

## Chapter Quiz

Write your answers on a separate sheet of paper.

1. What are three animals that carry diseases?
2. How do hairs in your nose help your body fight diseases?
3. How do white blood cells destroy bacteria?
4. What are three diseases caused by viruses?
5. What are the six kinds of nutrients you need for a healthy diet?
6. What do carbohydrates do for your body?
7. If you needed more protein in your diet, what foods would you need to eat?
8. What kinds of foods should you eat the least of? Why?
9. What are two diseases caused by smoking cigarettes?
10. How does exercise help you to stay healthy?

### Test Tip

When you are asked questions that begin with *How* or *Why*, answer in complete sentences. Read your answers to make sure they are sentences and that they answer the question.

### Research Project

Make a poster of a food pyramid based on the Food Guide Pyramid on page 177. Look through newspapers and magazines for pictures of foods. Choose one food from each food group to research. Find out how many grams of protein, carbohydrates, and fat are in one serving of each. Also look for amounts of cholesterol. Put all of this information on the poster.



*Zebras live in Africa on grasslands called savannas. What living things do zebras need to live and grow? What nonliving things do zebras need?*

## Learning Objectives

- Identify resources that are recycled in nature.
- Compare populations and communities.
- Describe how organisms interact with nonliving things in an ecosystem.
- Give an example of a food chain and a food web.
- Identify energy sources from the past.
- Explain the water and air cycles.
- Identify reasons for conserving natural resources.
- LAB ACTIVITY: Make models of food chains.
- SCIENCE IN YOUR LIFE: Relate recycling of garbage to preserving natural resources.

## Words to Know

<b>recycling</b>	reusing a substance over and over again
<b>habitat</b>	the place where an organism lives
<b>population</b>	all the members of a species living in the same place
<b>community</b>	a group of different populations living in the same place and interacting with each other
<b>ecosystem</b>	a community and all the nonliving things that the community interacts with
<b>food chain</b>	the path of food through a community
<b>producer</b>	an organism that makes its own food
<b>consumer</b>	an organism that eats other organisms
<b>food web</b>	a group of food chains that are linked to each other
<b>decomposer</b>	an organism that breaks down and absorbs nutrients from dead matter
<b>fossil fuel</b>	a fuel made of organisms that died millions of years ago
<b>solar energy</b>	energy from the sun
<b>evaporation</b>	the process by which a liquid changes to a gas
<b>condensation</b>	the process by which a gas changes to a liquid
<b>natural resource</b>	a substance found in nature that is useful to humans
<b>conservation</b>	the wise and careful use of natural resources

**13-1****Living Together****Words to Know**

<b>recycling</b>	reusing a substance over and over again
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<b>community</b>	a group of different populations living in the same place and interacting with each other
<b>ecosystem</b>	a community and all the nonliving things that the community interacts with

**Recycling Resources**

Take a breath of air. That same air might have been breathed by Christopher Columbus in 1492 or even Cleopatra in ancient Egypt. The air that our bodies use has been around for millions of years. We breathe it again and again. In fact, all the air, water, and food our bodies take in has been used before. Reusing a substance over and over is called **recycling**.

Nature recycles its resources. A resource is anything that an organism can use to live. All organisms share resources on Earth. Also, many organisms depend on each other to meet basic needs, such as eating food.

✓ **What happens to nature's resources on Earth?**

**Habitats**

A **habitat** is the place where an organism lives. A habitat can be a small place or a big place. For example, a bird's habitat is the tree in which it builds its nest. However, the entire forest where the bird lives can also be called its habitat.

All the members of a species living in the same place make up a **population**. For example, all the bullfrogs in a pond are a population. All the pine trees in a forest are a population. All the people in a city are a population.

One place can be the home of many populations. A group of different populations living in the same place and interacting with each other is called a **community**. All the plants and animals living in a desert make up the desert community. All the organisms living in a mud puddle make up the mud puddle community.

Organisms in a community interact with each other. Animals eat plants and other animals. Plants make oxygen for animals. Dead organisms provide bacteria with food.

