



Ecosystem

- All the organisms in a community plus abiotic factors
 - ♦ ecosystems are **transformers of energy** & **processors of matter**
- Ecosystems are self-sustaining
 - ♦ what is needed?




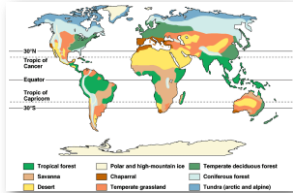
Ecosystem

- Community of organisms plus the abiotic factors that exist in a certain area


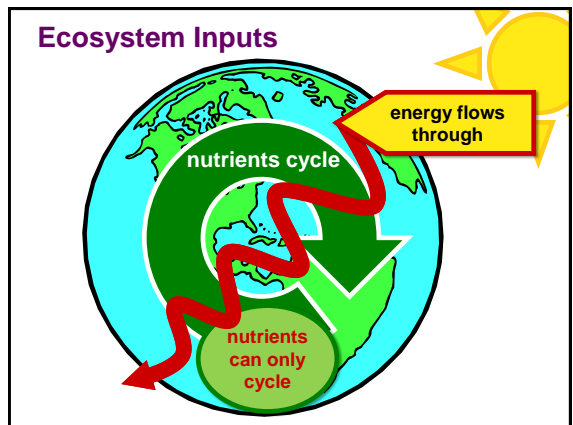
Interacting with the Environment

- Biotic environment
 - ♦ prey (food)
 - ♦ competitors
 - ♦ predators, parasites, disease
- Abiotic environment
 - ♦ sunlight
 - ♦ temperature
 - ♦ water
 - ♦ soil

Essential Questions

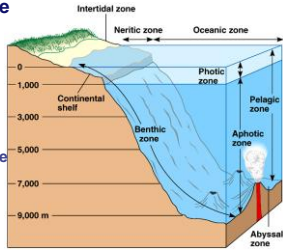
- What limits the production in ecosystems?
- How do nutrients move in the ecosystem?
- How does energy move through the ecosystem?

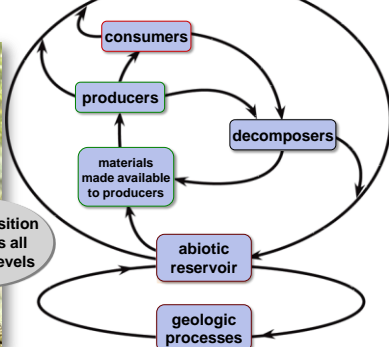
Energy Budget of Ecosystems

Production by autotrophs sets energy budget for an ecosystem

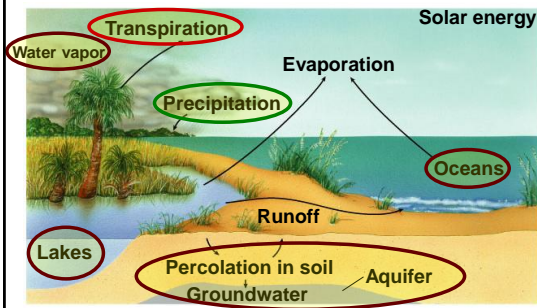
- ◆ Marine
 - light, temperature & nutrients
 - ◆ depth
- ◆ Terrestrial
 - light, moisture, temperature
 - ◆ latitude & climate
 - nutrients



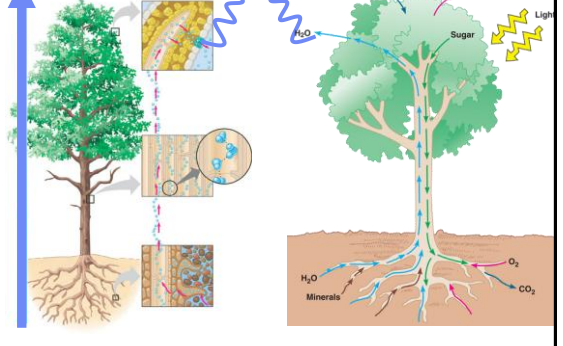
Generalized Nutrient Cycling



Water Cycle



Transpiration



Breaking the Water Cycle

- ◆ Deforestation breaks the water cycle
 - ◆ groundwater is not transpired to the atmosphere, so precipitation is not created

