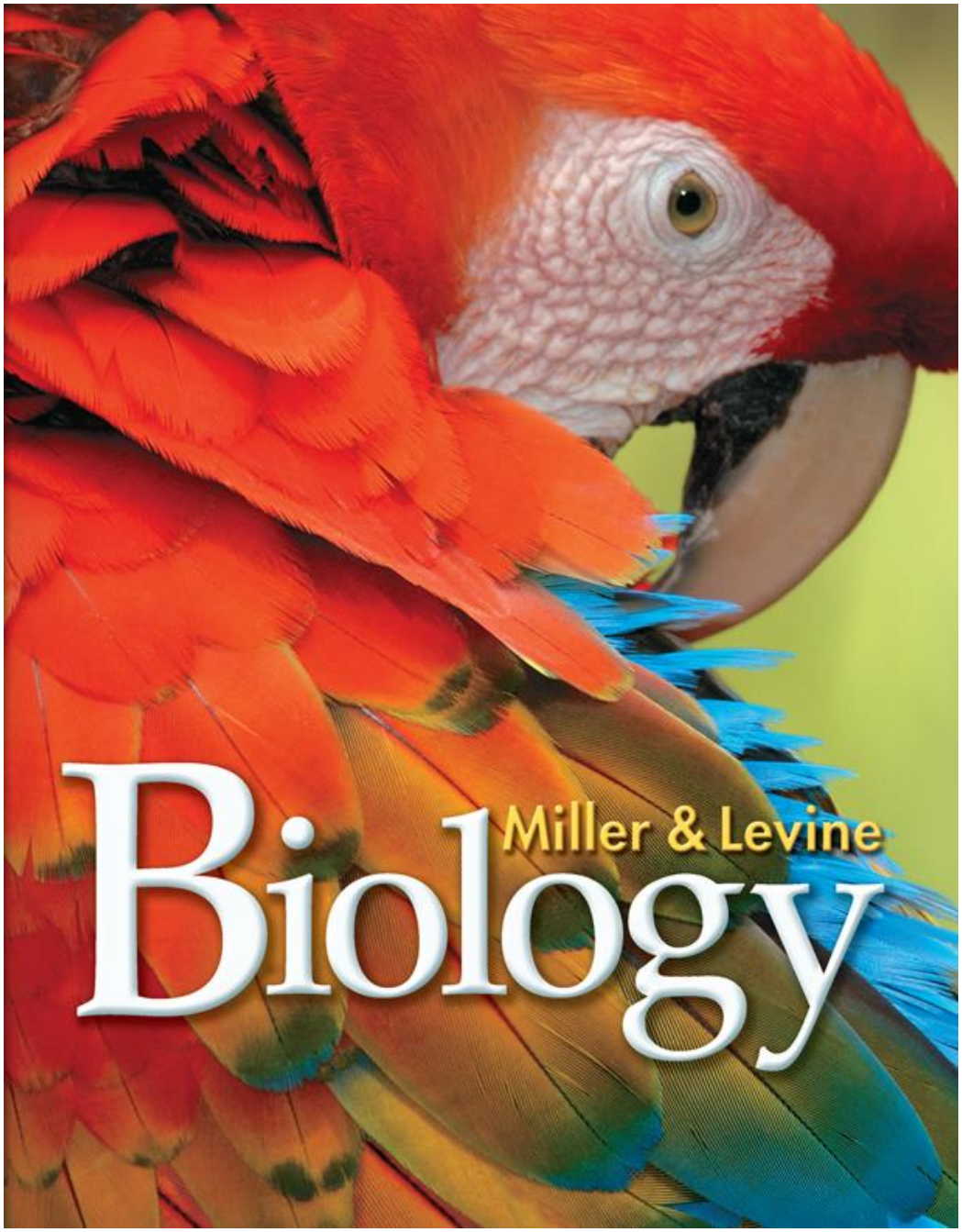


Lesson Overview

3.1 What Is Ecology?

Studying Our Living Planet

- **What is ecology?**

- **Ecology is the scientific study of interactions among organisms and between organisms and their physical environment.**

Studying Our Living Planet

The biosphere consists of all life on Earth and all parts of the Earth in which life exists