✓ **How are habitats, populations, and communities related to each other?**

## Ecosystems

An **ecosystem** is a community and all the nonliving things that the community interacts with. For example, animals breathe in oxygen from the air. Plants take in water from the soil through their roots. All living things depend on each other and on nonliving things.

### Remember

The study of how living things depend on each other is called ecology.



Figure 13-1 *A desert community includes all the organisms that live there.*

Ecosystems are made up of many parts working together, just like the systems in the human body. An ecosystem that works smoothly is said to be in balance. A balanced ecosystem helps the organisms in it to survive.

✓ What happens in a balanced ecosystem?

### Changing Communities

Over time, communities can change. For example, over many years, leaves and branches fall into a pond. Soil washes into the pond, too. As it fills up, the pond becomes shallower. The fish in the pond die and sink to the bottom. Nutrients from the dead fish make the soil on the pond floor rich. More and more plants grow in that soil. Slowly, the pond fills in. The pond becomes a meadow. Mice and rabbits move onto the meadow. Grass grows. Then bigger bushes grow. Finally, trees take root. The pond has become a forest.

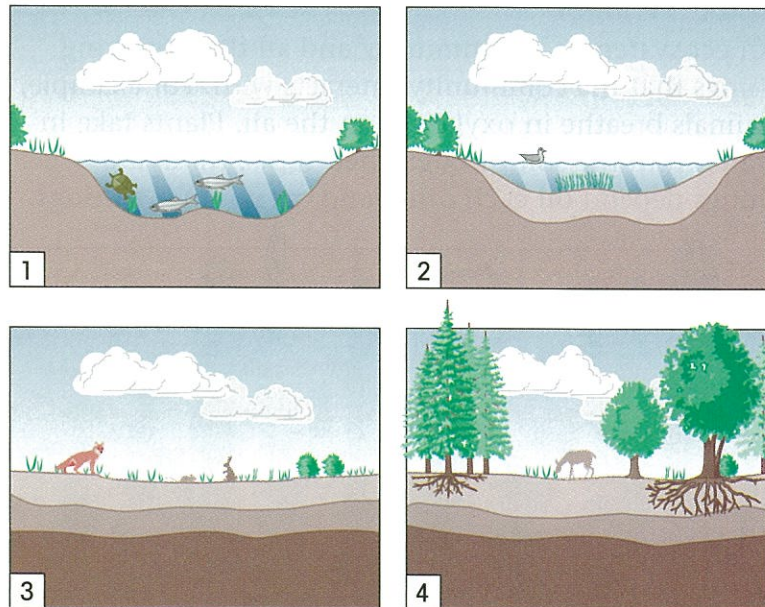


Figure 13-2  
*Over hundreds or even thousands of years, a pond may change into a forest.*

✓ What may happen to a community over the years?

## Lesson Review

1. What are three resources that nature recycles?
2. What makes up a community?
3. List two nonliving things that organisms interact with in an ecosystem.
4. **CRITICAL THINKING** As a pond changes into a forest, what happens to the types of organisms that make up the community?

## A Closer Look

### CHANGING COMMUNITIES

On May 18, 1980, the volcano Mount St. Helens in Washington blew its top. Rocks, ash, and hot gases swept across the forest nearby. Trees burned down or snapped in half. A thick layer of rock and ash settled over the land. Many plants, animals, and other organisms were killed. The forest community was destroyed.

With time, plants and animals moved into the area. Winds blew seeds and insects onto the land. The insects ate the seeds. Deer mice arrived. They ate the seeds and the insects. Some of the seeds grew into small plants. The soil became richer as the organisms died and decayed. Larger plants can now grow in the richer soil. They will provide food and shelter for other animals. Eventually, a forest will cover the area once again.

