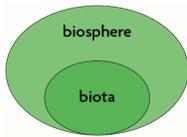


UNIT 5: ECOLOGY
Chapter 15: The Biosphere

I. Life in the Earth System (15.1)

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

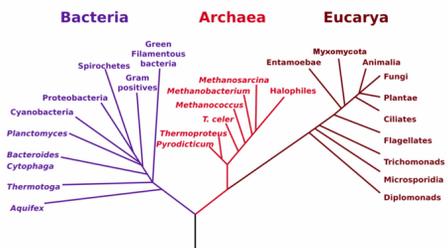
1. **Biosphere**- part of Earth where life exists



- a. Includes all living and non-living parts
- b. **Biota**- collection of just living things in biosphere

- a. Includes all living and non-living parts
- b. **Biota**- collection of just living things in biosphere

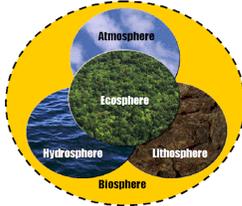
Phylogenetic Tree of Life



2. Earth has 4 major connected systems

a. **Biosphere**

b. **Hydrosphere**- all of Earth's water, ice, water vapor



c. **Atmosphere**- the air blanketing Earth's solid and liquid surface

d. **Lithosphere**- features of Earth's surface (continents, rocks, sea floor, and everything below Earth's surface)

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)

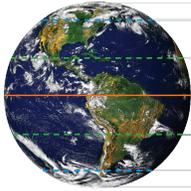
A. **Climate** is the prevailing weather of a region

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



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

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



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

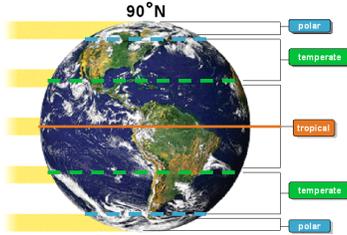
b. **Tropical zone** - surrounds the equator

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

2. Influence of sunlight

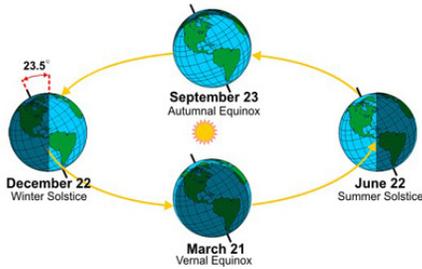
a. Earth's surface **heated unevenly**

1). Hottest portion where sun strikes directly



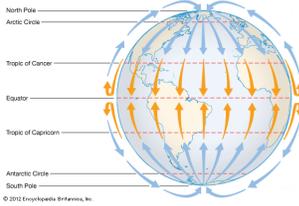
2). **Curved** shape causes uneven heating

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. Uneven heating causes wind and water currents



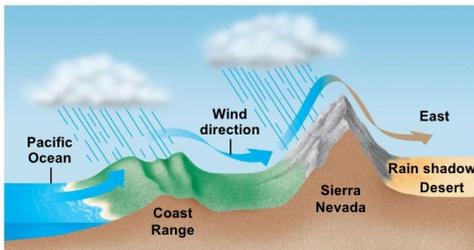
- c. Warm air (and water) rises and cold air (and water) sinks
- d. Also affects amount of precipitation (warm air holds more water than cold air)

4. **Landmasses**- also shape climate

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

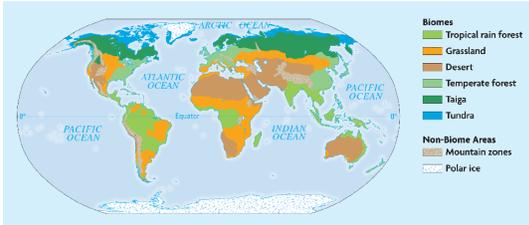


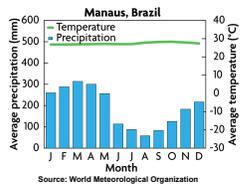
5. Adaptation to Climate- Many organisms **adapted** to survive in specific climate



III. Biomes (15.3)

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





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



B. Polar ice caps and mountains are not considered biomes

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



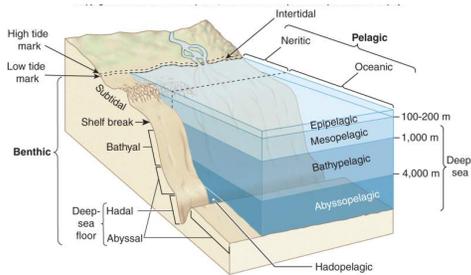
a. Found at poles (north and south)

b. Most animals depend on sea for food

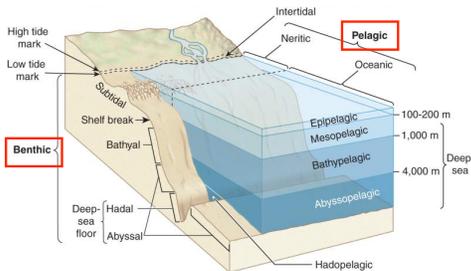
IV. Marine Ecosystems (15.4)

