Population Ecology & Distribution of Organisms,

ecology	study of interactions between organisms and the environment
organismal	structure, physiology, behavior, evolutionary vs environmental challenges
population	factors that affect pop. size
community	interactions between species vs comm. structure & organization
ecosystem	energy flow & chemical cycling between organisms & environment

ecosystem = community of organisms in an area and the physical factors with which they interact

landscape	factors controlling exchanges of energy, materials, organism across multiple ecosystems

landscape/seascape = mosaic of connected ecosystems

global	biosphere, or global ecosystem; influence of energy & materials on organisms across the biosphere

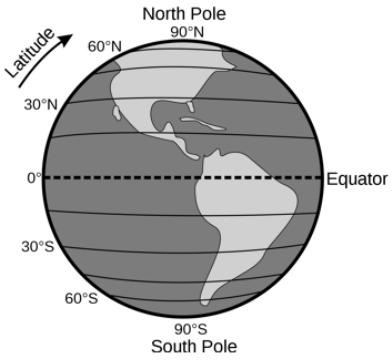
biosphere = sum of all the planet's ecosystems & landscapes

abiotic factors	*nonliving* chemicals & physical attributes of environment ex. temp., precipitation, sunlight, wind

Population Ecology & Distribution of Organisms, (cont)

biotic factors	organisms that make up the living component of environment

Global Climate Patterns



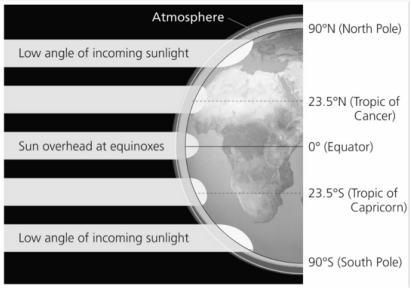
In geography, **latitude** is a geographic coordinate that specifies the north–south position of a point on the Earth's surface

patterns are largely determined by *solar energy* and the planet's *movement in space*

warming effect of sun = various temperatures --> evaporation, circulation of air/water

laditudinal variations in climate

Latitudinal Variation in Sunlight Intensity



• caused by shape of Earth
•sunlight strikes tropic regions between 23.5° north and 23.5° south latitude, most directly

•main reason polar regions are cooler is sunlight strikes poles at lower angles

Climate

Affected by:

- •seasonality
- •large bodies of water
- •mountain ranges

Seasonality

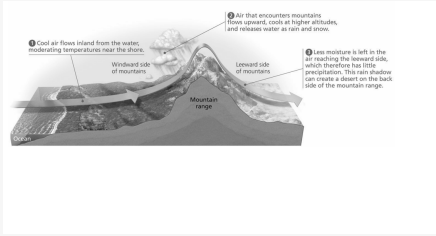
- •caused by the tilt of the Earth's axis of rotation & its annual passage around the sun
- •strong seasonla cycles in day length, solar radiation, temperate
- •changing angle of the sun affects local environments

Climate (cont)

Bodies of Water

- •moderate climate of nearby terrestrial environments
- •*during the day*, air rises over warm land and draws a cool breeze from the water across the land
- •*at night*, the land cools, air rises over warm water and draws cooler air from land back over the water, which is replaced by warmer air from offshore

Large Bodies of Water & Mountains on Climate



Biomes

*a **biome** is a type of ecosystem*

- • a community of organisms with certain abiotic environmental conditions
- •major life zones characterised by vegetation type in *terrestrial biomes* or by physical environment in *aquatic biomes*

- ○ *ecotone* - area of intergradation
- ○ *climograph* - plots annual mean temp. & precipitation
- ○ *disturbance* - removes organisms, alters resources
- ○

on land, what determines where biomes are located?

Biomes (cont)

CLIMATE & TERRESTRIAL BIOMES

• latitudinal patterns in terrestrial biomes reflect the latitudinal patterns on climate
• **temperature & precipitation** affect terrestrial biomes
• climate determines vegetation type and limits the distribution of terrestrial biomes

TERRESTRIAL BIOMES

•characterized by vertical layering (upper canopy, lower tree) = diverse habitat
• no sharp boundaries
‣ tropical forest
‣ savanna
‣ deserts
‣ others...

AQUATIC BIOMES

• *characterized by physical & chem environment, geological features, photosynthetic organisms, & heterotrophs)*
• stratified into vertical & horizontal zones
light intensity decrease with depth
vertical zones:
➢ upper **photic zone** - plenty of light for photosynthesis
➢ lower **aphotic zone** - little light
➢ **pelagic zone** (photic + aphotic)
➢ **benthic zone** - (bottom pelagic) organic & inorg. sediment
[benthos = communities]
thermocline separates warm upper layer from cold deeper water

_____

horizontal zones:
➢ **littoral** - shallow, near shore, rooted plants
➢ **limnetic zone** - away from shore, too deep for rooted plants

Interactions Between Organisms & Environment

dispersal

distribution

Interactions Between Organisms & Environment

dispersal

distribution