The Biosphere

What is the Biosphere?

- Combined portions of the planet in which all of life exists, including land, water and atmosphere
- Extend from 8-km above Earth's surface to 11-km below the surface of the ocean.

Levels of Organizations

- **Species**
  - Group of organisms so similar to one another that they can breed and produce fertile offspring
- **Population**
  - A group of individuals that belong to the same species and live in the same area

- **Community**
  - All the different populations that live together in a defined area
- **Ecosystem**
  - Collection of all the organisms that live in a particular place, together with their nonliving environment
- **Biome**
  - A group of ecosystems that have the same climate and dominant communities

Ecosystems

- Influenced by a combination of Biological and Physical Factors
- Depend on biotic factors and abiotic factors

Biotic vs. Abiotic

- **Biotic Factors**
  - The biological influences on organisms within an ecosystem
  - Ex: birds, trees, mushrooms, and bacteria

- **Abiotic Factors**
  - Physical or nonliving factors that shape ecosystems
  - Ex: temperature, precipitation, humidity, wind, nutrient availability, soil type, and sun light

What is a Biome?

- Areas that have distinctive climates and organisms

What are the Major Land Biomes?

- Tropical Rain Forest
- Temperate Forest
- Taiga
- Savanna
- Temperate Grassland
- Chaparral
- Desert
- Tundra
- Mountain

How are Biomes Named?

- According to their plant life
- Plant life determine which organisms live there

Organisms in Biomes

- Plants & animals have adapted to specific environments
- Threatened by human activities

Water Ecosystems

- Either Freshwater or Marine
  - Freshwater = no salt
  - Marine = salt water

Freshwater Ecosystems

- Includes lakes, ponds, rivers, streams and wetlands
- Distinguished by:
  - Depth of the water
  - How fast the water moves
  - Availability of mineral nutrients, sunlight, and oxygen

Marine Ecosystem

- Identified by the presence of salt water
- Includes estuaries, coral reefs, oceans and ice caps

What is Biodiversity?

- Term used to indicate the number and diversity of species on Earth
- There are now an estimated 13 million species of living organisms

Why is Biodiversity important?

- Earth's greatest natural resource
- Species of many kinds have provided us with:
  - **Food:** beef, chicken, salad
  - **Industrial Products:** paper, rubber
  - **Medicines:** painkillers, antibiotics, anticancer drugs

How can humans reduce biodiversity?

- Altering habitats
- Hunting species to extinction
- Introducing toxic compounds into food webs
- Introducing foreign species to new environment

Habitat Alteration

- When land is developed, natural habitat may be destroyed
- Habitats supply organisms what they need
- Habitat destroyed means that organisms will die
- Ex: Florida Panther

Introduced Species

- **Invasive Species**
  - Non-native animals that thrive in new territory where they are free of predators, diseases, or resources limitations that may have controlled their population in their native habitat
- Can cause the extinction of native species
- Ex: Pythons in Florida

Extinction

- Occurs when a species disappears from all or part of its range
- Caused by habitat destruction, introduced species, and hunting
- **Endangered Species**
  - If a species numbers have fallen so low that it is likely to become extinct

Endangered Species Act

- Began in 1973
- Protect plants and animals near extinction
- Protect the land where the organism lives
- Helps to bring the organisms population up

What Eats What in an Ecosystem

- **Producers**
  - Makes its own food
  - Plants, trees, algae
- **Consumers**
  - Gets energy by eating other organisms
  - Animals
- **Herbivore**
  - Eats only producers
  - Cows, sheep, deer, grasshoppers
- **Carnivores**
  - Eats only other consumers
  - Lions, hawks, spiders
- **Omnivore**
  - Eats both producers and consumers
  - Bears, pigs, humans

What is a Food Chain?

- A sequence in which energy is transferred from one organism to the next as each organism eats another

What is a Food Web?

- A group of interrelated food chains
- No one path
- Shows feeding relationships in an ecosystem

What is a Trophic Level?

- Each step in the transfer of energy through an ecosystem
- Each time energy is transferred, less of it is available to organisms at the next trophic level
- Producer ☾ Primary Consumers ☾ Secondary Consumers ☾ Tertiary Consumers

Problems of Urban Development

- Infectious diseases
- Inadequate water system
- Poor sewer systems
- Exposure to pollution

Population Growth

- US has over 300 million people
- Growth is determined by biotic potential and carrying capacity

What is Carrying Capacity?

- Is the maximum population a habitat can support indefinitely
- Population exceeds it, for long periods, degrades its environment and reduces future carrying capacity