**Notes: Ecology #4**

**Ecosystem Cycles**

* Matter cycles through an ecosystem as it is transferred between organisms and the environment
* There are many important cycles:
	+ Oxygen Cycle
	+ Hydrologic Cycle (water)
	+ Carbon Cycle
	+ Nitrogen Cycle

**Oxygen Cycle**

* Respiration
	+ Oxygen (O2 ) is consumed
	+ Carbon dioxide (CO2) is released
* Photosynthesis
	+ CO2 is consumed
	+ O2 is released
	+ Water
	+ ****Oxygen is also dissolved in water, where it can be used for respiration by aquatic creatures

**Hydrologic Cycle (Water cycle)**

* Driven by sun
* Heat turns water into vapor
	+ **Evaporation**
	+ **Transpiration (plants)**
* When air cools, vapor turns to clouds
	+ **Condensation**
	+ Clouds accumulate and drop **precipitation** (snow, rain, hail)
* Precipitation accumulates in lakes, rivers, oceans, etc.
	+ **Accumulation**

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**Carbon Cycle**

* All living things and many non-living things are made out of **carbon**
* In the atmosphere, carbon is in the form of **carbon dioxide** (CO2)
	+ Greenhouse gas that traps heat
* Organisms release CO2 during respiration
* When plants use CO2 in photosynthesis, the carbon becomes part of the plant
* If plants are buried when they die, they may become fossil fuels
	+ Burning fossil fuels emits CO2

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**Nitrogen Cycle**

* 78% of the air we breathe is nitrogen (N2)
* Four main processes:
	+ Nitrogen Fixation
		- Breaks apart into N2 usable forms
		- Atmospheric Fixation = By lightning
		- Biological Fixation= By bacteria
		- Industrial Fixation = Fertilizers
	+ Decay
		- Proteins are broken down from dead organisms and waste by bacteria into ammonia
	+ Nitrification
		- Ammonia converted by bacteria and legumes into nitrates and nitrites
	+ Denitrification
		- Conversion of nitrates and nitrites into N2 gas

**Phosphorus Cycle**

* Fertilizers
	+ Deposit phosphorus into soil
* Plants absorb phosphorus
	+ Animals eat plants
	+ Absorb phosphorus
* Problem = runoff
	+ Increased algae growth
	+ Called eutrophication

**Succession**

* Definition:
	+ Process of changes in the structure of an ecosystem over time
* An undisturbed ecosystem, if examined over a long period of time, is in a constant state of change
* Plant and animal species are replaced by new ones
* The time for succession differs between ecosystems
* Two types of succession:
	+ Primary
	+ Secondary
* **Primary Succession** (hundreds to thousands of years)
	+ Occurs in an area where there are no living organisms
	+ May have been complete destruction due to a catastrophic disaster (volcano)
	+ Barren land, no soil
	+ Pioneer species come from outside the area
		- Make area hospitable to other species



* **Secondary Succession (50-200 years)**
	+ Occurs in an area where organisms formerly lived
	+ Previous population has been wiped out by a natural disaster (flood, fire, drought)
	+ Soil still intact, some seeds and roots still remain
		- These species establish the new population
	+ After many years, the community will reach a stable state (**climax community)**

