

## **Chapter Eighteen: Interactions of Living Things**

### **Teacher Notes**

#### **Lesson One: Everything Is Connected**

- Studying the Web of Life
  - Ecology-the study of the interactions of living organisms with one another and with their environment.
  - The Two Parts of an Environment
    - Biotic-describes living factors in the environment
    - Abiotic-describes the nonliving part of the environment, including water, rocks, light, and temperature.
  - Organization in the Environment
    - first level-individual organisms
    - second level-larger and made of similar organisms that form a population
    - third level-made of different populations that form a community
    - fourth level-is made of communities and its abiotic factors that form the ecosystem
    - fifth level-contains all ecosystems that form the biosphere
  - Populations-a group of organisms of the same species that live in a specific geographical area.
  - Communities-all the populations of species that live in the same habitat and interact with each other.
  - Ecosystems-a community of organisms and their abiotic environment
    - scientists studying ecosystems study how organisms interact as well as how temperature, precipitation, and soil characteristics affect the organism.
  - The Biosphere-the part of Earth where life exists
    - study all that is studied in the ecosystem level and also interaction with atmosphere, water, soil, and rock

#### **Lesson Two: Living Things Need Energy**

- The Energy Connection
  - Producers-organisms that use sunlight directly to make food
    - usually do this by photosynthesis
    - most producers are plants
  - Consumers-an organism that eats other organisms
    - Herbivore-an organism that eats only plants
    - Carnivore-an organism that eats animals
    - Omnivore-an organism that eats both plants and animals
    - Scavenger-are omnivores that eat dead plants and animals
  - Decomposers-organisms that get energy by breaking down dead organisms
    - examples are bacteria and fungi
  - Food Chains and Food Webs
    - Food Chain-the pathway of energy transfer through various stages as a result of the feeding patterns of a series of organisms.

- Food Web-a diagram that shows the feeding relationships between organisms in an ecosystem.
- Energy Pyramids-a triangular diagram that shows an ecosystem's loss of energy, which results as energy passes through the ecosystem's food chain.
  - producers are on the bottom and are the largest area; the top has a much smaller number of organisms.
- Wolves and the Energy Pyramid
  - control the populations of many other organisms because they prey on many animals
  - when the wolf population was diminished the populations of other organisms got too large causing survival problems.
  - Gray Wolves and the Food Web
    - Gray wolves were introduced back into Yellowstone in 1995; they began breeding and restored the natural energy flow.
    - Farmers and ranchers in the area are not happy because they think their livestock will become prey.
  - Balance in Ecosystems
    - all organisms in a food web are important for the health and balance of all other organisms in the food web.

### **Lesson Three: Types of Interactions**

- Interactions with the Environment
  - Limiting Factors
    - amount of food, water, living space, and other resources that limit the size of a population
  - Carrying Capacity-the largest population that an environment can support at any given time.
    - if more of a specific population exists; individual members will die
- Interactions Between Organisms
  - 4 ways organisms interact
    - competition
    - predators and prey
    - symbiotic relationships
    - coevolution
- Competition
  - when two or more individuals or populations try to use the same resource.
    - can happen between individuals within a population
    - can happen between populations
- Predators and Prey
  - Prey-an organism that is killed and eaten by another organism.
  - Predator-an organism that eats all or part of another organism.
  - Predator Adaptations
    - must be able to catch their prey like running quickly
    - may ambush prey
  - Prey Adaptations
    - can run away, stay in groups, or camouflage

- some are brightly colored and may contain poison
- Camouflage
  - a way to avoid being eaten by being hard to see
- Defensive Chemicals
  - chemicals that spray predators or inject predators
- Warning Coloration
  - some animals are brightly colored so that other organisms know that they are poisonous.
  - common warning colors are red, yellow, orange, black, and white
- Symbiosis-a relationship in which two different organisms live in close association with each other.
  - Mutualism-a relationship between two species in which both species benefit.
  - Commensalism-a relationship between two organisms in which one organism benefits and the other is unaffected.
  - Parasitism-a relationship between two species in which one species, the parasite, benefits from the other species, the host, which is harmed.
    - the host may even be killed by the parasite
- Coevolution-the evolution of two species that is due to mutual influence, often in a way that makes the relationship more beneficial to both species.
  - Coevolution and Flowers
    - a pollinator is an organism that carries pollen from one flower to another. Pollen is necessary for reproduction in most plants.
    - flowers have color, odor, or nectar to attract a pollinator
    - bats have changed over time to have long, thin tongues and noses to help them reach the nectar in flowers