

Introduction to Global Systems – Ch. 3 Lesson 1



Ecology

The scientific study of interactions among organisms, populations, and communities and their interactions with their environment

- The root of the word ecology is the Greek word *oikos* meaning “house”.
- The study of nature’s houses, organisms that live in those houses, and interactions based on energy and nutrients

Biosphere: includes all life on Earth from bacteria to trees and fish and mold spores to humans

- Includes all parts of Earth in which life exists



Species and Populations



Species

A group of similar organisms that can breed and produce fertile offspring.



Population

A group of individuals that belong to the same species and live in the same area.

Community



Population



Community

A collection of different populations that live together in a defined area

Ecosystem



Community



Ecosystem

All the organisms that live in a place, together with their physical environment.

Biome



Ecosystem



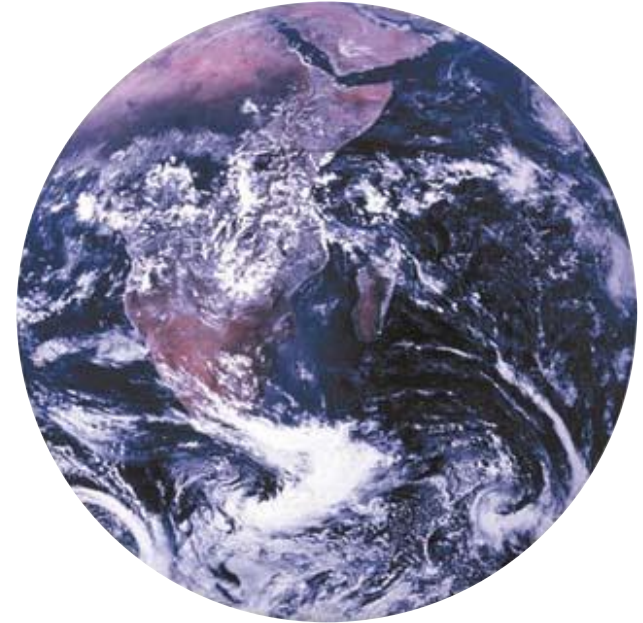
Biome

A group of ecosystems that share similar climates and typical organisms.

Biosphere



Biome



Biosphere

Our entire planet, with all its organisms and physical environments, is known as the biosphere.

Gathering Ecological Data

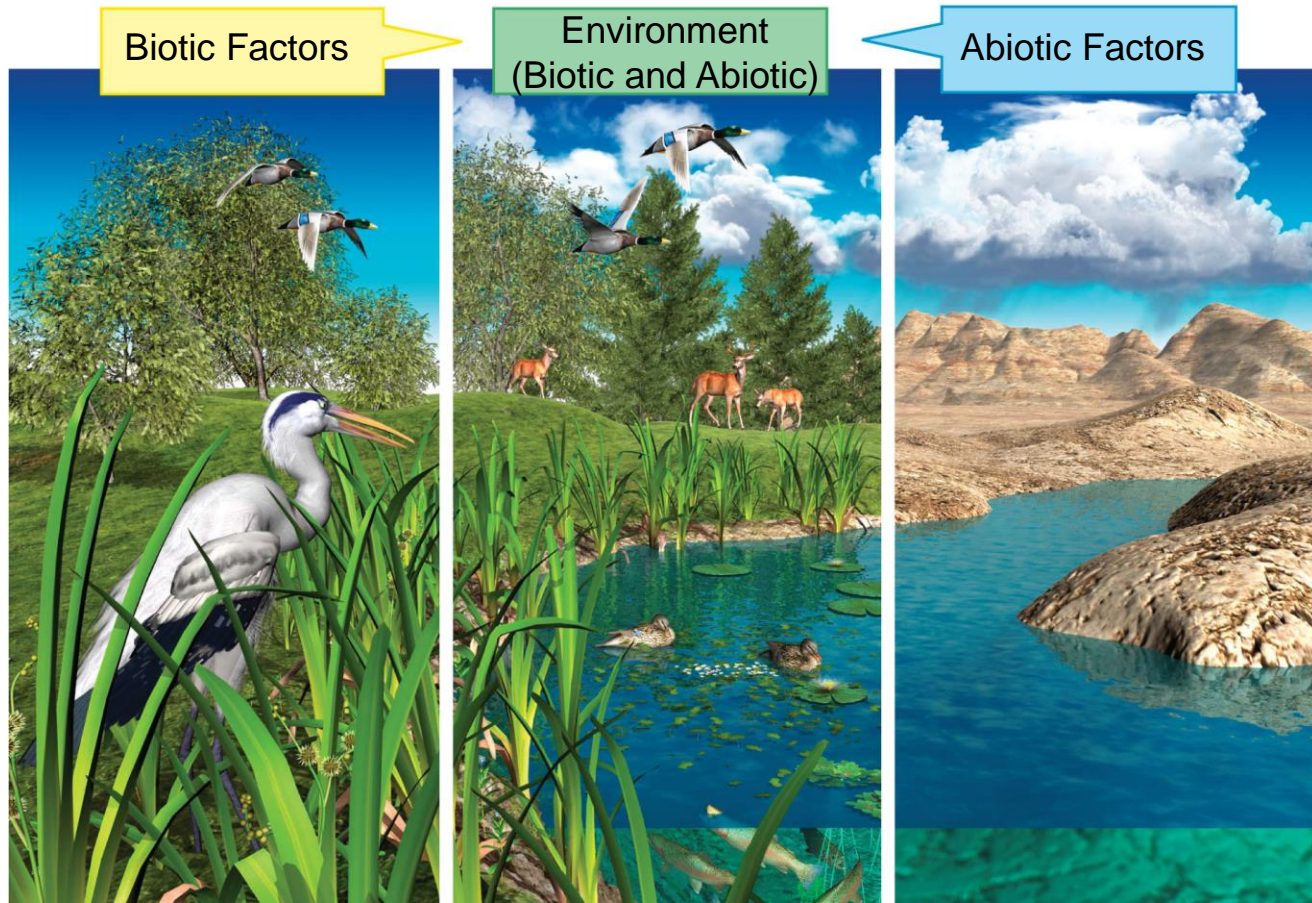
Ecologists rely on 3 main approaches to studying ecology:

