

Ecosystem Interactions

Grades 6-8

Educational Program Guide

OAS

MS-LS2-3 | Science Practices 1, 2, 3, 4, 5, 6, 7, 8

Program Overview

The instructor will lead a discussion on the definition and components of ecosystems. The class will construct a food chain and discover the process of energy transfer and nutrient cycling. Students will then work in groups to assemble food chains using museum specimens. The class will collect data and each student will graph the results. The class will then discuss ecosystem structure.

Objectives

After participating in this program, students will be able to:

- Identify and define the ecosystems and their components
- Discuss ecosystem structure and the roles and relationships different organisms can play in an ecosystem.
- Understand how ecosystems work, the natural balance of ecosystems, and why they are important.

Background

Everything we use every day came from an **ecosystem**. Living or nonliving, our resources come from nature. Ecosystems are organized into levels and categories by the scientists who study them. The first level of organization in an ecosystem is **biotic** or living versus **abiotic** or nonliving. Non-living things include water, soil, rocks and minerals, air, and the sun. Living things can be further divided in several ways, the first of which is their classification. The five kingdoms are represented in almost every ecosystem, animals, plants, fungus, bacteria, and protists. However, it may be better further divide living things by the way they obtain energy and/or what they eat. **Producers** are living things

Background (cont.)

that produce their own food using non-living sources of energy. Plants use sunlight, water, and air to create sugar, a form of stored energy. This stored energy is then available as food to **consumers**, or living things that cannot create food, and therefore must consume other living things as food to get energy. **Decomposers** are another form of living thing that cannot create their own food but they generally prey upon dead matter. **Consumers** can be further divided, depending on what they consume. An animal that eats only plants is an **herbivore**, or plant eater. An animal that eats both plants and animals is an **omnivore**, or everything eater. An animal that eats only (or mostly) other animals is a **carnivore** or meat eater. **Food chains** are a simplified way of looking at one of many possible paths that energy and nutrients may travel through an ecosystem. A grasshopper may eat little bluestem grass, then be eaten by a meadowlark who is then eaten by a hawk. That same grass could also be eaten by the meadowlark directly (in the form of seeds), a cotton rat, or a bison. The grasshopper may also be eaten by many other animals.

Food chains can combine to form **food webs**, which are a more accurate way of looking at ecosystems. Ecosystems are complex, made up of many connections between many varieties of living things and the non-living environment. At first glance, it may be difficult to see how a coyote can be connected to a wild flower. Coyotes are carnivores, eating mostly animals (though they do eat some plant material). That coyote may eat a rabbit who ate the leaves of the plant, or eat a bird who ate a caterpillar that nibbled on the flower. Life on earth continues because plants can use light energy from the sun and combine it with water and carbon dioxide to form sugar, a stored food resource available to the plant and anything that eats a plant. This basic ability, to transform light energy into sugar energy, is what drives most ecosystems (subterranean and deep sea ecosystems may be exceptions). All other living things depend on plants, either directly or indirectly.

At the Museum

Hall of Natural Wonders

This gallery features five ecosystems: an upland stream, an oak-hickory forest, a limestone cave, a mixed grass prairie, and a short grass prairie. Ask your students to find and identify different types of living and nonliving things they see in the ecosystems. Discuss which organisms are producers and which are consumers. Of the consumers, decide which are herbivores, omnivores, or carnivores. As a class, discuss different types of food chains you could create using the living things in the exhibits.

Vocabulary

Ecosystem	all of the living and nonliving things interacting in a particular area
Producer	any green plant that makes its own food using chlorophyll and light energy
Carnivore	meat eater; any animal that eats only animal matter
Community	the living part of an ecosystem; any relationship in nature that involves plants and animals living together and interacting with one another in a particular environment
Consumer	any organism that depends directly or indirectly on food producing plants; any organism that consumes other organisms
Decomposers	living thing that obtains food by breaking down the remains of dead organisms
Environment	the living and nonliving factors that actually affect an individual organism at any point in its life cycle
Food Chain	transfer of energy through an ecosystem through the action of food producers, food consumers, and decomposers; food chains interact to create a complex food web
Habitat	the physical place where an animal lives; it provides all of the resources needed for life
Herbivore	plant eater; an animal that eats only plants
Omnivore	everything eater; an animal that eats both plants and animals
Resources	substances or objects required by an organism for normal maintenance, growth, and reproduction