Chapter 4



Ecosystems and Communities







Abiotic Factors: Anything that is part of an organism's environment, and is not living.
Ex. Wind, Water, Sand, Soil.
Biotic Factors: Anything that is part of an organism's environment, and is living.
Ex. Trees, Other Organisms.

- <u>Habitat</u>: The place where an organism lives out its life.
 - Habitats can change, or even disappear.
- <u>Niche</u>: The role and position a species has in its environment.
 - Includes how it gets food, how it survives, and how it reproduces.

Living Relationships

- What's it called when organisms live near and interact regularly with each other?
- The answer: <u>Symbiosis</u>
- There are many different types of symbiotic relationships.
- See p. 93

- Commensalism: a symbiotic relationship in which one species benefits and the other is unaffected.
 - Ex. Spanish moss.
- <u>Mutualism</u>: a symbiotic relationship in which both species involved benefit.
 - Ex. Ants and acacia trees, teeth cleaner birds or fish.

Parasitism: A symbiotic relationship in which one species benefits and the other is harmed.

Ex. Ticks, Tapeworms, Tree fungus.







Human Head Louse



Human Body Louse











- Review: A community is a group of interacting populations.
- Review: An ecosystem is a group of species interacting with one another AND with their environment (abiotic factors).

Note: So far we have thought of these populations and communities as animals- but what happens with plants?



<u>Limiting Factors</u>: Biotic or abiotic factors that restrict or prevent the existence, numbers, reproduction, or distribution of organisms.

- Ex. A predator such as a lynx is a limiting factor for a prey such as a hare.
- Ex. A cold snowy winter is a limiting factor for thousands of species that would die under those conditions.
- Ex. In brackish water, fish can't pass from salt water to fresh water. The salinity of the water is a limiting factor.



 <u>Tolerance</u>: The ability of an organism to withstand changes in abiotic or biotic factors around them.

- Ex. Many plants have a tolerance for shade, but those that don't will surely die without the proper amount of sunlight.
- Ex. Many animals that live in warm climates have a tolerance for coldness, while others will die after just one cold night.



 <u>Succession</u>: natural changes and the replacement of different species in the communities of an ecosystem.

- Succession occurs in different stages and can often take decades, centuries, or even thousands of years.
- Plants most important organisms when talking about succession.



Primary Succession: The first arrival of communities of organisms in a formerly lifeless area.

Pioneer Species: The very first species to colonize a lifeless area.

 <u>Colonization</u>: Moving from a familiar habitat to a new unfamiliar area.



Climax Community: A stable community in which change does not occur on a regular basis.

- Ex. A mature forest with large trees, vines, grasses, squirrels, chipmunks, mice, etc. could be a climax community if there are no new species showing up and no extinctions.
- Simply put: nothing coming, nothing going!



Secondary Succession: The changes in a community that occur when a natural or unnatural disaster destroys most of the individuals in a community. These same species of animal and plant then return to their habitats.

- Ex. A fire
- Ex. A farmer stripping and abandoning his fields
- Ex. A volcano erupts ash and debris



| Primary | Secondary |
|------------------------|-----------------------|
| Barren | Soil |
| Ex. Lichen | Ex. Grasses |
| Begins on Rock, | Begins After Disaster |
| Sand, etc. | |
| Pioneer Species | Previous Species |
| | |

Succession

- <u>Marine Biomes</u>: biomes that are found in salt water are marine biomes.
 - *<u>Photic Zone</u>: The portion of the marine biome that is shallow enough for light to penetrate.*
 - Main resource for food is <u>plankton</u>, which are small organisms that include small plants (<u>phyto</u>-) and tiny marine animals (<u>zoo</u>-).
 - <u>Aphotic Zone</u>: Deeper water in the marine environment that never receives sunlight.
 - Food falls from above.



 Estuary: Anywhere where a river joins the ocean and fresh water tends to mix with salt water.

- The salinity of the water can change depending on the tides or on other weather factors.
- This brackish water can often lead far inland up the river.



- *Intertidal Zone*: (p. 110) The area that is completely covered by water at high tide, but exposed at low tide.
 - Found on beaches, lake shores, river beds, etc.
 - Ex. of wildlife living there: snails, sea stars or starfish. They have suction cups to hold them in place when the tide is coming in or going out.



Freshwater Biomes: No salt in the water.

- Photic zones usually reach to the bottom of the lake.
- With deep lakes, an aphotic zone appears and once again no vegetation grows.
- The temperature in freshwater varies greatly, as do the types of organisms that live there.

4.3 Biomes

The amount of rainfall and the average yearly temperature determine what type of terrestrial biome that you are in.





4.3 Biomes



<u>Desert</u>: Extremely dry, not always hot.

- Very little vegetation
- One desert in Chile, the Atacama, receives no rain fall, EVER!
- Large areas of no life
- Strange adaptations of organisms to tolerate the conditions



4.3 Biomes



<u>Tundra</u>: Cold, little rainfall.

- <u>Permafrost</u> occurs because the temperature rarely reaches above freezing
- Short growing season of plants is a strong limiting factor.
- Few large animals
 - Horrible, dark winters.
 - Preserved Woolly Mammoth found here!



4.3 Biomes



- **<u>Taiga</u>**: (Boreal Forest) A bit warmer than tundra, and a bit more rainfall.
 - Long, severe winters, short, mild summers.
 - Plants have time to grow and develop.
 - More large animals than in the tundra
 - Many trees



4.3 Biomes



- *Grasslands*: (Woodland, Shrubland, Savannah) large communities covered in grasses and other similar plants.
 - Ususally has dry seasons so that tree life cannot be supported.
 - Many different animals can live herelarge and small alike.
 - First biome where we start to see a lot of <u>humus</u>: dead, decaying plant and animal matter which helps make up the underlying soil.



4.3 Biomes



<u>*Temperate Forest*</u>: Medium precipitation, noticeable seasons.

- Trees everywhere, and most lose their leaves annually.
- Clay found under humus
- Many species of plant and animal, some migrate into warmer areas.



4.3 Biomes



- <u>*Tropical Rain Forest*</u>: Characterized by intense rainfall, many species from all kingdoms, and warm climate.
 - Located near the equator
 - Has different levels within the forests, providing many different niches- see p. 100.
 - Little humus because dead organisms are decomposed quickly
 - Being destroyed by humans



Important Study Tips!

- Biotic/Abiotic Factors
- Niche/Habitat
- Symbiosis
 - Parasitism/Commensalism/Mutualism
- Community/Population
- Tolerance
- Primary/Secondary Succession
- Climax Community/Pioneer Species
- Know Biomes
 - Aquatic
 - Marine/Estuary/Fresh/Photic/Aphotic
 - Terrestrial