

# Ecosystem Discovery



## Overview

Students will develop an understanding of ecosystems by drawing pictures of different ecosystems in small groups. Then the class will work together to create a mural of the Sandia Mountain ecosystem. Students will compare the different components of these ecosystems.

## Concepts

1. The Earth is composed of both living and nonliving parts. The living parts include animals (consumers), plants (producers), and fungi and microscopic organisms (decomposers); the nonliving (abiotic) parts include the sun, water, air (gases), and rocks.
2. An ecosystem is a community of living organisms that interact with each other and the non-living parts.

## Time

1 hour and 30 minutes

- Introduction :10 minutes
- Ecosystem pictures: 30 minutes
- Finding the Connections: 10 minutes
- Mural: 30-plus minutes (can be done over several days)
- Closure: 10 minutes

## Materials

For the whole class:

- Picture of an ecosystem
- A large sheet of butcher paper for the mural

For each team:

- large pieces of paper
- art materials (markers, crayons, scissors, glue, magazines, etc.)

For each student:

- Ecosystem Explorations Journal

## Teacher Preparation

1. Locate a picture of a natural ecosystem to share with students.
2. Gather together art materials.



## Background

Every environment is composed of living and nonliving parts, and in every environment, the living and nonliving parts interact with each other in a variety of ways. **Ecology** is the scientific study of these interactions. There are countless relationships that affect the overall success of each respective environmental community; nothing works independently. An **ecosystem** is all of the **living** and **non-living** parts within an environment and the interactions between those parts. Sometimes these interactions occur between living components (food chain), sometimes between non-living components (erosion), and sometimes between living and nonliving components (photosynthesis). Like the digestive system or a stereo system, an ecosystem is a group of different parts that work together.

The living parts of an ecosystem include animals (consumers), plants (producers), and fungi and micro-organisms (decomposers). The nonliving, or abiotic components of an ecosystem include the sun's energy, water, air (atmospheric gases), and rock, which makes up the landforms. Soil is composed of living (producer, consumer, and decomposer) and nonliving (rock particles) components. The earth is comprised of many different examples of ecosystems, from tidal pools to tropical rain forests.

An ecosystem can be thought of as an imaginary web in which all the living and non-living parts of an environment are connected. The connections in each environment are countless. For example, a coyote and a rabbit are connected as parts of a food chain. The rabbit and the coyote both rely on oxygen in the air for survival. The rabbit might use grass for shelter, while grasshoppers are using the same grass as a food source. Each blade of grass relies on the sun for energy, and obtains nutrients from the soil in which it grows. The shape of the land will cause water to be more plentiful in some areas rather than other areas, which means within an ecosystem, there may be different communities present. Each community consists of the plant and animal species best suited to the nonliving components of the area.

An ecosystem relies on the delicate state of balance between living and nonliving things in a particular environment. If a part of an ecosystem is removed or altered, the existing harmony will be offset and the entire system will go through a change, large or small. The understanding of ecosystems provides a strong foundation for studying the environment. Understanding the interconnectedness of things in an ecosystem provides a basis for respecting the significance of each of the different parts of the surrounding environment.

## Procedure

### Introduction

1. Hang a picture of an ecosystem where all students can see it. Any picture with a nature scene will work.
2. Write the word "ecosystem" in the middle of the chalkboard. Ask students to take notes in their Ecosystem Explorations Journal.
3. Write #1, #2, and #3 on the board and explain that there are three different components that make up an ecosystem.



4. Explain that the first component is a place, or environment. Write the word “place” next to the #1 on the board. Ask students to give examples of natural environments: desert, jungle, mountains, ocean, lake, river, bosque, etc.
5. Explain that the second ingredient for an ecosystem is the parts of that environment. Write the word “parts” next to the #2 on the board. Some of those parts are living; others are nonliving. Ask the students to give examples of the different parts of an environment: plants, animals, micro-organisms, fungi, bacteria, rock, water, air, heat, light, land forms, etc. Give students the definitions for producers, consumers, decomposers, living, and non-living, and have the students determine which categories their examples fit in and why. (Tell them they may fit in more than one – Producers, consumers, and decomposers all being living things as well).
6. To conclude the definition of an ecosystem, write the word “connections” next to the #3, and explain that all the parts within a certain place are connected to each other in many different ways. Different parts of an ecosystem interact in a variety of ways. For example: plants rely on sunlight in order to produce energy and a bird weaves grasses into its nest. Ask the students to give other examples of the different ways parts of an ecosystem connect: coyotes eat rabbits; trees are connected to the soil because the soil provides nutrients and stability for trees; heat from the sun melts ice.



