

# Using Natural Resources

## Earth's Resources


### ..... Before You Read .....

<b>What do you think?</b> Read the two statements below and decide whether you agree or disagree with them. Place an A in the Before column if you agree with the statement or a D if you disagree. After you've read this lesson, reread the statements to see if you have changed your mind.		
Before	Statement	After
	1. The world's supply of oil will never run out.	
	2. You should include minerals in your diet.	

### ..... Read to Learn .....

## Natural Resources

Where does the electricity for electric lights come from? It might come from a power plant that burns coal or natural gas. Or it might come from rooftop solar panels made with silicon, a mineral found in sand.

The smallest microbe and the largest whale rely on materials and energy from the environment. The same is true for humans. People depend on the environment for food, clothing, and fuels to heat and light their homes. *Parts of the environment that supply materials useful or necessary for the survival of living things are called **natural resources**.* Natural resources include land, air, minerals, and fuels. For example, trees and water are natural resources. 

## Nonrenewable Resources

Do you travel in a vehicle that runs on gasoline? Do you drink soda from aluminum cans or water from plastic bottles? Gasoline, aluminum, and plastic are made from nonrenewable resources.

**Nonrenewable resources** are natural resources that are being used up faster than they can be replaced by natural processes. Nonrenewable resources form slowly, usually over thousands or millions of years. If they are used faster than they form, they will run out. Nonrenewable resources include fossil fuels and minerals.

### Key Concepts

- What are natural resources?
- How do the three types of natural resources differ?

### Study Coach

**Building Vocabulary** Work with another student to write a question about each vocabulary term in this lesson. Answer the questions and compare your answers. Reread the text to clarify the meaning of the terms.

### Key Concept Check

**1. Define** What are natural resources?

---



---



---

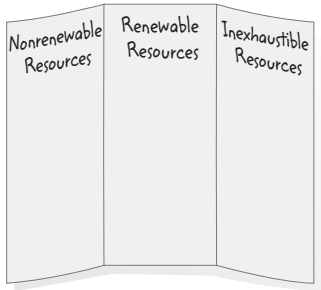


---



---

Make a horizontal tri-fold book and use it to identify similarities and differences among the types of resources.



**✓ Reading Check**

**2. Identify** three products that are made from oil.

---



---



---

**✓ Reading Check**

**3. Summarize** Why are minerals nonrenewable?

---



---



---



---



---

## Fossil Fuels

Fossil fuels include coal, oil, and natural gas. The fossil fuels we use today formed from the decayed remains of organisms that died millions of years ago. Fossil fuels are forming all the time, but we use them much more quickly than nature replaces them.

Fossil fuels form underground. Coal is mined from the ground. Some coal mines are on the surface, and others are underground. The coal that is mined today formed from the decayed remains of trees, ferns, and other swamp plants that died 300–400 million years ago. The fossil fuels oil and natural gas are drilled from the ground.

Fossil fuels are mainly used as sources of energy. Many electric power plants burn coal or natural gas to heat water and make steam that powers generators. Natural gas also is used to heat homes and businesses. Gasoline, jet fuel, diesel fuel, kerosene, and other fuels are made from oil. Most plastics also are made from oil. ✓

## Minerals

Have you ever added fertilizer to the soil around a plant? Fertilizers contain the minerals phosphorus and potassium. These minerals promote plant growth. Humans also need minerals for good health. Calcium and magnesium are two minerals the human body needs.

Minerals are nonliving substances found in Earth's crust. People use minerals for many purposes. The mineral gypsum is used in wallboard and cement. Silicon has many uses in industry. It is important for the manufacture of computers and other electronic devices. Copper is widely used in electrical wiring.

Uranium is a mineral that can be used as a source of energy. In a nuclear power plant, the nuclei of uranium atoms are split apart. This reaction is known as nuclear fission. Some of the energy that held the nuclei together is released as thermal energy. This thermal energy is then used to boil water and produce steam, which generates electricity.

Like fossil fuels, minerals are formed underground by geologic processes over millions of years. For that reason, most minerals are considered nonrenewable. Some minerals, such as calcium, are plentiful. Others, such as large rubies, are rare. ✓

# Renewable Resources

Supplies of many natural resources are constantly renewed by natural cycles. The water cycle is an example. When liquid water evaporates, it rises into the atmosphere as water vapor. Water vapor condenses and falls back to the ground as rain or snow. Water is a renewable resource.

