

Reflect

You wake up early on a Monday morning. You grab something to eat and drink and then go outside to catch the bus. When you arrive at school, you suddenly remember you forgot to do part of your homework! You find a classmate, and she helps you finish up a few science questions. Then you both head into class, where your teacher is starting the school day.



organism:
a living thing

From the time you woke up until the time you started class, you were interacting with your environment. Any behavior in, near, or with something is called an **interaction**. You ate food, drank liquids, breathed air, and relied on other people for help getting to school and finishing your homework. In the same way, **organisms** interact with their environment every day. These interactions help organisms survive. What are some things organisms might interact with? Are they living or nonliving? Can you think of some ways organisms interact with each other?

What is an ecosystem? What are the different parts of an ecosystem?

An **ecosystem** is a community made up of living and nonliving things in their natural environment. **Nonliving things** do not grow, need food, or reproduce. Some examples of important nonliving things in an ecosystem are sunlight, temperature, water, air, wind, rocks, and soil. **Living things** grow, change, produce waste, reproduce, and die. Some examples of living things are organisms such as plants, animals, fungi, and bacteria. Organisms interact with the living and nonliving things in their ecosystem to survive.

A forest is a type of ecosystem. What kinds of living things would you expect to see in a forest? You might see different kinds of animals such as bears, deer, mice, and snails. You might also see plants such as trees and bushes. Other living things in the forest might include mushrooms or even bacteria living in the soil. These living things interact with the nonliving things around them such as sunlight, temperature, water, and soil. They depend on each other to meet their own needs for survival. This is known as interdependency. For example, a tree depends on sunlight for energy and food. A snail depends on plants for food.

What Do You Think?

This bee is collecting pollen from a plant's flower. It uses the pollen to make food for itself and other bees. The bee depends on the plant's flower for food. What living and nonliving things do you think the plant depends on?



How do the nonliving components in an ecosystem support the other components?

Nonliving components are important parts of any ecosystem. Sunlight is one of the most important nonliving components. Light from the Sun helps plants to produce food and oxygen. Sunlight also provides heat that makes life on Earth possible. Without heat from the Sun, living organisms would all die because Earth would be too cold.

Take a deep breath. Every time you breathe, you take in air. Air is a mixture of gases, including nitrogen, oxygen, and carbon dioxide. These gases are nonliving components needed by almost all organisms on Earth.

Water is another important nonliving component. Think about how thirsty you get after you exercise. Your body is telling you that it needs water—you cannot live without it. In fact, about 60% of your body is water!

Temperature is a nonliving component that affects living things in an ecosystem. Think about what happens when

the temperature drops in the winter. Animals move to warmer areas or hibernate, trees lose their leaves and stop growing, and people begin to wear warmer clothing. Soil is another kind of nonliving component. In a desert, the soil is very sandy and has little moisture. It can support only certain plants that have adaptations to live with very little rainfall. In a rain forest, the soil can be poor in nutrients but high in moisture. It supports large trees, long vines, and many other kinds of plants that take up nutrients in the soil right away and often grow quickly.



This plant uses nonliving components such as sunlight, water, and carbon dioxide to produce food and oxygen.

Look Out!

Animals compete with each other for nonliving components such as water. But, animals aren't the only organisms that compete for the resources around them! Plants also compete with each other for nonliving parts of an ecosystem. Suppose a fire destroys a forest. A short while later, new trees start to grow. At first, many young plants may grow in the forest. But some plants, like trees, are able to absorb more water and nutrients and they begin to grow taller. As they grow, they block the sunlight to smaller plants growing below. The smaller plants cannot produce enough food to sustain themselves and die off. Forest ecosystems change because conditions in the forest are constantly changing.

How do the living components in an ecosystem support the other components?

Think about some of the living components of a forest ecosystem. How do they interact with other things in the ecosystem? A forest has plants such as grasses, bushes, and trees. The grasses and bushes provide food to animals like deer and mice. Trees provide shade from the sunlight and shelter to other organisms. Birds help spread the seeds of a plant to new areas of the forest. Earthworms mix and move the soil, which helps circulate nutrients back to the ecosystem. When organisms die, their bodies become part of the soil and provide nutrients to plants and other organisms. The living components of the forest depend on each other for survival.