**CRITICAL THINKING** Why didn't the deer mice move into the area before the seeds and insects?



*Life is returning to Mount St. Helens.*

## 13-2

## Using Nature's Resources

## Words to Know

<b>food chain</b>	the path of food through a community
<b>producer</b>	an organism that makes its own food
<b>consumer</b>	an organism that eats other organisms
<b>food web</b>	a group of food chains that are linked to each other
<b>decomposer</b>	an organism that breaks down and absorbs nutrients from dead matter
<b>fossil fuel</b>	a fuel made of organisms that died millions of years ago
<b>solar energy</b>	energy from the sun
<b>evaporation</b>	the process by which a liquid changes to a gas
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<b>natural resource</b>	a substance found in nature that is useful to humans
<b>conservation</b>	the wise and careful use of natural resources

## Food Chains and Webs

All the organisms in a community need food. The plants make their own food. Some of the animals eat the plants. Other animals eat the animals that feed on the plants. The path of food through a community is called a **food chain**. A community may have many food chains.

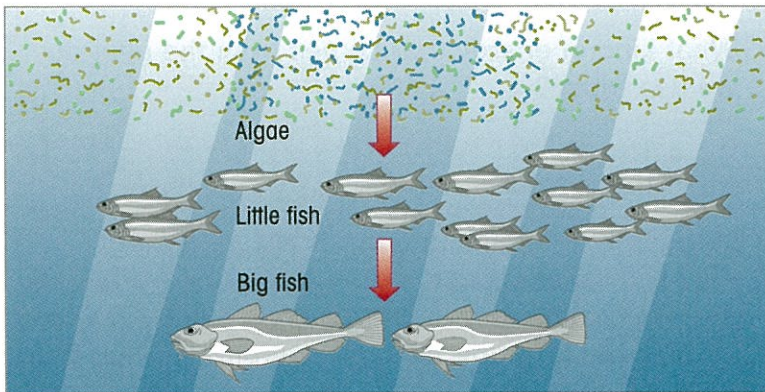
Every food chain begins with a **producer**. A producer is an organism that makes its own food. Green plants and other organisms that have chlorophyll in their cells are producers. Many producers are eaten by consumers. A **consumer** is an organism that eats other organisms. Animals, fungi, most bacteria, and some protists are consumers.

**Remember**

Green plants make food from chlorophyll, sunlight, water, and carbon dioxide.



Most consumers eat several kinds of food. They are part of more than one food chain. So the different food chains in a community are usually linked to each other. Together, the linked food chains make up a **food web**.



**Figure 13-3** *In the ocean, algae are at the beginning of the food chain.*

Some consumers, such as certain bacteria and fungi, are also decomposers. A **decomposer** is an organism that breaks down and absorbs nutrients from dead matter. Decomposers break down the large molecules in dead organisms into smaller molecules. Some of these molecules are absorbed as food for the decomposer. Others become part of the soil. Plants use the molecules to live and grow. The continuous movement of food through a community forms a *food cycle*.

✓ **What is the difference between a producer and a consumer?**

## Energy from the Past

When you drive a car, you are using dead plants and animals. That is because gasoline is a **fossil fuel**. A fossil fuel is made of organisms that died millions of years ago. Deep in the Earth, heat and pressure slowly changed the remains of dead organisms into coal, oil, and natural gas. People discovered that they could burn these materials for energy.

**Remember**  
Fossils are the remains of organisms that lived long ago.

The Earth has only limited amounts of fossil fuels. Other sources of energy are needed. Scientists are working on ways to trap the sun's energy. Energy from the sun is called **solar energy**. Solar energy is often used today to heat homes.

✓ **What kind of energy that comes from the past do we use today?**

## The Water Cycle

There is only a certain amount of water on Earth. People and other organisms use that water again and again. The water continuously moves to different parts of the Earth. Rainwater falls to the ground. Water in the ground runs into streams. Streams run into rivers. Rivers run into lakes and oceans.