**Renewable resources** are natural resources that can be replenished by natural processes at least as quickly as they are used. These resources do not run out because they are replaced in a fairly short period of time. Renewable resources include water, air, land, and living things.

Renewable resources are replenished by natural processes. Still, they must be used wisely. If people use any resource faster than it is replaced, it becomes nonrenewable. A forest can be a nonrenewable resource if the trees are cut down faster than they can be replaced. ✓

## Air

Green plants produce almost all of the oxygen in the air we breathe. Oxygen is a product of photosynthesis. Remember that photosynthesis is a series of chemical reactions in plants that use energy from light and produce sugars. Without plants, Earth's atmosphere would not contain enough oxygen to support most forms of life.

Air also contains carbon dioxide (CO<sub>2</sub>), which plants need for photosynthesis. CO<sub>2</sub> is released into the air when dead plants and animals decay, when fossil fuels or wood are burned, and as a product of cellular respiration in plants and animals. Cellular respiration is a series of chemical reactions that convert energy from food into a form usable by cells. Without CO<sub>2</sub>, photosynthesis would not be possible.

## Land

Fertile soil is an important resource. Topsoil is the upper layer of soil that contains most of the nutrients plants need. Gardeners know that topsoil can be replenished by the decay of plant material. The carbon, nitrogen, and other elements in the decomposing plants become available for the growth of new plants.

Topsoil can be classified as a renewable resource. However, if it is carried away by water or wind, it can take hundreds of years to rebuild. Land resources also include wildlife and ecosystems such as forests, grasslands, deserts, and coral reefs. ✓

### ✓ Reading Check

**4. Compare** In what way are renewable and nonrenewable resources similar?

---

---

---

---

---

### 💡 Think it Over

**5. Generalize** Do you think humans could survive if most of the plants on Earth died? Why or why not?

---

---

---

---

### ✓ Reading Check

**6. Consider** How is topsoil replenished by natural processes?

---

---

---

---

## Math Skills

Converting a ratio to a percentage often makes it easier to visualize a set of numbers. For example, in 2007, 101.5 quadrillion units (quads) of energy were used in the United States. Of that, 6.813 quads were produced from renewable energy sources. What percentage of U.S. energy was produced from renewable energy sources?

Set up a ratio of the part over the whole.

$$\frac{6.813 \text{ quads}}{101.5 \text{ quads}}$$

Rewrite the fraction as a decimal.

$$\frac{6.813 \text{ quads}}{101.5 \text{ quads}} = 0.0671$$

Multiply by 100 and add %.

$$0.0671 \times 100 = 6.71\%$$

**7. Use Percentages** Of the 101.5 quads of energy used in 2007, 0.341 quads were from wind energy. What percentage of U.S. energy came from wind?

### Key Concept Check

**8. Differentiate** How do inexhaustible resources differ from renewable and nonrenewable resources?


## Water

Can you imagine a world without water? All organisms require water to live. People need a reliable supply of freshwater for drinking, washing, and irrigating crops. People also use water to run power plants and factories. Oceans, lakes, and rivers serve as major transportation routes and recreational areas. They are important habitats for many species, including some that people depend on for food.

Most of Earth's surface is covered by water. But only a small amount of that water is freshwater that people use. Freshwater is renewed through the water cycle. The total amount of water on Earth always remains the same.

Has your community ever been asked to conserve water because of a drought? A drought can cause a shortage in the supply of freshwater. In many large cities, water is transported from hundreds of miles away to meet the needs of residents. In some parts of the world, people must travel long distances every day to get water.

## Inexhaustible Resources

An **inexhaustible resource** is a natural resource that will not run out, no matter how much of it people use. Energy from the Sun, solar energy, is inexhaustible. So is wind, which is generated by the Sun's uneven heating of Earth's lower atmosphere. Another inexhaustible resource is thermal energy from within Earth. 