Animals that eat only plants are called **herbivores**. Animals that eat only other animals are called **carnivores**. A **predator** is a type of carnivore that catches and eats other animals. The animals predators catch and eat are called **prey**. Animals that eat both plants and animals are **omnivores**. How would you classify yourself?

Look Out!

A single type of organism may play more than one part in an ecosystem. For example, you might think of a snake as only a predator. A snake does eat other organisms. But the snake may also be food for another predator. Certain birds like eagles and hawks eat snakes for food. The snake is a predator and also a prey animal for other organisms.

Everyday Life: Medicines from Plants

Suppose you wake up one morning with a headache, a cough, a stuffy nose, and a fever. Your doctor might give you antibiotics to fight the infection. Did you know that the first antibiotics came from a fungus? Scientists discovered that a type of mold called **penicillium** kills certain bacteria that make us sick. This mold was made into a medicine called penicillin. During World War II, penicillin saved the lives of many soldiers who had bacterial infections, and it continues to help people today.

Many of today's medicines come from plants. For example, the cancer drug paclitaxel comes from a yew, which is a type of tree. People with heart problems may take a drug called digitalis, which comes from a plant called foxglove. Some medicines are also manufactured but still based on a natural chemical found in plants.

Try Now

Work with a classmate or a small group to record how you interact with your environment every day.

1. First, find a partner or make a small group.
2. Then, work together to list the living and nonliving components you have interacted with today. See how many you can list in three minutes. Use a watch or a timer to keep track of time. You might want to build a T-chart to help organize your list.
 - For example, you might have eaten a piece of fruit at lunch. Fruit comes from plants, so it would count as a living component.
 - You also may have worn a coat to protect you from the cold. The cold temperature would count as a nonliving component. (If the coat contains fibers from plants, it counts as a living component.)
 - When you are finished, compare your list with another group. What living and nonliving components did the group list? Did it list any that you did not? What do you think are the most important components? Could you live without any of these components?



Try Now

What do you know?

A desert ecosystem is made up of living and nonliving components. Read the list of living and nonliving components below. Where does each component belong? Write the name of each component in the correct column of the table. Then include one way each component interacts with other components in the ecosystem.

- beetle
- hawk
- mouse
- sunlight
- water
- snake
- cactus
- soil

Nonliving	Living	Interaction

Observing Interdependency

To apply what your child has learned about interdependency, take him or her to a natural area nearby. It could be your backyard, a local park, a riverside, a city street, or any area where they might observe organisms in their natural environment. Work with your child to select an organism to observe. It could be an animal, such as a deer, squirrel, or fish. Keep in mind that smaller animals like insects can be found in grass and under rocks. Insects often make fascinating subjects for observation. You may also choose to observe a type of plant or a fungus like a mushroom. Whatever you observe, be safe and do not touch or otherwise disturb the organism.

Write down the ways the organism is interacting with the living and nonliving components around it. For example, a beetle may be interacting with nonliving components by digging in the soil or drinking water. It may be interacting with living components by eating plants, or it may be prey for birds or other insects.



With your child, convert your list into a visual representation of these connections. Use a piece of poster board or butcher paper for your visual. Write the name of your organism at the center and draw a picture of it. Draw lines from the organism to all the living and nonliving components with which it is interacting. Label each interaction on the line between the organism and the component. Feel free to draw lines between many different components. For example, you may connect a beetle with a plant that it is eating, and then draw a line between the plant and the soil that the beetle is digging in. On the line between the plant and the soil you can note that the plant obtains nutrients and water from the soil. The goal is to illustrate that the living and nonliving components in an ecosystem are highly interconnected.

Here are some questions to discuss with your child:

- How is your organism dependent on the living components in its environment?
- How is your organism dependent on the nonliving components in its environment?
- What components are needed by almost all organisms in the environment?
- Which interactions were difficult to observe? How do you know they were happening?