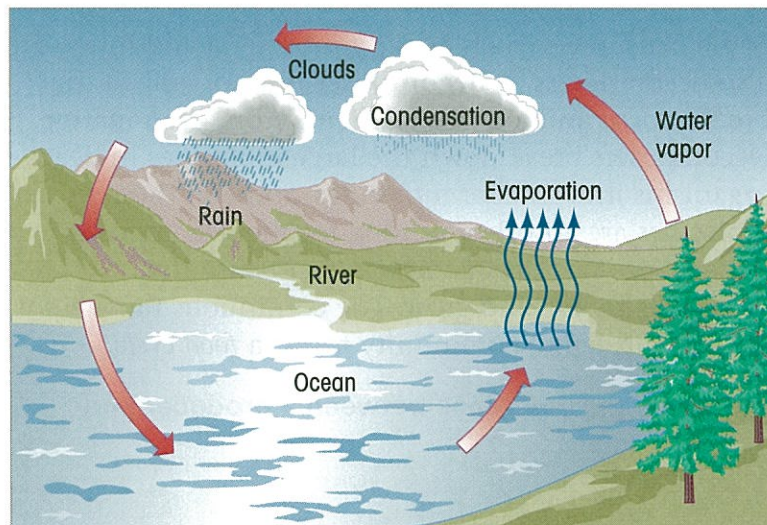


Figure 13-4 *Water is recycled in the water cycle.*

When water heats up, it changes into a gas called water vapor. This process is called **evaporation**. The sun's energy causes water to evaporate from the land and bodies of water. Plants and other organisms release water vapor into the air.

When water vapor cools, it changes to a liquid. This process is called **condensation**. As water vapor rises into the sky, it condenses and forms clouds. Later, the water falls to Earth again as rain or snow. The continuous movement of water on Earth is called the *water cycle*.

✓ What are two processes in the water cycle?

### The Oxygen and Carbon Dioxide Cycle

The recycling of air involves two processes that you already know about—photosynthesis and respiration. When green plants carry out photosynthesis, they give off oxygen as a byproduct. People and other organisms use this oxygen for respiration.

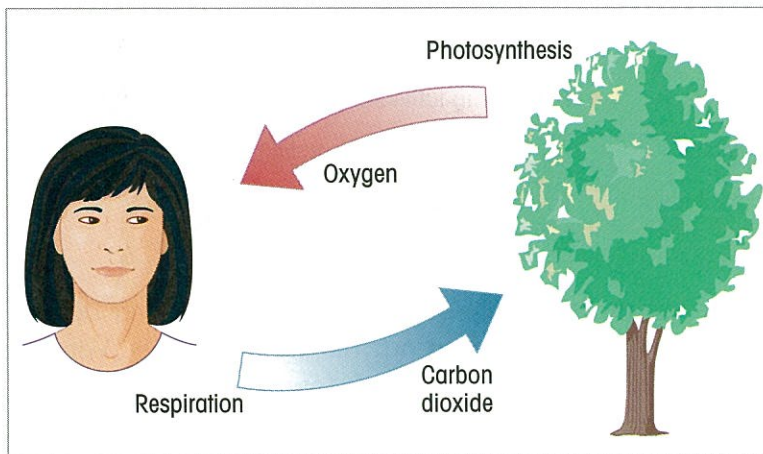


Figure 13-5 *Plants and animals constantly recycle oxygen and carbon dioxide.*

Remember that carbon dioxide is a waste product of respiration. Carbon dioxide is a gas that plants need for photosynthesis. As you can see, oxygen and carbon dioxide constantly cycle between plants and animals. Organisms need each other.

✓ What two gases are recycled by organisms?

## Natural Resources and Conservation

Water, air, soil, minerals, forests, wildlife, and fossil fuels are substances found in nature that are useful to humans. Each is a **natural resource**. For example, people use fossil fuels to produce energy. Air and water are needed for our health. Some things in nature, such as mountains and waterfalls, are called natural resources simply because they are pleasing to our senses.

Resource	How People Use It
Water	For living and growing, cooking, washing, producing electricity, manufacturing, transportation
Air	For breathing, inflating tires and other objects, manufacturing
Soil	For growing plants
Minerals	For getting nutrients, fertilizing, manufacturing
Forests	For making furniture, paper, fuel, recreation
Wildlife	For food, medicine, recreation
Fossil fuels	For fuel for vehicles, factories, and electric power plants

There are more people on Earth today than ever before. We are using up many of our natural resources. Very old forests have been chopped down. Many plant and animal species have been killed off. The loss of any type of organism can harm other populations in that organism's habitat. For example, an organism could be a food source for other organisms. Its loss can destroy the balance of a whole ecosystem.