### Components of Ecosystems

- #1) **Place:** an environment (desert, ocean, rain forest, bosque, grassland)
- #2) **Parts:** both living and non-living things (soil, plants, water, animals)
- #3) **Connections:** interactions; the way things work together

### Componentes de Ecosistemas

- #1) **Lugar:** un medioambiente (desierto, océano, bosque pluvial, bosque, prados)
- #2) **Partes:** seres vivos y no vivos (tierra, plantas, agua, animales)
- #3) **Relación:** interacciones; la forma que los seres vivos y los objetos trabajan unidos.

### Ecosystem Pictures: Done in Teams

1. Divide the class into teams and distribute one large sheet of paper to each team.
2. Explain that there are different ecosystems all over the world, and each team will work together to create a drawing or model of a different ecosystem.
3. Assign each team to create one of the following ecosystems: desert, river, ocean, rain forest, northern forest, grassland, swamp.
4. Each team must include both living (producers, consumers, decomposers) and nonliving components in their reproduction.



Encourage students to use the library or other resources to learn more about the ecosystem that their team will be illustrating.

### Finding the Connections: Done Individually

1. Once each team has constructed a drawing or model of an ecosystem, have each student open his or her journal to a blank page.
2. Ask each student to write “Place,” “Parts,” and “Connections” in a column along the left-hand side of a page in their journal.
3. Next to the word “Place” have each student name their ecosystem’s environment.
4. Next to “Parts,” have each student list the different living and nonliving parts present in their team’s ecosystem. Using a color key or symbol, have the students mark which living parts are producers, which are consumers, and which are decomposers.
5. Next to “Connections,” have each student write down or draw at least three connections present in the ecosystem.

### Mural of a New Mexico Ecosystem: Done as a Class

The class will work together to create a mural of a New Mexico ecosystem (one which you will be going to on your field trip). If possible, have the entire class work on the same mural. This activity will help students conceptualize what they will see and learn about when they participate in the Ecology Field Program at the Sandia Mountain Natural History Center or other natural area. Although some students may have never been to the mountains, they can still participate because there is no one correct way to draw this ecosystem. Encourage students to hypothesize about what parts might be found in this ecosystem. It is important to include both living and nonliving parts in this picture.

1. Place a large piece of paper on the bulletin board or on a table. Provide paints, markers, scrap paper, and scissors for the students to use. Magazines are helpful too.
2. Beginning with the mountains, have students draw or cut out different parts of the ecosystem. When ready, the students can take turns gluing the parts to the paper.
3. Hang the completed mural on the wall. Students can refer to the mural during the entire Ecosystem Explorations unit.
4. When your class returns from their field trip, have students compare their mural to what they discovered on the field trip. Have them add pictures of things that may have been left out.



## Picture of an Ecosystem



### Closure

Have students compare the connections that occur between the different living and nonliving parts of their ecosystem to the connections in the class mural of the Sandia Mountain ecosystem. Questions to ask the class include:

What are some living parts of an ecosystem?

What will happen if you remove the sun (plants, water, people, coyotes) from an ecosystem? What else will be affected? How?

How are you connected to the ecosystem you visited? [eat Piñon nuts, plants give us oxygen, use water from snowmelt, etc.]

### Adaptations for Students with Limited English Proficiency

Show pictures that represent the parts of an ecosystem to reinforce the definition. Show a finished drawing of an ecosystem to serve as a model when giving instructions. Have students preview in their first language the definition of ecosystem as this is the underlying concept for the unit.



**Key words:** ecology: el ecología; ecosystem: la ecosistema; living parts: los seres vivos; non-living parts: los seres que no son vivos

### Journal Exercise

The journal is part of this lesson, as students record the place, parts, and connections in their team's ecosystem picture.



**Assessment**

Use the ecosystem drawings and individual journals to assess student understanding of ecosystems.

**Extensions**

Have the students make a drawing of their personal ecosystem in their journals. This picture should include: where they live, where their food and energy comes from, the other people and animals that share their personal ecosystem, etc.

