

Chapter 3-1 & 3-2

Ecology & Energy Flow

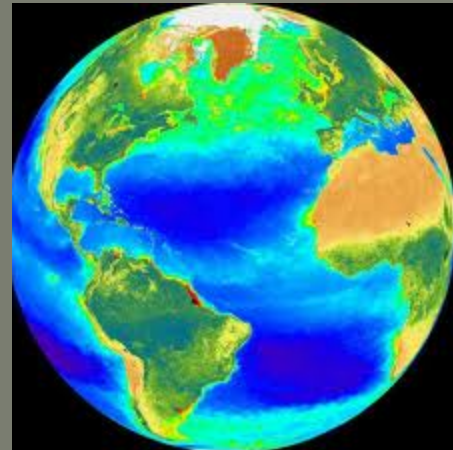
Essential Questions:

- What are the different levels of organization that ecologists study?
- What are methods of ecological study?
- What is the source of energy for life processes?
- How does energy flows through living systems?
- How efficient is energy transfer among organisms?

3–1 What Is Ecology?

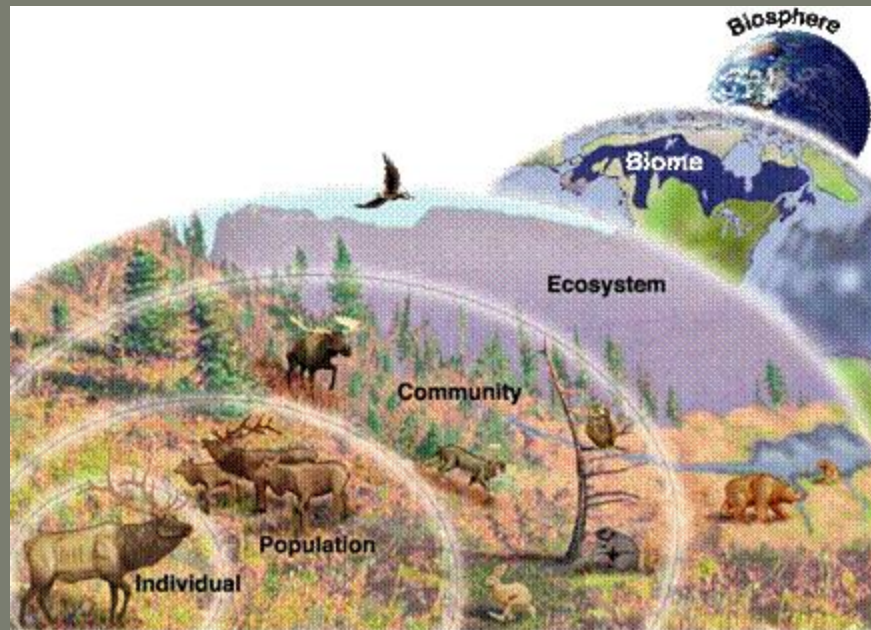
A. Interactions and Interdependence

1. Ecology – scientific study of organisms' interactions with each other and with their environment
2. Biosphere – living things, atmosphere, water, non-living things
 - a. Extends 8 km above surface of earth, and 11 km below ocean surface



B. Levels of Organization

Species → population → community → ecosystem
→ biome → biosphere



C. Ecological Methods

1. Observing
2. Experimenting
3. Modeling



3-2 Energy Flow

A. Producers

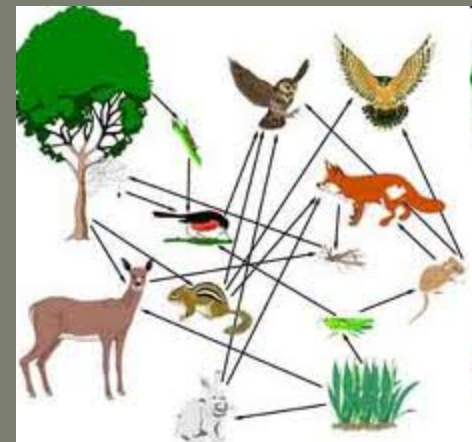
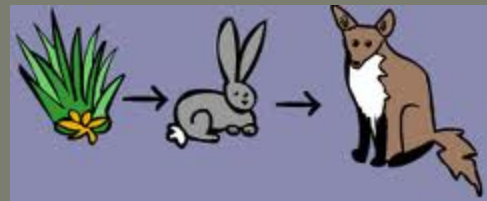
1. Energy From the Sun = photosynthesis
2. Life Without Light – a few organisms use energy from inorganic chemicals = chemosynthesis
3. Autotrophs = get own food from sun/chemicals = producers



B. Consumers = heterotrophs – must get energy from other organisms

C. Feeding Relationships – energy flows in ONE DIRECTION: sun → autotrophs → consumers

1. Food Chains – series of steps
2. Food Webs – most ecosystems and feeding relationships are more complex
3. Trophic Levels – each step in a food chain is a trophic level



D. Ecological Pyramids – shows relative amounts of energy or matter at each trophic level

1. Energy Pyramid

- a. only 10% of energy @ 1 trophic level is transferred to the next level
- b. Grass → cow → human
100% 10% 1%



2. Biomass Pyramid

a. Biomass = total amount of living tissue within a given trophic level

3. Pyramid of Numbers

a. Number of individual organisms @ each trophic level

b. **Usually** the same as energy/biomass (exception: forests – fewer producers than 1st level consumers)