forest → desert

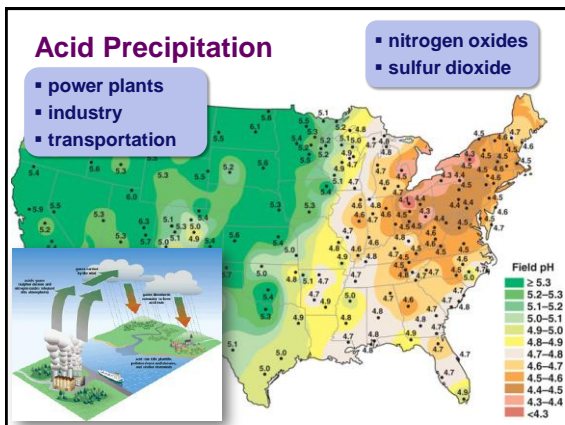
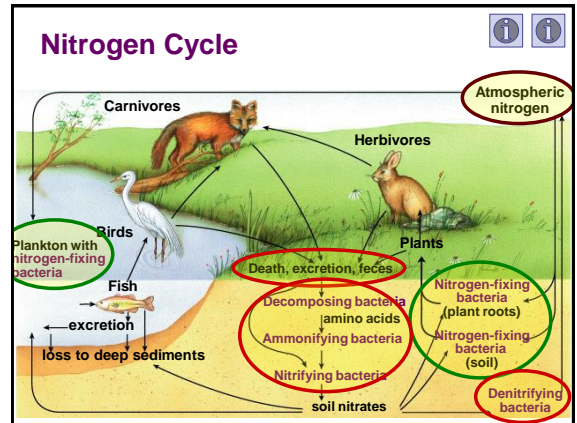
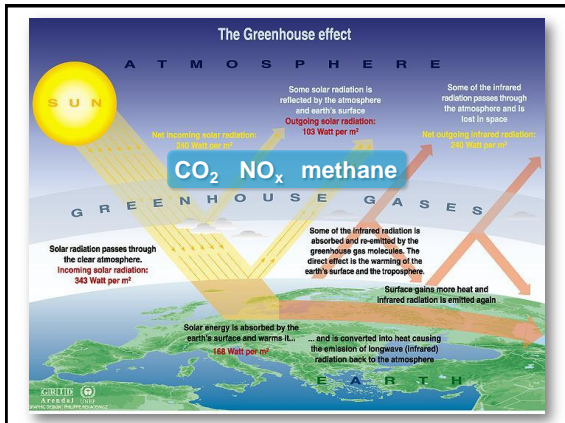
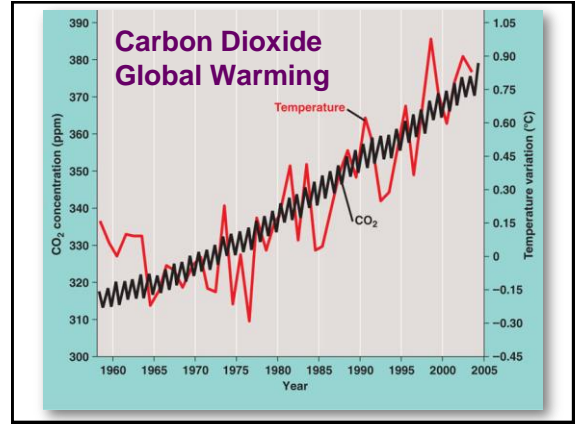
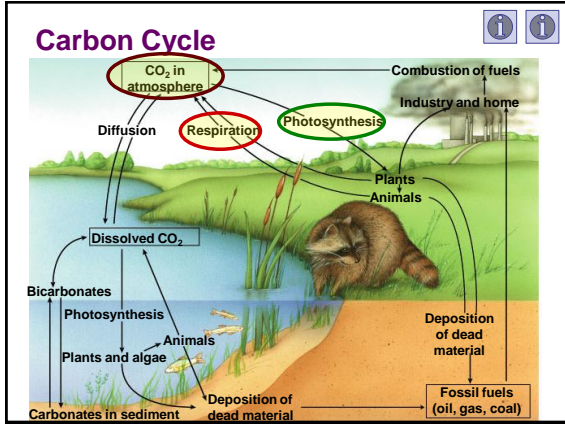