**Conservation** is the wise and careful use of natural resources. More and more people are realizing how delicate the Earth's ecosystems are. These people argue that we must save the Earth's natural resources for the future. They say we must keep the air and water clean.

We must stop the extinction of species. This will help preserve our planet's ecosystems.

✓ List three examples of natural resources.

## Lesson Review

1. Draw and label a food chain that includes big fish, algae, and little fish.
2. How does water move in the water cycle?
3. How do the processes of photosynthesis and respiration help recycle the air?
4. **CRITICAL THINKING** Why is it important to use fossil fuels wisely?

## On the Cutting Edge

### LESS GASOLINE FOR CARS OF THE FUTURE

In 1974, the average car used 1 gallon (about 4 liters) of gasoline for every 14 miles (about 23 kilometers) it traveled. Today, many cars can travel twice as far on 1 gallon of gasoline. Even so, researchers are working on designing cars that use even less gasoline. One way to make cars go farther on less fuel is to make them lighter in weight. The lighter the car, the less gasoline it uses. Researchers are now designing and testing cars made of materials, such as aluminum and plastic, that are lighter than steel. Researchers hope that within the next few years, cars will be up to 40 percent lighter and be able to travel 100 miles (160 kilometers) per gallon.

**CRITICAL THINKING** What other qualities should lightweight materials that are used for cars have?



*Lightweight cars, such as this car made of aluminum, use less gasoline.*



## LAB ACTIVITY

### Making Models of Food Chains

#### BACKGROUND

The plants in a community make their own food. The animals eat the plants or other organisms. The path of food through a community is called a food chain.

#### PURPOSE

You will make models of two different food chains to see how organisms depend on each other.

#### MATERIALS

pencil, 6 hole-punched index cards, pieces of yarn, paper

#### WHAT TO DO

1. Write the name of each organism from the chart above on a separate index card.
2. The chart lists some foods that the organisms eat. Use the information in the chart to make a model food chain. Include at least three of the organisms. Remember that a food chain begins with a producer. Make the model food chain by using the yarn to connect the correct index cards.
3. Draw and label the model you made on a separate sheet of paper.
4. Now make a second food chain, following Steps 1 to 3. You may need to take apart your first model.

#### DRAW CONCLUSIONS

- What can you now say about the organisms in a community?
- What would you have if you arranged several different food chains so that the organisms were connected?

Desert Organisms	Foods They Eat
Plants	Make their own food
Lizards	Grasshoppers
Rats	Plants, Grasshoppers
Hawks	Snakes, Rats
Grasshoppers	Plants
Snakes	Rats

## SCIENCE IN YOUR LIFE

### Recycling Garbage

People in the United States produce hundreds of millions of tons of garbage every year. These wastes must be thrown out, or disposed of, properly to avoid health problems.

Most of the solid wastes that we produce are buried in large pits called *landfills*. Some wastes are burned. But there are problems with these methods of waste disposal. Many of the landfills are filling up quickly. Burning wastes pollutes the air.

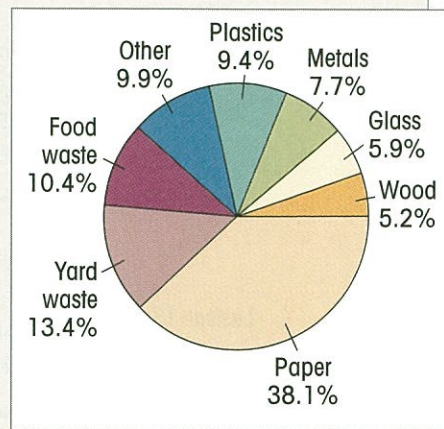
Recycling garbage can help solve the problem of waste disposal. When people recycle garbage, they reuse the wastes instead of disposing of them. The pie graph on this page compares the amounts of different kinds of wastes that people produce. Notice that about 38% of the wastes are paper. Paper, glass, metal, plastics, and yard wastes can all be recycled. That is more than 70% of all the wastes we produce.

