

A green tree frog with red eyes and a red mouth is perched on a green leaf. The frog is looking towards the right. The background is a soft, out-of-focus green.

Habitats & Adaptations

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Habitat and Niche

Every living thing needs a place to live. A red fox lives in a den in a forest of evergreens. A whale lives in the ocean with millions of other sea animals. A moss lives on the floor of a rain forest. The place where a thing lives is its **habitat**. Each living thing must be able to get all the things it needs in its habitat. It needs food and shelter. It needs some amount of space, depending on its size. A habitat also includes things that are not living, such as air, water, and rocks.

In most cases, a number of living things can share a habitat. The fox, for example, might share its den with



other foxes. All the foxes as a group are a *population*. Their habitat is the area of the forest in which they run, play, and find food. Suppose there are also rabbits living in the forest. Foxes often eat rabbits. That is part of fox's **niche**, or part it plays in the ecosystem. Part of a rabbit's niche is to avoid being caught by the fox. Another part is to be food for the fox.

🔊 Near the fox den there might be a herd of caribou and a thick stand of spruce trees. There might be a lake with several kinds of fish. These living things, taken together, form a **community**.



COMPARE AND CONTRAST How is a habitat different from a community?



In a forest, the eagle's habitat is the treetops. Part of its niche is to capture small animals for its young. The squirrel's habitat is a nest in a tree, and the mushroom's habitat is the forest floor.



Interdependence

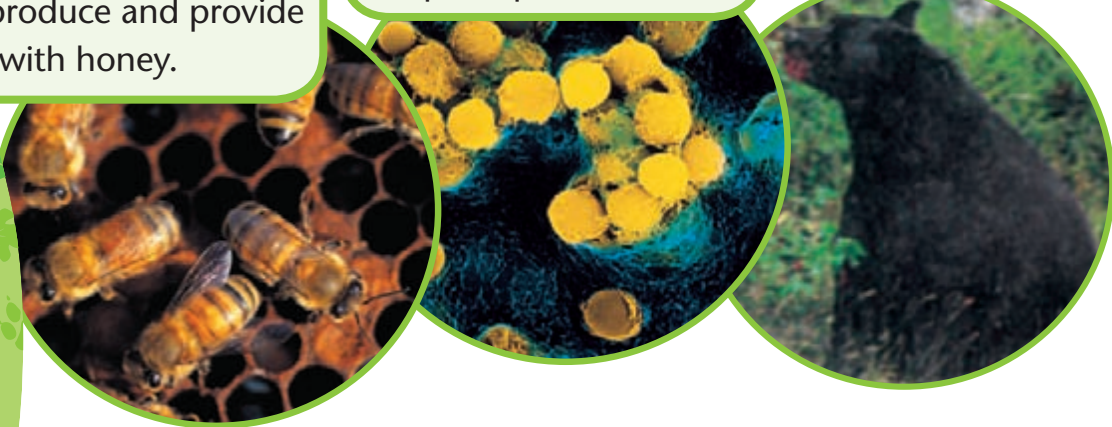
Have you ever thought about how many things in the world depend on other things to happen? We depend on the sun to appear every morning to give us light. We depend on the moon to cause tides in the ocean. We depend on the rain to water our crops. In many ways, things in the natural world are *interdependent*, or depend on one another for survival.

Most of the organisms on Earth depend on plants. Plants depend on the sun to make their own food. Without the sun, there would be no food on Earth. Even animals that eat other animals depend on the sun. This is because the animals that are eaten were once plant eaters. Ecosystems also depend on organisms that break down the remains of dead things. In this way, the food energy in the dead things are returned to the soil for plants and other living things to use.

Beekeepers provide bees with habitats and help them get pollen and nectar. The bees help farmers' plants reproduce and provide us with honey.

The blueberry plant in the forest depends on the sun to make its own food. The plant depends on bees to get pollen to its flowers and help it reproduce.

The bear depends on the blueberries and on insects and other plants and animals for food.



There are many other, smaller examples of interdependence. Without snakes on the prairie, there would be too many mice. If there were too many mice, they would eat all the available seeds. In time, then, the other mice would starve. If that happened, then hawks, which eat mice, would also starve. Another example is an oak tree and a squirrel. The squirrel eats the tree's seeds, but it also carries the seeds to other places where they might sprout and grow into new oak trees.

An important example of interdependence is the bee and the flower. Bees need the nectar of flowers to make honey, and bees spread pollen. So, when a bee enters a flower, it sips nectar and gets pollen on its body. As it goes from flower to flower, it spreads the pollen among the flowers. Once the flowers receive pollen, they can reproduce. The flowers are helped, and so are the bees. For this reason, farmers in many places keep beehives near fruit trees, vegetable crops, and other plants. The bees have their nectar and pollen, and the farmers have their plants pollinated.

