Background Information

All the living organisms and nonliving things interacting in an environment form an **ecosystem**. Within these ecosystems, many interactions occur. The carbon dioxide/oxygen cycle is an example of an interaction within an ecosystem. The nitrogen cycle is an example of an interaction within an ecosystem. Living organisms and nonliving things in any ecosystem interact in these cycles in nature. In order to understand how organisms and nonliving things interact, students will need to understand what plants and animals need, how they meet their needs, and how meeting those needs changes the environment.

Habitats
Within every ecosystem, there may be one or more **habitats**. A habitat is the specific environment in which organisms can meet their basic needs. Most organisms need, water, nutrients (food), air, sunlight, space and shelter. Some of these needs are met by other living organisms and some are met by nonliving things.

Nonliving Things
The nonliving things in any ecosystem include air, water, rocks, soil and sunlight. Living organisms use these nonliving things in a variety of ways to meet their basic needs.

- Plants and animals use gases from the **air** (carbon dioxide/oxygen cycle);
- All living organisms need **water** to survive (water cycle);
- Energy starts with **sunlight** and moves through ecosystems through plants and animals (food webs and chains);
- Organisms live in the **soil** and important nutrients are moved through and recycled through soil (nitrogen cycle).
- Organisms use **rocks** as shelter

Living Organisms
Groupings:
Living organisms (plants and animals) that are alike and produce offspring like themselves are grouped as a **species**. Two or more organisms of the same species living in the same place make up a **population**. Populations that live in the same place at the same time make up a **community**.

Adaptations:
Every species of living organisms has characteristics that help them survive in their environment. These characteristics are called **adaptations**. Adaptations of any species help that species survive and reproduce. In order for a species to survive, it must pass traits on to the next generation. Organisms do not consciously adapt to their environment. All adaptations are either **inherited traits** passed from generation to generation, or **instinctive or learned behaviors**.

Inherited traits are characteristics that are passed from parents to their offspring. (i.e. hair color, eye color, fur color, size, etc.)

A **behavior** is something that an organism does. Behaviors are also responses to changes in an environment.

- **Animals:** An **instinctive behavior** is a behavior that is inherited from the parents. (i.e. A colt being born and standing and walking right away). A **learned behavior** is a behavior that an animal learns from observing other animals of from being taught. Some behaviors are a combination of instinct and learning.
- **Plants:** All plant behaviors are inherited. Plants cannot learn. They do respond to different things in their environment in order to survive.

Niche:
Every organism interacts with other organisms and with the environment in any ecosystem. Organisms eat different foods, live in different habitats and interact with other organisms. Adaptations play an important part in determining how organisms interact with their environment and with each other. All of these determine the role of the organisms within the ecosystem. This role is called its **niche**.

Organisms are classified by their role or **niche** into three groups:

- **Producers** – Organisms that make their own food
- **Consumers** – Organisms that eat other organisms to get their **energy.** Consumers are classified into three groups as well:
    - **Herbivores** – Organisms that eat only plants and plant products
    - **Carnivores** – Animals that eat other animals
        - **Predator –** An animal that kills and eats another animal
        - **Prey** – The animal that is eaten
    - **Omnivores** – Animals that eat both plants and animals
- **Decomposers** – Organisms that feed on dead materials and wastes

Food Chains:
All organisms in an ecosystem need energy. Our main source of energy on earth is sunlight. Plants capture energy from the sunlight and so the movement of energy begins. Plants store the energy in their parts and when organisms eat plants, the energy moves from the plants to those organisms. **Energy passes from one organism to another.** This path of energy movement through an ecosystem is called a **food chain.**

Food Webs:
In an ecosystem, there are many different food chains, or paths of energy flowing through. These food chains overlap since organisms eat many different organisms. Some organisms feed on the same thing causing food chains to overlap. This overlapping of food chains in an ecosystem is called a **food web.**

Ecosystems:
All of these interactions occur in any ecosystem. Students should be able to recognize these interactions in many different ecosystems. Give students as many different examples as possible. (i.e. desert, ocean, forests, ponds, wetlands, etc.)