Many communities collect garbage and take it to a processing center. The garbage is sorted and then melted, shredded, or crushed. The new material is used to make products such as newspapers and aluminum cans.

**Find out how much recyclable garbage you and your family produce.**

1. Copy the chart. Collect the different types of garbage listed in the chart for one week.
2. Record the number of items you collected of each type of garbage.

If possible, take everything you have collected to a recycling center.



*Different types of wastes are produced by people.*

Source: Environmental Protection Agency

Type of Recyclable Garbage	Number of Items Collected
Paper	
Plastic	
Glass	
Metal	

#### Critical Thinking

What can you do to produce less garbage?

**Summary**

Organisms depend on each other for food. They also depend on nonliving things, such as air, water, soil, and sunlight. Many of our natural resources are recycled so they can be shared.

**Lesson 13.1**

A community is a group of different populations living in the same place. A community and the nonliving things it interacts with make up an ecosystem. Most communities change over time.

**Lesson 13.2**

All organisms are part of food chains and food webs. Water, oxygen, and carbon dioxide constantly cycle between organisms and different parts of the Earth. Water, air, soil, forests, wildlife, minerals, and fossil fuels are all natural resources that must be used wisely.

natural resource

conservation

habitat

condensation

recycling

solar energy

ecosystem

food web

**Vocabulary Review**

Match each definition with a term from the list.

1. A community and all the nonliving things with which the community interacts
2. Reusing a substance over and over again
3. The place where an organism lives
4. A substance found in nature that is useful to humans
5. Energy from the sun
6. The process by which a gas changes to a liquid
7. A group of food chains that are linked to each other
8. The careful use of natural resources



## Chapter Quiz

Write your answers on a separate sheet of paper.

1. What is the difference between a population and a community?
2. How do plants get water in an ecosystem?
3. What happens to many communities over long periods of time?
4. Rabbits eat plants. Foxes eat rabbits. Do rabbits, foxes, and plants form a food chain? If yes, draw a diagram of the chain.
5. Are you a producer or a consumer? Explain your answer.
6. How do decomposers help plants?
7. What are three fossil fuels?
8. What process causes water to leave the ocean and enter the air?
9. What two processes are involved in the recycling of air?
10. Why should people conserve natural resources?

### Test Tip

Answer the questions you are sure of first. Then go back and answer those you need to think more about. Be sure that the number of each answer matches the number of its question.

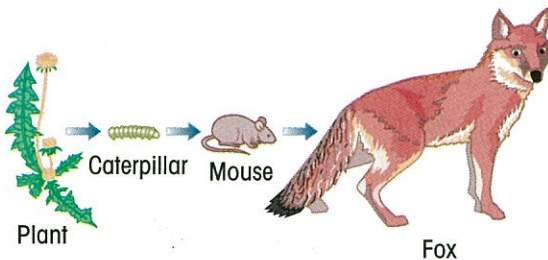
### Research Project

Research one food chain for each of five different ecosystems. For example, you could find food chains for a desert community, an ocean community, a rain forest community, a woodlands community, and an Arctic community. Draw and label the food chain. Label the producers, the consumers, and the decomposers.

## Unit 3 Review

Choose the letter for the correct answer to each question.

Use the diagram below to answer Questions 1 and 2.



- Which organisms in the food chain diagram above are consumers?
  - fox, mouse, and caterpillar
  - fox and mouse
  - mouse and caterpillar
  - plant and caterpillar
- Which is the producer?
  - fox
  - mouse
  - plant
  - caterpillar
- What is a group of food chains that are linked to each other called?
  - a food cycle
  - a food web
  - photosynthesis
  - an ecosystem
- What carries messages between your brain and other parts of your body?
  - glands
  - brain stem
  - tendons
  - neurons
- What are the main organs of the respiratory system called?
  - lungs
  - feet
  - ears
  - kidneys
- Which cells help the body fight disease?
  - red blood cells
  - bacteria
  - white blood cells
  - viruses
- Which nutrients should make up the smallest part of your diet?
  - carbohydrates
  - fats
  - proteins
  - water

### Critical Thinking

The organs and systems of the human body all work together to help a person survive. How is this like an ecological community?