Energy Resources  •  Guided Reading and Study

Fossil Fuels (pp. 354–360)

This section explains how fuels provide energy. The section also explains what fossil fuels are and compares and contrasts the different types of fossil fuels.

Use Target Reading Skills

After you read the section, reread the paragraphs that contain definitions of Key Terms. Use all the information you have learned to write a meaningful sentence using each Key Term.

Energy Transformation and Fuels (pp. 354–355)

1. A substance that provides a form of energy, such as heat, as a result of a chemical change is a(n) ____________________________.

2. Is the following sentence true or false? Energy cannot be converted from one form to another. ____________________________

3. The process of burning a fuel is called ____________________________.

4. Is the following sentence true or false? The energy stored in fuels can be used to generate electricity. ____________________________

5. Circle the letter of each sentence that is true about the production of electric power.

   a. In most power plants, water is boiled to make steam.
   b. The mechanical energy of steam turns the shaft of a generator.
   c. Powerful magnets turn inside a wire coil.
   d. Electricity is produced by a turbine.

What Are Fossil Fuels? (pp. 356–359)

6. Energy-rich substances formed from the remains of once-living organisms are called ____________________________.

7. List the three major fossil fuels.

   a. ____________________________ b. ____________________________
   c. ____________________________

8. Energy-rich chemical compounds that contain carbon and hydrogen atoms are called ____________________________.
Fossil Fuels (continued)

9. Complete the flowchart.

Combustion of Fossil Fuels

- Hydrogen
- Carbon
- Energy

10. A solid fossil fuel formed from plant remains is ____________

11. Is the following sentence true or false? Today, coal provides 23 percent of the energy used worldwide. ____________________

12. Is the following sentence true or false? The major use of coal is to fuel factories. ____________________

13. Circle the letter of the sentence that is true about coal as an energy source.
   a. It is the least plentiful fossil fuel in the United States.
   b. It is difficult to transport.
   c. It provides a lot of energy when burned.
   d. It produces less air pollution than other fossil fuels.
Energy Resources: Guided Reading and Study

14. How can coal mining harm the environment?

15. Another name for oil—the thick, black, liquid fossil fuel—is

16. Circle the letter of each sentence that is true about petroleum.
   a. Petroleum accounts for more than half the energy produced in the world.
   b. Petroleum fuels most cars, airplanes, trains, and ships.
   c. The United States consumes a third of all the petroleum produced in the world.
   d. Finding oil is difficult.

17. Scientists can use __________________________ to test an area for oil without drilling.

18. When oil is first pumped out of the ground, it is called __________________________.

19. A factory where crude oil is separated into fuels and other products by heating is called a(n) __________________________.

20. Compounds that are made from oil are called __________________________.

21. Circle the letter of each sentence that is true about natural gas.
   a. It produces a lot of energy.
   b. It produces more air pollutants than oil.
   c. It is difficult to transport.
   d. It is highly flammable.

22. Is the following sentence true or false? Because natural gas is less dense than oil, it often rises above an oil deposit. __________________________
Energy Resources · Guided Reading and Study

Fossil Fuels (continued)

Fuel Supply and Demand (p. 360)

23. Is the following sentence true or false? Fossil fuels are considered a renewable resource. 

24. Circle the letter of each sentence that is true about the supply of fossil fuels.
   a. Fossil fuels take hundreds of millions of years to form.
   b. One half of Earth’s known oil reserves has already been used.
   c. Most nations that consume a lot of fossil fuel have large reserves of their own.
   d. New sources of energy are needed to replace decreasing fossil fuel reserves.
Renewable Sources of Energy (pp. 361–367)

This section describes several renewable sources of energy and explains the advantages and disadvantages of each energy source.

Use Target Reading Skills

Before you read, preview Figure 7. Then write two questions that you have about the diagram in the graphic organizer below. As you read, answer your questions.

Q. How does the house capture solar energy?

A.

Q.

A.

Harnessing the Sun’s Energy (pp. 362–363)

1. What is solar energy?

2. Circle the letter of each sentence that is true about solar energy.
   a. It is the source of most other renewable energy resources.
   b. It causes pollution.
   c. It will not run out for billions of years.
   d. It is available only when the sun is shining.

3. How do some solar plants capture energy and use it to generate electricity?

4. Is the following sentence true or false? Solar energy can be converted directly into electricity in a solar cell.

5. What are solar cells used to power?

6. Is the following sentence true or false? Solar heating systems convert sunlight into mechanical energy.
Renewable Sources of Energy (continued)

7. Complete the concept map.

8. How do active solar heating systems differ from passive solar heating systems?

Hydroelectric Power (p. 364)

9. List other renewable sources of energy besides the sun.
   a. __________________________
   b. __________________________
   c. __________________________
   d. __________________________
   e. __________________________

10. Electricity produced by flowing water is called __________________________.
Energy Resources • Guided Reading and Study

11. Is the following sentence true or false? Hydroelectric power is the least widely used source of renewable energy in the world today.

12. What are two limitations on hydroelectric power in the United States?

Capturing the Wind (pp. 364–365)

13. Circle the letter of each sentence that is true about wind energy.
   a. It provides 10 percent of the world’s electricity.
   b. It is the fastest-growing energy source.
   c. It causes pollution.
   d. In some places it is the major source of power.

14. Is the following sentence true or false? Most places have winds that blow steadily enough to be a worthwhile energy source.

