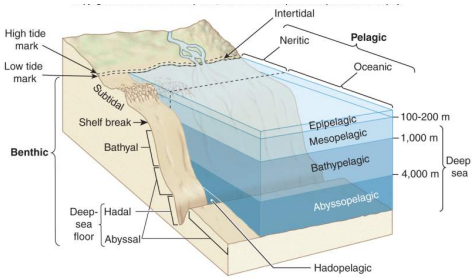
a. Found at poles (north and south)

b. Most animals depend on <u>sea</u> for food

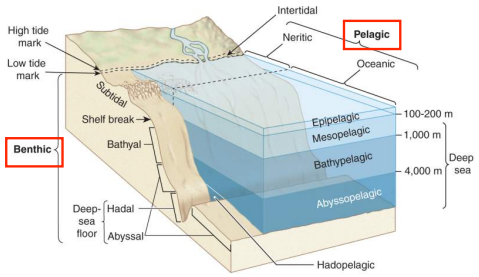
IV. Marine Ecosystems (15.4)

A. The ocean can be divided into zones

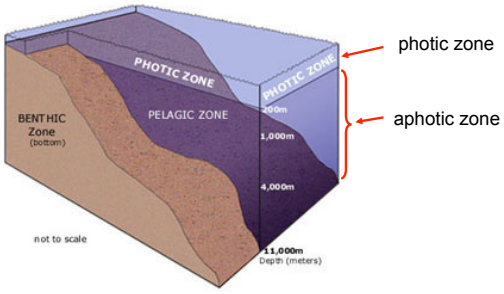
1. Ocean Zones



a. Divided into open sea (**pelagic**) and ocean floor (**benthic** zone)

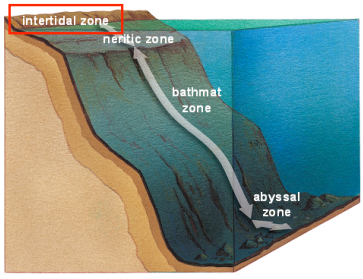


b. Divided between areas that receive light (**photic** zone) and those that do not (**aphotic** zone)

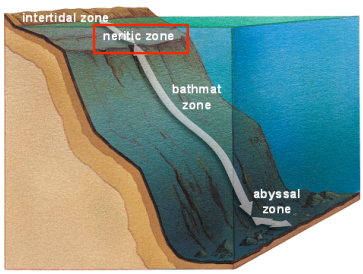


c. Ocean also separated into zones using distance from shoreline and water depth

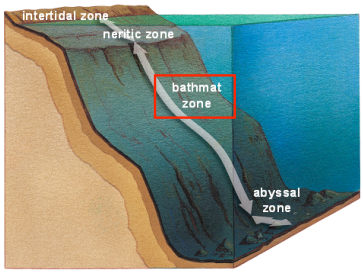
1). **Intertidal zone**- between high and low tide lines



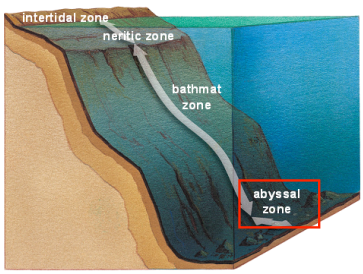
2). **Neritic zone**-extends from intertidal out to edge of continental shelf



3). **Bathyal zone**- extends from edge of neritic zone to base of continental shelf



4). **Abyssal zone**- lies below 2000 meters and is in complete darkness

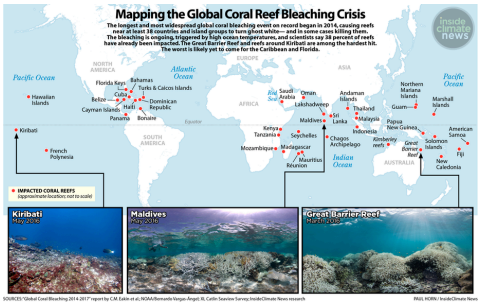


d. Life in **Neritic Zone**- only 1/10th of ocean but contains <u>majority</u> of biomass (Most biomass consists of plankton)

B. Coastal waters contain unique habitats

1. **Coral Reefs**- found within tropical zone and contains large <u>diversity</u>

Ocean acidification from increased CO_2 levels, combined with increased sea temperatures have caused **coral bleaching**

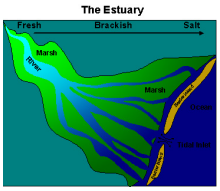


2. **Kelp Forests**- found in cold, nutrient rich waters

V. Estuaries and Freshwater Ecosystems (15.5)

A. Estuaries are dynamic environments where rivers flow into the ocean

1. **Estuary**- partially enclosed body of water formed where a river flows into the ocean



a. Mix of **fresh** and **salt** water

b. River carries lots of **nutrients**

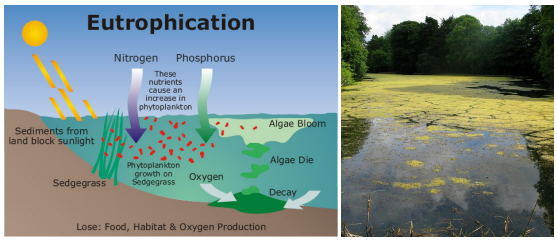
c. Large numbers of species thrive and are highly productive ecosystems

d. Provide refuge for many species and spawning grounds

e. Over **80%** of estuaries have been lost to land development

San Mateo Creek, and **Trestles Beach estuary-** One of last free-flowing creeks from it's source in the mountains to the ocean in California.

Anthropogenic- Caused or influenced by **humans**. Anthropogenic carbon dioxide is that portion of carbon dioxide in the atmosphere that is produced directly by human activities, such as the burning of fossil fuels, rather than by such processes as respiration and decay.



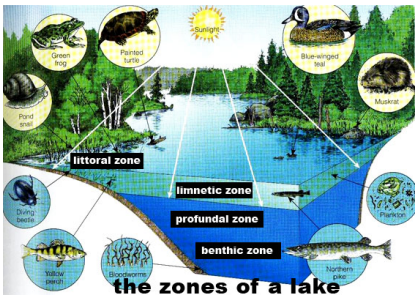
B. Freshwater ecosystems include moving and standing water

1. **Freshwater ecosystems**- rivers, streams, wetlands

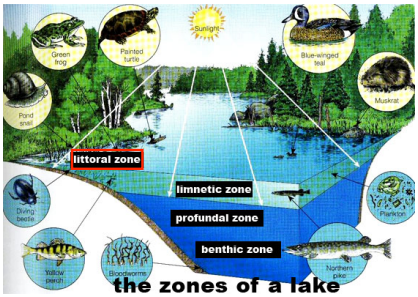
2. among most <u>productive</u> ecosystems on Earth

C. Ponds and lakes share common features

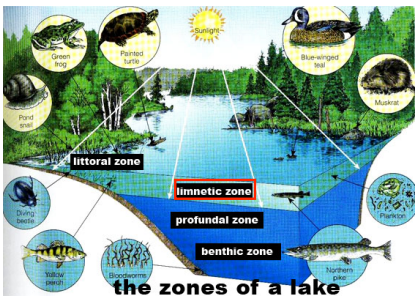
1. Smaller in size than oceans, but also divided into zones



a. **Littoral zone**- between low and high water marks



b. **Limnetic zone**- open water farther out from shore



c. **Benthic zone**- <u>bottom</u> of lake or pond where less sunlight reaches