Principles of Ecology

Chapter 2

Organisms and Their Relationships

Section 2.1

Ecology

- Every organism depends on many things to survive in an environment
  - These could be nonliving factors or other organisms
  - **Ecology** – the study of the relationships between living organisms and their environments
- Ecologists observe, experiment and model environments
- Many times they use **models**
  - Allows the ability to control variables that are difficult in the real environment

The Biosphere

- **Biosphere** – the portion of Earth that supports life
  - "bio" – life
  - "sphere" – the Earth is round
- Extends several miles above the surface of Earth to several miles below the ocean's surface
- Includes landmasses, bodies of water, and all places that support life
- Includes frozen polar regions, deserts, oceans and rain forests

Abiotic vs Biotic Factors

- **Abiotic Factors**
- The nonliving factors in an environment
- These can change depending on the environment
- Examples:
  - Temperature
  - Air or water currents
  - Sunlight
  - Rainfall
- Organisms are adjusted to THEIR abiotic factors – if they move, they might die

- **Biotic Factors**
- The living factors in an environment
- Examples:
  - Organisms living in the area
  - Plants and animals both
- Needed for interaction and survival of the species
  - Reproduction
  - Food sources

Levels of Organization

- The biosphere is too large to study entirely
- Scientists break it down to smaller groups based on:
  - Numbers of organisms
  - Number of organisms
  - Complexity of the system
- Six divisions of organization:
  - Organism
  - Population
  - Biological community
  - Ecosystem
  - Biome
  - biosphere

Organisms, Populations and Biological Communities

- **Organism** – the single living thing itself
  - Example: a single fish
- **Population**- organisms of the same species sharing the same geographical location
  - Example: a school of fish
- Populations can grow when resources are plentiful – more organisms are made
- Usually the resources are scarce – the population stays at constant level
- **Biological community** – group of interacting populations
  - Occupy the same geographical area
  - Example: school of fish + plants in their location

Organisms, Populations and Biological Communities

Individual

Population

Community

Ecosystems, Biomes and the Biosphere

- **Ecosystem** – biological community + all the abiotic factors that affect it
  - Coral reef that the fish live in + the water temperature and currents
  - Ecosystems are very fluid and can overlap and change
  - They can be large (coral reef) or small (an aquarium)
- **Biome** – large group of ecosystems that share a climate and similar communities
  - the original fish could live in the marine biome
- **Biosphere**- all the biomes on Earth combine to form

Ecosystems, Biomes and the Biosphere