-land,

-water,

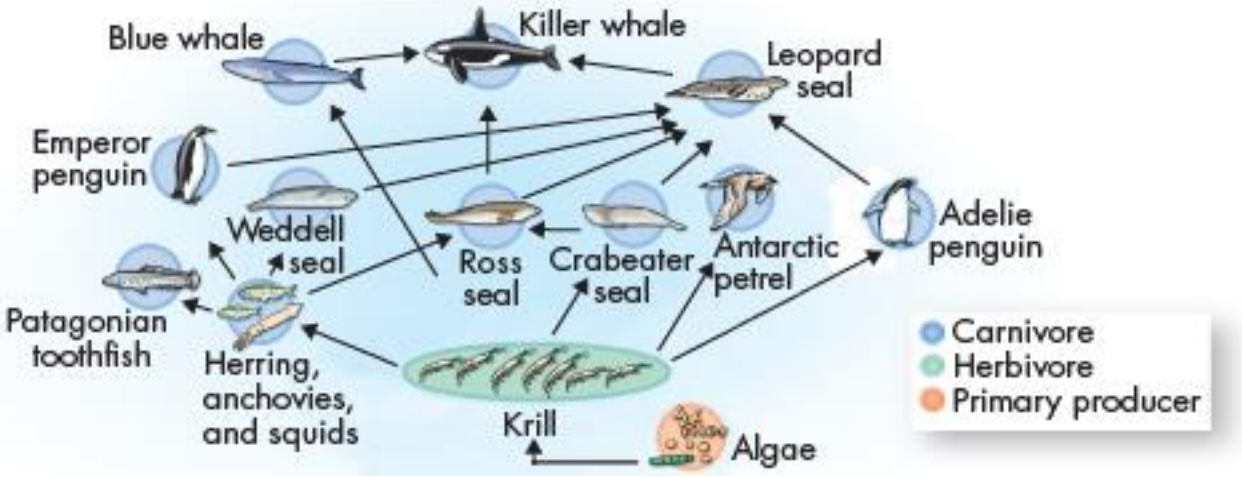
-the atmosphere

The biosphere extends from about 8 km above Earth's surface to as far as 11 km below the surface of the ocean.

The Science of Ecology

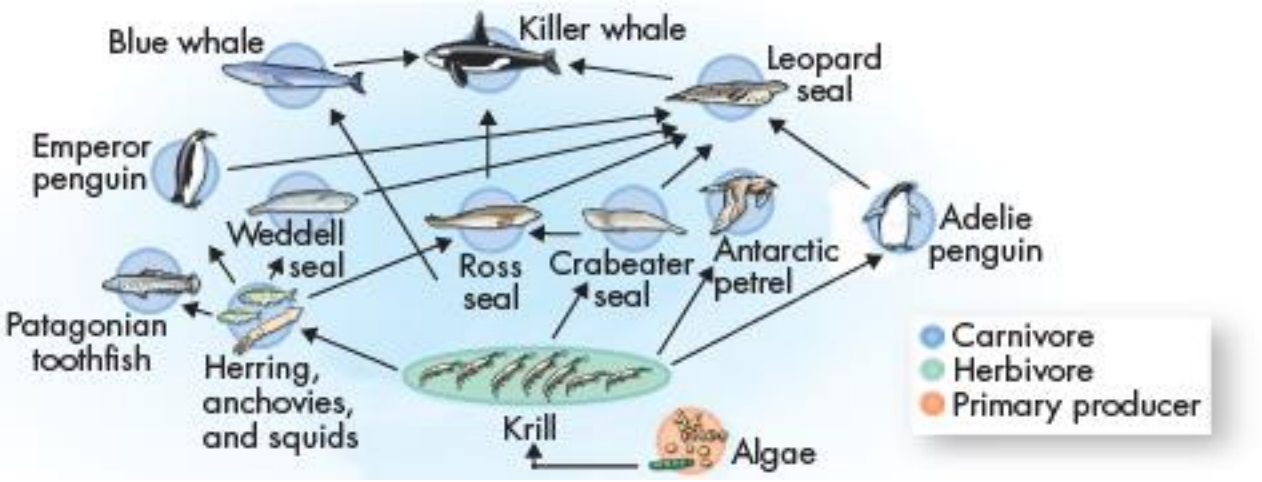
Ecology is the scientific study of interactions among and between organisms and their physical environment.

Interactions within the biosphere produce a web of interdependence between organisms and the environments in which they live.



The Science of Ecology

Organisms respond to their environments and can change their environments, producing an ever-changing biosphere.