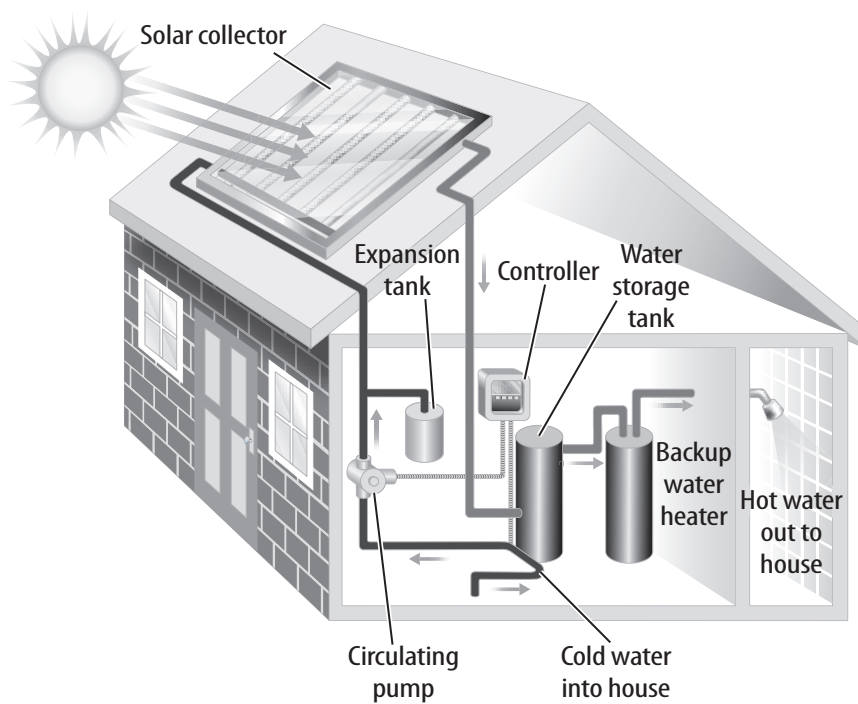
## Solar Energy

Without the Sun's energy, life as it is on Earth would not be possible. If you've studied food chains, you know that energy from the Sun is used by plants and other producers during photosynthesis to make food. Consumers are organisms that get energy by eating producers or other consumers. The energy in food chains is always traced back to the Sun.

Solar energy can be used in many ways. Greenhouses trap thermal energy. They make it possible to grow warm-weather plants in cool climates. Solar cookers concentrate the Sun's thermal energy to cook food. Large solar-power plants provide electricity to many homes.

Solar energy also can be used to heat water in individual homes, as shown in the figure at the top of the next page. The hot water can be stored in a tank until it is needed.

## Solar Energy from an Inexhaustible Resource



### Visual Check


**9. Identify** In which part of the system is water heated by the Sun?

---

---


## Wind Power

Sailboats, kites, and windmills are powered by wind. Wind is the movement of air over Earth's surface. Wind is an inexhaustible resource produced by the uneven heating of the atmosphere by the Sun.

If you live in an area that has strong winds, you might have seen giant wind turbines at work. In areas with frequent, strong winds, turbines can be used to produce electricity. 

## Geothermal Energy

Another type of inexhaustible resource is geothermal energy. **Geothermal energy** is thermal energy from within Earth. Molten rock that rises close to the surface of Earth's crust is called magma. Pockets of magma in some parts of Earth's crust heat underground water and rocks.

The heated water produces steam, which is used in geothermal power plants to generate electricity. People who live in California—as well as in other parts of the world—rely on geothermal energy to produce a large amount of their electricity. 

### Reading Check

**10. Describe** What causes wind?

---

---

---

### Reading Check

**11. Recognize** What are three types of inexhaustible resources?

---

---

---

## After You Read

### Mini Glossary

**geothermal energy:** thermal energy from within Earth

**inexhaustible resource:** a natural resource that will not run out, no matter how much of it people use

**natural resource:** a part of the environment that supplies materials useful or necessary for the survival of living things

**nonrenewable resource:** a natural resource that is being used up faster than it can be replaced by natural processes

**renewable resource:** a natural resource that can be replenished by natural processes at least as quickly as it is used

1. Review the terms and their definitions in the Mini Glossary. Write a sentence describing natural resources in your own words.

2. The table below identifies three types of resources along with an example of each. Complete the table by writing at least two additional examples of each type.

Inexhaustible Resource	Nonrenewable Resource	Renewable Resource
geothermal energy	oil	water

3. Review the questions you wrote as you read the lesson. Select one, and write the answer below without referring to the text.

Copyright © Glencoe/McGraw-Hill, a division of The McGraw-Hill Companies, Inc.

### What do you think NOW?

Reread the statements at the beginning of the lesson. Fill in the After column with an A if you agree with the statement or a D if you disagree. Did you change your mind?



Log on to [ConnectED.mcgraw-hill.com](http://ConnectED.mcgraw-hill.com) and access your textbook to find this lesson's resources.

**END OF LESSON**