## 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 |

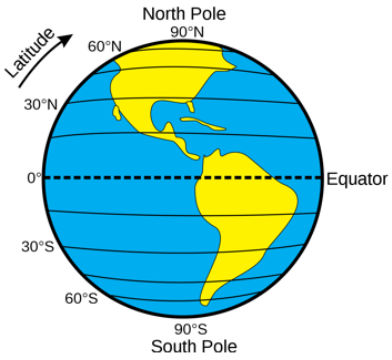
biosphere = sum of all the planet's ecosystems & landscapes

| | |
|---|---|
| **abiotic** factors | *nonliving* chemicals & physical attributes of environment<br>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



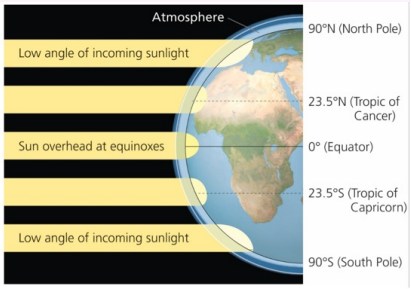

In geography, **latitude** is a geographic coordinate that specifies the north–south position of a point on the Earth's surface

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

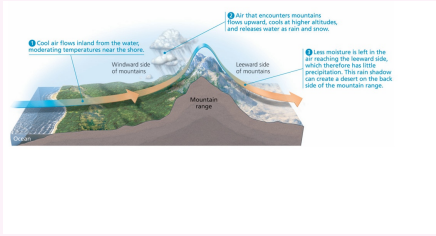
- •caused by the tilt of the Earth's axis of rotation & its annual passage around the sun
- •strong seasonla cycles in day length, solar radiation, temperate
- •changing angle of the sun affects local environments

## 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

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*horizontal zones:*

➢ **littoral** - shallow, near shore, rooted plants

➢ **limnetic zone** - away from shore, too deep for rooted plants

## Interactions Between Organisms & Environment

dispersal

distribution

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