Levels of Organization

Ecological studies may focus on levels of organization that include the following:

-Individual organism

-Population—a group of individuals that belong to the same species and live in the same area

Levels of Organization

Ecological studies may focus on levels of organization that include the following:

-Community—many different populations that live together in a defined area

-Ecosystem—all the organisms that live in a place, together with their physical environment (or surroundings)

Levels of Organization

Ecological studies may focus on levels of organization that include the following:

Biome—a group of ecosystems that share similar climates and typical organisms

Levels of Organization

Ecological studies may focus on levels of organization that include the following:

Biosphere—our entire planet, with <u>all</u> its <u>organisms</u> and <u>physical environments</u>

Biotic and Abiotic Factors

- **What are biotic and abiotic factors?**

- **-The biological influences on organisms are called biotic factors.**

  ***aka living things**

  -Physical components of an ecosystem are called abiotic factors.

  ***non-living things**

Biotic Factors

A **biotic factor** is any living part of the environment with which an organism might interact.

-including animals, plants, mushrooms and bacteria.

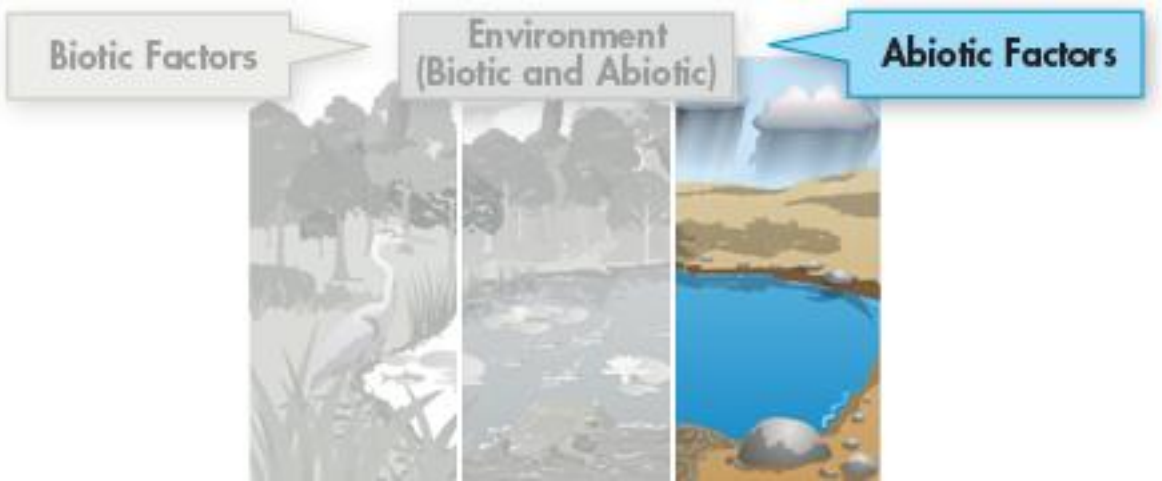
Biotic factors relating to a bullfrog might include algae it eats as a tadpole, the herons that eat bullfrogs, and other species competing for food or space.

Abiotic Factors

An **abiotic factor** is any nonliving part of the environment.

-sunlight, heat, precipitation, humidity, wind or water currents, soil type, etc.

For example, a bullfrog could be affected by abiotic factors such as water availability, temperature, and humidity.



Biotic and Abiotic Factors Together

The difference between abiotic and biotic factors is not always clear. Abiotic factors can be influenced by the activities of organisms and vice versa.

For example, pond muck contains nonliving particles, and also contains mold and decomposing plant material that serve as food for bacteria and fungi.

Biotic and Abiotic Factors Together

In addition, trees and shrubs affect the amount of sunlight the shoreline receives, the range of temperatures it experiences, the humidity of the air, and even the chemical conditions of the soil.

A dynamic mix of biotic and abiotic factors shapes every environment.

Ecological Methods

- **What methods are used in ecological studies?**

- **Regardless of their tools, modern ecologists use three methods in their work: observation, experimentation, and modeling.**

  -Each of these approaches relies on scientific methodology to guide inquiry.

Observation

Observation is often the first step in asking ecological questions.

Questions may form the first step in designing experiments and models.

Experimentation

Experiments can be used to test hypotheses.

An ecologist may set up an artificial environment in a laboratory or greenhouse, or carefully alter conditions in selected parts of natural ecosystems.

Modeling

Many ecological events occur over such long periods of time or over such large distances that they are difficult to study directly.

Ecologists make models to help them understand these phenomena.