Fast Fact

Scientists studied monkeys that follow a path to gather grapes. This was better than picking all the grapes nearest to them. They got more grapes in a shorter period of time.



MAIN IDEA AND DETAILS What does every plant on Earth depend on?

Bees use flower nectar to make honey. As they gather the nectar, they spread pollen, helping plants reproduce.



Change in Ecosystems

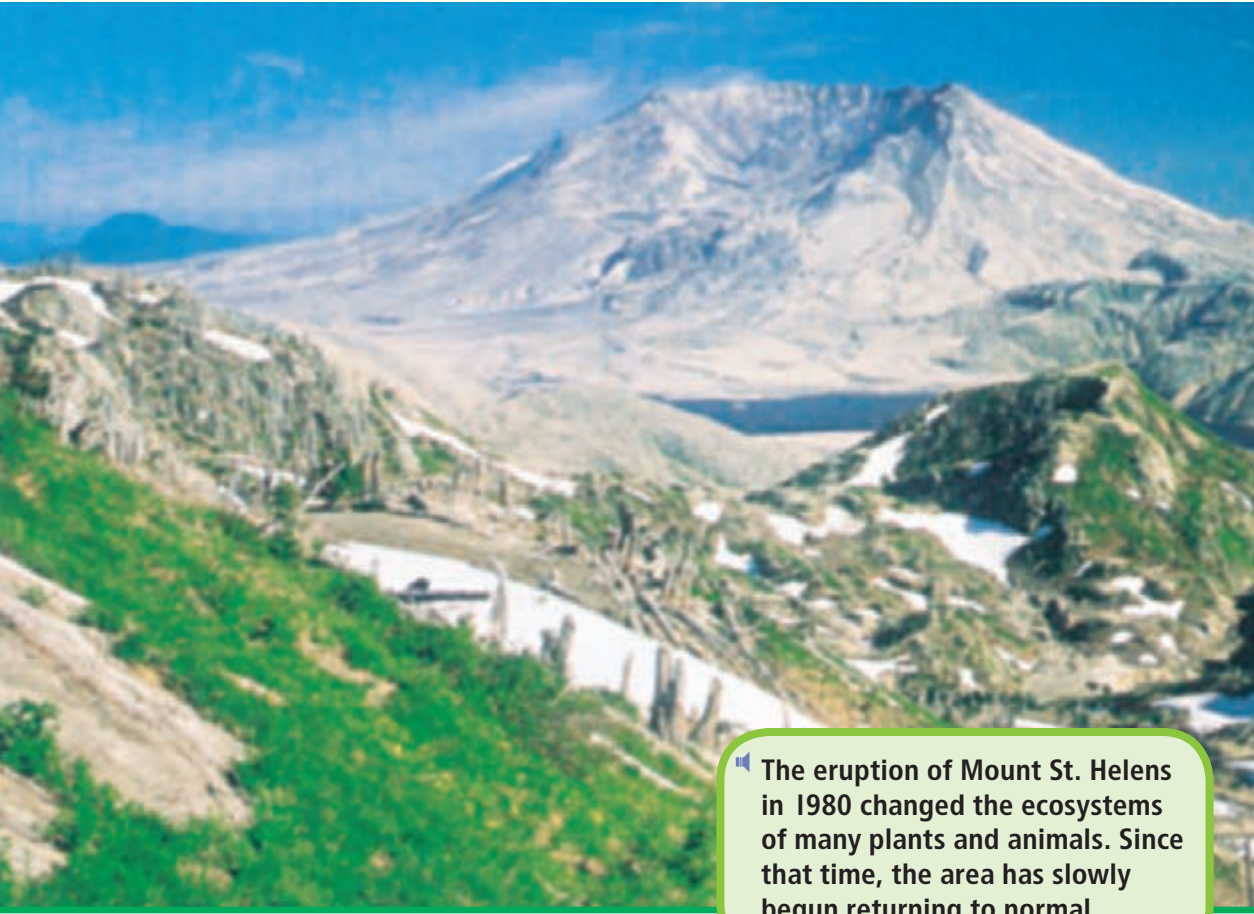
A good example of how animals depend on plants might be the last meal you ate. It probably had fruits or vegetables in it. Other animals, like birds, insects, and squirrels, depend on plants in another way. They make their homes in plants.

Plants also depend on animals. Animals that eat plants keep the plants from spreading too much. This leaves space for different plants to grow near one another.

Because animals and plants depend on each other, any change can have a big effect on an ecosystem. Some changes involve living things. Deer that live in a forest find food from plants and trees that grow there. If there are too many deer, there will not be enough plants and trees in the forest to provide food.