Biomass Fuels (p. 365)

15. Fuels made from living things are called ____________________________

16. Circle the letter of each sentence that is true about biomass fuels.
   a. They include leaves, food wastes, and manure.
   b. They can be converted to other fuels.
   c. They are widely used today in the United States.
   d. They are renewable resources.
Renewable Sources of Energy (continued)

Tapping Earth’s Energy (p. 366)
17. Intense heat from Earth’s interior is called ____________________.
18. Is the following sentence true or false? Geothermal energy is an unlimited source of cheap energy. ____________________
19. Add arrows to the drawing to show how water flows through a geothermal power plant.

The Promise of Hydrogen Power (p. 367)
20. What is the obstacle to using hydrogen as a fuel?
Nuclear Energy (pp. 370–374)

This section explains how nuclear reactions inside atoms can produce energy. The section also describes the advantages and disadvantages of nuclear energy.

Use Target Reading Skills

As you read, compare and contrast fission and fusion reactions in the Venn diagram below. Write the similarities in the space where the circles overlap and the differences on the left and right sides.

Nuclear Fission  Nuclear Fusion

Energy produced
**Nuclear Energy (continued)**

**Introduction (p. 370)**
1. The central core of an atom that contains the protons and neutrons is called the _________________.
2. Complete the concept map.

![Concept Map](image)

**Nuclear Fission (pp. 370–371)**
3. Is the following sentence true or false? Nuclear reactions convert matter into energy. ________________
4. What formula, developed by Albert Einstein, describes the relationship between energy and matter? ________________
5. The splitting of an atom's nucleus into two smaller nuclei is called ________________.
6. Is the following sentence true or false? In a controlled nuclear chain reaction, the energy released as heat can be used to generate electricity. ________________
Energy Resources • Guided Reading and Study

Nuclear Power Plants (pp. 372–373)

7. How is electricity produced in a nuclear power plant?

Match the part of a nuclear reactor with its function.

<table>
<thead>
<tr>
<th>Part of Reactor</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>8. reactor vessel</td>
<td>a. It contains the uranium.</td>
</tr>
<tr>
<td>9. fuel rod</td>
<td>b. It is where nuclear fission occurs.</td>
</tr>
<tr>
<td>10. control rod</td>
<td>c. It controls the reactions.</td>
</tr>
<tr>
<td>11. heat exchanger</td>
<td>d. It changes hot water to steam.</td>
</tr>
</tbody>
</table>

12. When fuel rods in a nuclear power plant generate so much heat that they start to melt, the condition is called a(n) ____________________.

13. Why is it difficult to dispose of radioactive wastes produced by power plants?

The Quest to Control Fusion (p. 374)

14. The combining of two atomic nuclei to produce a single larger nucleus is called ____________________.

15. Circle the letter of each sentence that is true about nuclear fusion.
   a. It produces less energy per atom than nuclear fission.
   b. The fuel it needs is readily available.
   c. It should produce less radioactive waste than nuclear fission.
   d. It is widely used today to produce electricity.
Energy Conservation (pp. 375–378)

This section describes several ways that energy use can be reduced to make available fuels last as long as possible.

Use Target Reading Skills

Before you read, write what you know about energy efficiency and conservation in the graphic organizer below. As you read, write what you learn.

<table>
<thead>
<tr>
<th>What You Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I turn off lights to conserve energy.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>What You Learned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
</tbody>
</table>
Energy Resources • Guided Reading and Study

Introduction (p. 375)

1. What are two ways to preserve our current energy sources?

Energy Efficiency (pp. 376–377)

2. The percentage of energy from a fuel that is actually used to perform work is its

3. What happens to the energy from a fuel that is not used to perform work?

4. A layer of material that helps block the transfer of heat between the air inside and the air outside a building is called

5. How does insulation work?

6. Circle the letter of the choice that is the best material for insulation:
   a. fiberglass
   b. brick
   c. stone
   d. glass

7. Why do new windows have two panes of glass with space between them?
Energy Conservation (continued)

Is the following sentence true or false? Incandescent light bulbs waste less energy than compact fluorescent bulbs.

8. How have engineers improved the energy efficiency of cars?

9. What are some ways to reduce the number of cars on the road?

10. Reducing energy use is called

Energy Conservation (p. 378)

11. Circle the letter of each sentence that describes a way you can reduce your personal energy use.
   a. Use air conditioners instead of fans.
   b. Use electric lights whenever possible.
   c. Walk or ride a bike for short trips.
   d. Recycle.
### Key Terms

Solve the clues by filling in the blanks with Key Terms from the chapter. Then write the numbered letters in the correct order to find the hidden message.

<table>
<thead>
<tr>
<th>Clues</th>
<th>Key Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Substance that provides energy as the result of a chemical change</td>
<td>1 2</td>
</tr>
<tr>
<td>Compound made from oil</td>
<td>3 4</td>
</tr>
<tr>
<td>Liquid fossil fuel</td>
<td>5 6 7</td>
</tr>
<tr>
<td>Part of nuclear reactor where nuclear fission occurs</td>
<td>8</td>
</tr>
<tr>
<td>Factory where crude oil is separated into fuels and other products</td>
<td>9</td>
</tr>
<tr>
<td>Dangerous condition caused by overheating inside a nuclear reactor</td>
<td>10</td>
</tr>
<tr>
<td>Percentage of energy that is used by a device to perform work</td>
<td>11</td>
</tr>
<tr>
<td>Building material that blocks heat transfer between the air inside and the air outside</td>
<td>12</td>
</tr>
<tr>
<td>Reducing energy use</td>
<td>13 14</td>
</tr>
<tr>
<td>Electricity produced by the kinetic energy of moving water</td>
<td>15 16</td>
</tr>
<tr>
<td>Mixture of gasoline and alcohol</td>
<td>17</td>
</tr>
<tr>
<td>Compound that contains carbon and hydrogen atoms</td>
<td>18</td>
</tr>
</tbody>
</table>

**Hidden Message**

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18