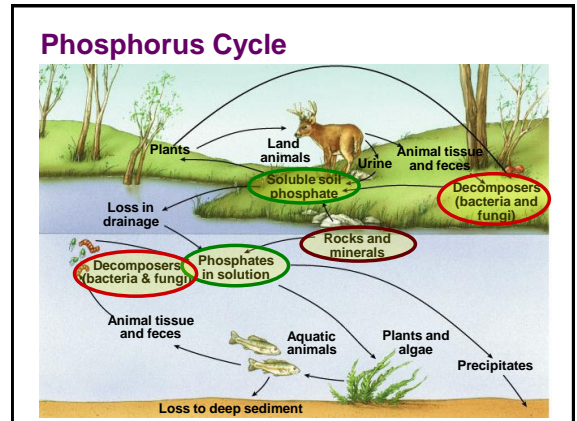
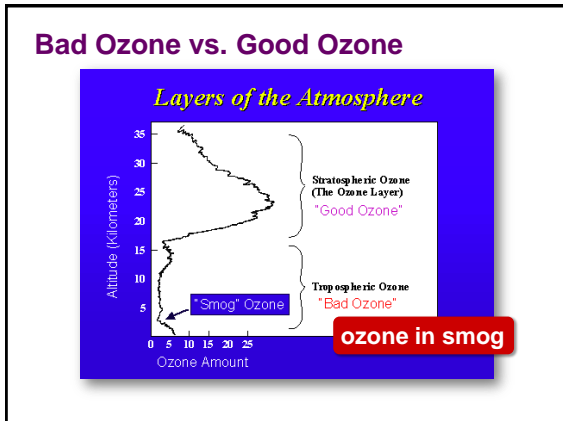
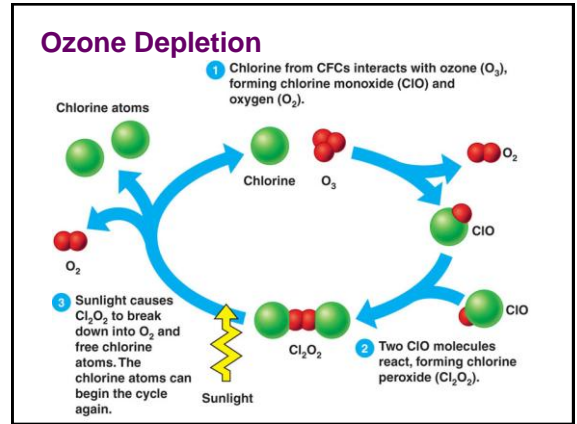
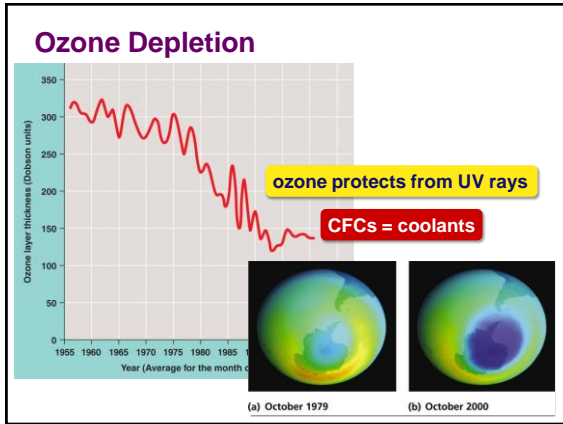
Studying Ecosystems

Hubbard Brook Experimental Forest

38 acre deforestation







Repairing the Damage

- The Greenbelt Movement
 - planting trees in Kenya
 - restoring a sustainable ecosystem
 - establishing democracy
 - empowering women

Nobel Peace prize 2004

Wangari Maathai

Barry Commoner's Laws of Ecology

- Everything is connected to everything else
- Everything must go somewhere
 - there is no such place as "away"
- There is no such thing as a free lunch

Laws of Unintended Consequences