These deer left their usual environment because they had to find food.





■ The eruption of Mount St. Helens in 1980 changed the ecosystems of many plants and animals. Since that time, the area has slowly begun returning to normal.

■ Some deer will leave the forest to find other sources of food, and some will die from a lack of food. There will be fewer deer in the forest. When the plants and trees grow back, there will once again be enough food for the deer.

■ Some changes involve nonliving things. Have you ever lived through a dry summer with little rainfall? If so, you have seen grass or other plants die because they did not get enough water. Often the plants are home to animals. The animals might also die or move elsewhere for food and shelter.



CAUSE AND EFFECT What would happen to the birds in your back yard if their food supply ran out?

Climate and Change

A *climate* is the pattern of weather in a place over a period of time. Your climate may be warm and sunny or cold and rainy. It depends on where you live.

 The climate of a place affects its ecosystems. Some ecosystems provide homes to only a few living things. For example, caribou, a kind of reindeer, live in some of the coldest parts of the world. Most other animals need a warmer climate.

 The climate of a tropical rain forest is warm and wet. Rain forests have the most diversity of all the ecosystems in the world. **Diversity** is the number of different kinds of living things in an ecosystem. In a tropical rain forest, you can find monkeys, birds, butterflies, flowers, and many other animals and plants.

 Whether an environment has a lot of diversity or is made up of just a few living things, climate is important. Because climate includes rainfall, temperature, and sunlight, a change in any of these can have a serious effect.

 Imagine if a desert changed from a dry climate to one with more rainfall. The plants and animals living there would die or move to an ecosystem where they could survive. After some time, other plants and animals that need more rainfall would take their place.

  **CAUSE AND EFFECT** How would a warm, wet climate affect the populations that could live in an ecosystem?



▶ Tropical rain forests provide environments for a great diversity of living things.

Adaptations

All living things have certain needs. Animals need food, water, air, and shelter in order to survive. They get their food from other animals and plants. Zebras eat grass. Lions and leopards eat other animals. Most people eat plants, such as fruits and vegetables, and animals, such as chickens and cows.

Plants make their own food. In order to make the food, plants need to have sunlight. They also need water from rainfall and nutrients from soil.

Plants and animals have adaptations. An **adaptation** is a body part or a behavior that helps a living thing survive. For instance, birds have feathers. Their feathers keep them warm and dry. Birds also have a smooth surface and spaces in their bones that make them light. This helps them fly easily.

Birds that do not fly have different adaptations. Ostriches have long legs and feet with two toes, so they can run very quickly. Penguins have adaptations that help them swim in ocean waters.

This eagle's feathers are designed to help it fly at great heights and with great speed.



▮ This frog's color helps it hide from its enemies.



Fast Fact

- ▮ There are frogs in the country of Madagascar whose brown and yellow coloring and rough covering hide them well. The frogs look as though they are part of the mud and trees where they live!

▮ Some animals, such as chameleons and certain snakes, can change color. These animals can hide from their enemies.

▮ Another adaptation is the ability to move from one place to another. Whales, birds, and butterflies travel south to warm climates during wintertime. They return north when the weather is warm again.



MAIN IDEA AND DETAILS Give an example of how animals adapt to changes in their environment. Try to think of an example that has not been used in this book.

Survival

All plants and animals are suited for their environments. They all have adaptations—or body parts or behaviors—that make them fit to live where they do. A plant or an animal that does not get what it needs from its environment must move, or it may die.

 Many living things survive by looking or behaving in ways that help them avoid their enemies. For example, the porcupine has sharp quills. Some animals roll into a ball or play dead. Many insects and sea animals actually look like some other object, such as a rock, to fool other animals. Other organisms have ways of getting rid of species that would use the resources in a place. Certain plants do this by giving off substances that are deadly to other plants.

 The cheetah survives by eating its prey, an antelope. This can also help the antelope population survive by doing away with weak, sick, and old animals.





🔊 The iguana's tough, leathery scales help it survive attacks by other animals that want to eat it.

🔊 Some living things are sensitive to their environments and cannot survive when conditions change. For example, certain kinds of mosses cannot survive where the air is polluted. In some parts of the world, species of frogs have been dying off. Many scientists say that this is because of pollution.

