

## Unifying Theme: Ecosystems

### Essential Standards and Clarifying Objectives

#### 5.L.2 Understand the interdependence of plants and animals with their ecosystems.

**5.L.2.1** Compare the characteristics of several common ecosystems, including estuaries and salt marshes, oceans, lakes and ponds, forests, and grasslands.

**5.L.2.2** Classify the organisms within an ecosystem according to the function they serve: producers, consumers, or decomposers (biotic factors)

**5.L.2.3** Infer the effects that may result from the interconnected relationship of plants and animals to their ecosystem.

#### 4.L.1 Understand the effects of environmental changes, adaptations and behaviors that enable animals (including humans) to survive in changing habitats.

**4.L.1.3** Explain how humans can adapt their behavior to live in changing habitats (e.g., recycling wastes, establishing rain gardens, planting trees and shrubs to prevent flooding and erosion).

#### 5.L.1 Understand how structure and systems of organisms (to include the human body) perform functions necessary for life.

**5.L.1.1** Explain why some organisms are capable of surviving as a single cell while others require many cells that are specialized to survive.

#### 5.P.3 Explain how the properties of some materials change as a result of heating and cooling.

**5.P.3.1** Explain the effects of the transfer of heat (either by direct contact or at a distance) that occurs between objects at different temperatures (conduction, convection, radiation).

### Unpacking

What does this clarifying objective mean a child will know, understand and be able to do?

**5.L.2.1** Students know that there are different types of ecosystems (terrestrial and aquatic). These ecosystems can be divided into two types according to their characteristics:

**Terrestrial** – Land-based ecosystems include forests and grasslands.

*Forests* have many trees (with needles or with leaves), shrubs, grasses and ferns, and a variety of animals. They usually get more rain than grasslands. Diverse types of animals can be found in forests, depending on their type. Deciduous forests: black bear, deer, red fox, vole, rabbit, cardinal. Rain forests: panther, monkeys, capybara, snakes, spiders. Temperatures in the forests may vary depending on where the forest is located.

*Grasslands* have fertile soil and are covered with tall grasses. They usually get a medium amount of rain, but less than forests. Temperatures may also vary depending on where the grassland is located. Some examples of animals that live in the grasslands are prairie dogs, bison, and

grasshoppers.

**Aquatic-** Water-based ecosystems may be freshwater (lakes and ponds) or saltwater (oceans, estuaries and saltwater marshes).

*Lakes and ponds* are bodies of freshwater that are surrounded by land. Ponds are usually shallower than lakes and the temperature of the water usually stays the same from top to bottom. Plants and algae usually grow along the edges where the water is shallow. Some examples of animals may be different types of fish, amphibians, ducks, turtles, or beavers.

*Oceans* are large bodies of saltwater divided by continents. Oceans have many types of ecosystems depending on the conditions (sunlight, temperature, depth, salinity) of that part of the ocean. Most organisms live where the ocean is shallow (from the shoreline to the continental shelf) because sunlight can reach deep and the water is warm making food abundant. Some examples of organisms that live in the shallow ocean are drifters (jellyfish or seaweed), swimmers (fish), crawlers (crabs), and those anchored to the ocean floor (corals). Some organisms live in the open ocean, near the surface or down to the deep ocean bottom. Plankton float in the upper regions of the water. Some organisms swim to the surface to find food or for air (whales, turtles, sharks) while others live closer to the bottom (certain fish, octopus, tubeworms).

Students know typical visual representations of the various ecosystems, as well as graphic representations of the food chains and webs, cycles and energy pyramids that are commonly associated with ecosystems.

**5.L.2.2** Students know that organisms in an ecosystem can be producers, consumers, or decomposers. Students know that producers convert energy from the sun into organic matter through the process of photosynthesis. This organic matter is used by producers and consumers as food which provides the energy that fuels basic life processes. Consumers sometimes consume only or mostly other consumers as a food source. Producers and consumers produce wastes as they perform their life processes, and become waste organic matter when they die. Decomposers use these waste materials and other nonliving organic matter to fuel their life processes and recycle nutrients that are necessary for producers to carry out their life processes.

**5.L.2.3** Students know that all of the organisms in an ecosystem have interconnected relationships. Students know that because of this, factors that impact one population within an ecosystem may impact other populations within that ecosystem.

**4.L.1.3** Students know that humans can adapt their behavior in order to conserve the materials and preserve the ecological systems that they depend upon for survival.

**5.L.1.1** Students know that unicellular organisms, such as algae, consist of a single cell and perform all life processes within a single cell. Students know that multicellular organisms are organisms that consist of more than one cell and have differentiated cells that perform specialized functions in the organism.

**5.P.3.1** Students know that radiation is the transfer of energy by electromagnetic waves. Electromagnetic waves can carry energy through places with or without any matter. The Sun is the main source of electromagnetic energy on Earth. Part of this energy, light, is used by producers to make food.