- *Observation* – first step in asking questions
 - Some may be simple while others are more complex
 - This leads to testable hypotheses
- *Experimentation* – designed to test a hypothesis by gathering data
 - Can be artificial environments to see how some organisms change
- *Modeling* - ecologists make models to help understand phenomena



- Useful models make predictions that lead to the development of additional hypotheses.

Biotic and Abiotic Factors



Biotic factors: any living part of the environment with which an organism might interact

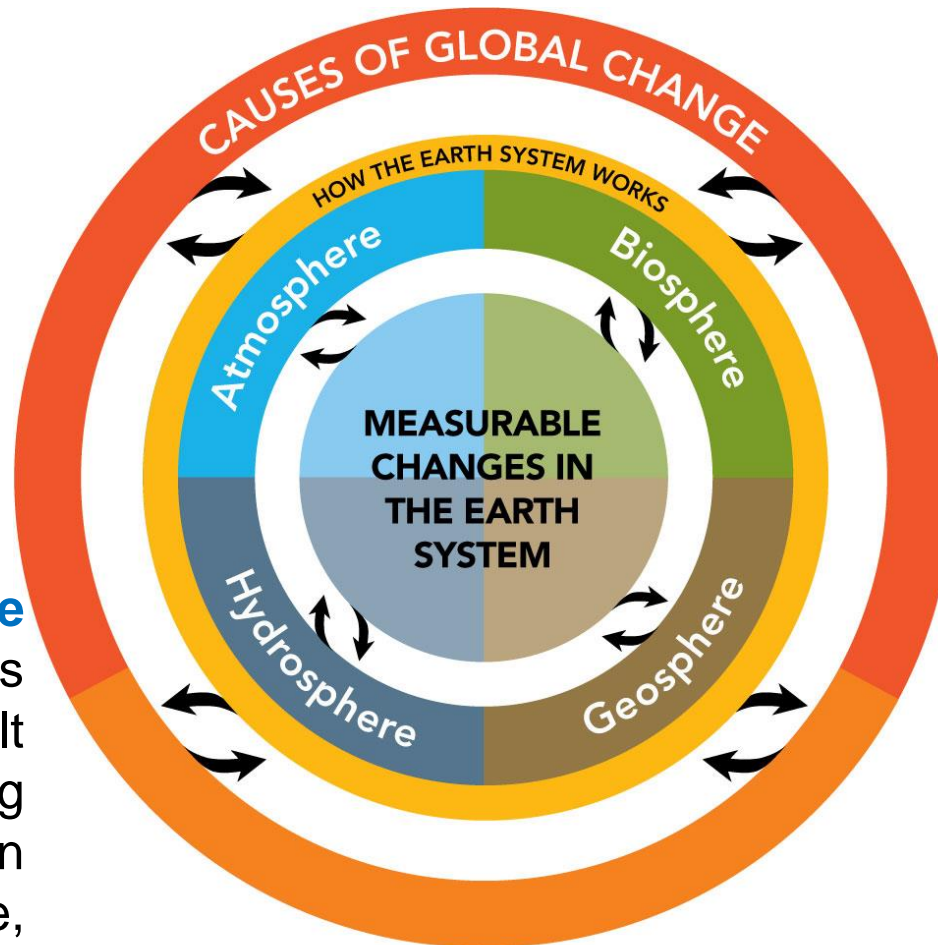
Abiotic factors: any nonliving part of the environment, such as sunlight, heat, precipitation, humidity, wind or water currents, and soil type

Modeling Global Systems

Earth's four global systems are constantly interacting.

The **atmosphere** includes all the gases that surround Earth.

The **hydrosphere** consists of all Earth's fresh water and salt water, including water vapor and rain in the atmosphere, water underground, and ice.



The **biosphere** includes all living organisms and the environments they live in.

The **geosphere** includes all the “usually solid stuff” – rocks, continents, and the ocean floor. Deep inside Earth, portions of the geosphere are liquid.

Adapted from *Understanding Global Change*, UC Berkeley