A. The ocean can be divided into zones

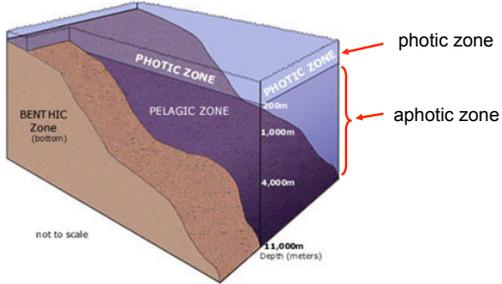
1. Ocean Zones



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

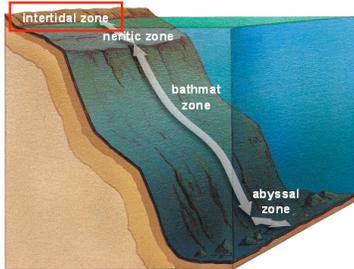


b. Divided between areas that receive light (**photic zone**) and those that do not (**aphotic zone**)

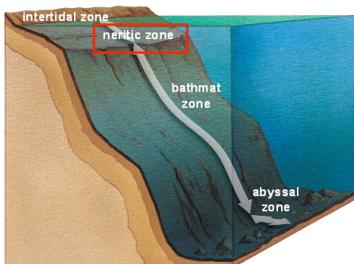


c. Ocean also separated into zones using distance from shoreline and water depth

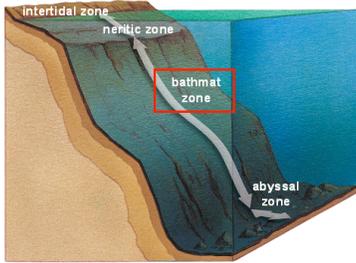
1). **Intertidal zone**- between high and low tide lines



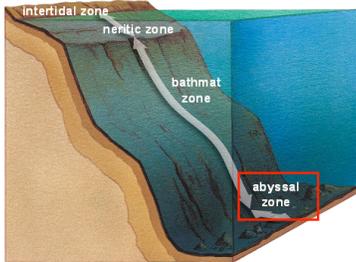
2). **Neritic zone**-extends from intertidal out to edge of continental shelf



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 majority of biomass (Most biomass consists of plankton)



B. Coastal waters contain unique habitats

1. **Coral Reefs**- found within tropical zone and contains large diversity



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

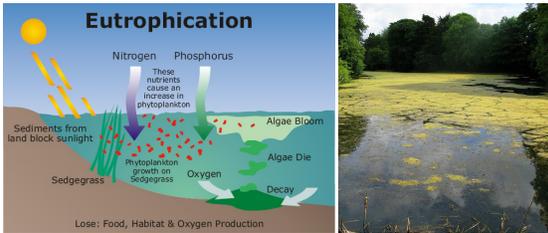


- a. Mix of **fresh** and **salt** water
- b. River carries lots of **nutrients**
- c. Large numbers of species thrive and are highly **productive** ecosystems
- d. Provide **refuge** for many species and **spawning** grounds



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

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

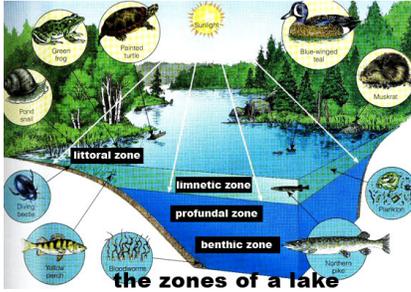
- 1. Freshwater ecosystems- rivers, streams, wetlands



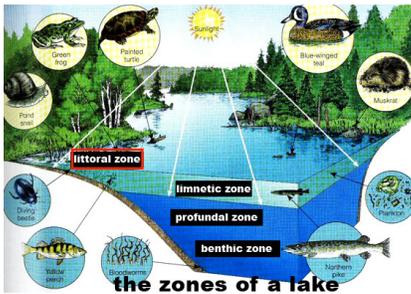
2. among most **productive** ecosystems on Earth

C. Ponds and lakes share common features

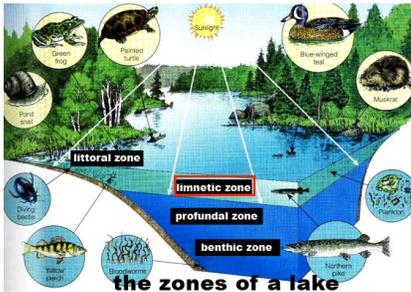
- 1. Smaller in size than oceans, but also divided into zones



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



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



c. **Benthic zone**- bottom of lake or pond where less sunlight reaches