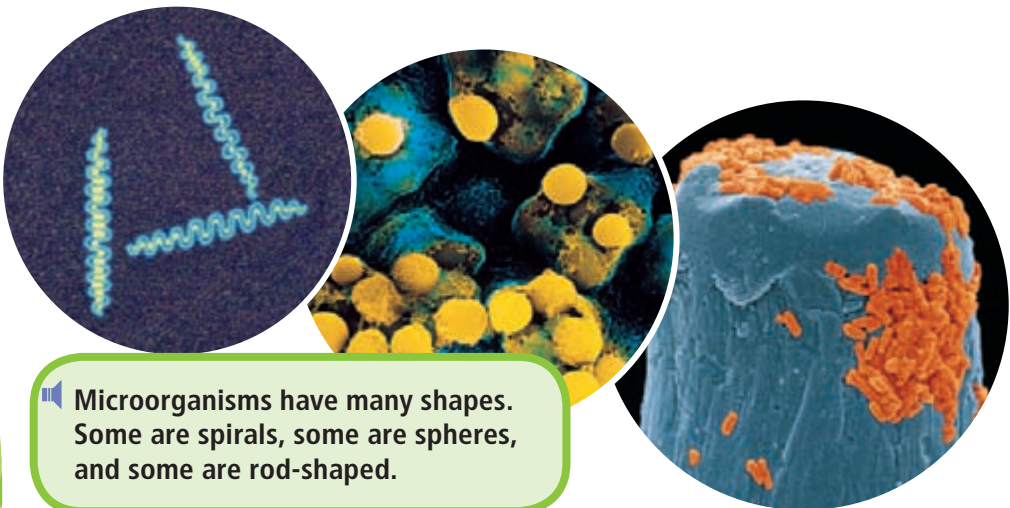
🔊 Sometimes, animals are unable to escape being eaten. Sad as it may seem, this enables other animals to survive. Even among one kind of animal, such as deer, there can be a contest for survival. For example, in an especially cold winter, not all deer get enough to eat. The ones that are not strong enough to fight for the food will die, and the strong ones will survive.

Microorganisms

Have you ever used a microscope? If so, you have probably seen *microorganisms*, or living things too small to be seen with the eyes alone. There are many kinds of microorganisms. Some have only one cell. Some are like plants in that they make their own food. Others are like animals in that they can move and get nutrients from other living things.

You might think of germs when you think of microorganisms. Actually, most microorganisms are not harmful. In fact, many are helpful. For example, some kinds of bacteria are used to make cheese and yogurt or to make bread rise. Other microorganisms help people digest their food. Still others help return nitrogen, an important plant nutrient, to the soil. There are even bacteria that help clean up oil spills.

Some bacteria have the important job of helping “recycle” nutrients back into the environment. When a plant or an animal dies, microorganisms break down the materials in it. This returns the materials and nutrients to the soil and makes soil rich.



Microorganisms have many shapes. Some are spirals, some are spheres, and some are rod-shaped.

Algae are other important microorganisms. Algae, which are like plants, live in fresh water and salt water everywhere on Earth. You may recall that plants make their own food and give off oxygen. This is what algae do, too. In fact, algae make much of the oxygen on Earth. They also are food for millions of water animals.

Of course, there are microorganisms that are harmful to people, plants, and animals. Some cause disease and infection, and others make substances that poison living things. However, there are more kinds of helpful and harmless microorganisms than there are harmful ones.



MAIN IDEA AND DETAILS What are two important things algae do?

Summary

Every living thing has a habitat, or place to live, and its own niche, or role it plays in its ecosystem. Living things depend on one another, on other living things, and on nonliving things to meet their needs. Living things in ecosystems may experience changes, such as climate changes, lack of food or water, too many predators, and severe weather events. When changes happen, plants may die since they cannot move. However, animals might survive if they can find better homes. Animals must be suited to live in their environments. If they are not, they may not be able to survive. Microorganisms, most of which are helpful, have important jobs in the environment.



Glossary

-  **adaptation** (ad•uhp•TAY•shuhn) A body part or a behavior that helps a living thing survive in its environment (10, 11)
-  **community** (kuh•MYOO•nuh•tee) All the populations of organisms living together in an environment (3)
-  **diversity** (duh•VER•suh•tee) A great variety of living things (8)
-  **habitat** (HAB•ih•tat) The place where an organism lives (2)
-  **niche** (NICH) The role, or part, an animal or a plant plays in its ecosystem (3)

Think and Write

-  **1.** What do we mean when we say that animals and plants in an ecosystem depend on one another?
-  **2. MAIN IDEA AND DETAILS** What is an example of a change that could affect an ecosystem?
-  **3. CAUSE AND EFFECT** Why are animals adapted to their environment?
-   **4. Expository Writing** Think about the animals and plants in an ecosystem and what they need to live. Describe how living and nonliving things in an ecosystem might change and affect one another.

Hands-On Activity

Draw a set of diagrams or make two small models showing an ecosystem before and after some kind of change. The change might be a drought, a flood, a lack of predators, or something else. Label your diagrams or models.

School-Home Connection

Ask an adult to take you to a nearby stream or park. Together, make a list of all of the living things you can see or imagine in that environment. Discuss how the living things depend on one another.