

Chapter 13

Energy and Energy Transformations



What is energy, and what are energy transformations?

Supplemental Worksheets

inquiry

Which objects have energy?

If your answer is everything in the photo, you are right. All objects contain energy. Some objects contain more energy than other objects. The Sun contains so much energy that it is considered an energy resource.

- From where do you think the energy that powers the cars comes?
- Do you think the energy in the Sun and the energy in the green plants are related?
- What do the terms *energy* and *energy transformations* mean to you?



Quick Vocabulary

Lesson 1

electric energy energy an electric current carries

energy ability to cause change

kinetic energy energy due to motion

mechanical energy sum of potential energy and kinetic energy in a system of objects

nuclear energy energy that is stored and released in the nucleus of an atom

potential energy stored energy due to interactions between objects or particles

radiant energy energy that electromagnetic waves carry; sometimes called light energy

sound energy energy that sound carries

thermal energy sum of kinetic energy and potential energy of the particles that make up an object

work energy transfer that occurs when a force makes an object move in the direction of the force while the force is acting on the object

Lesson 2

friction force that resists the sliding of two surfaces that are touching

law of conservation of energy states that energy can be transformed from one form into another or transferred from one region to another, but energy cannot be created or destroyed

radiant energy transmitted by electromagnetic waves

Lesson 1

Reading Guide

Key Concepts

ESSENTIAL QUESTIONS

- What is energy?
- What are potential and kinetic energy?
- How is energy related to work?
- What are different forms of energy?

Vocabulary

energy p. 421

kinetic energy p. 422

potential energy p. 422

work p. 424

mechanical energy p. 425

sound energy p. 425

thermal energy p. 425

electric energy p. 425

radiant energy p. 425

nuclear energy p. 425



Multilingual eGlossary



Video BrainPOP®

Forms of Energy

Inquiry

Why is this cat glowing?

A camera that detects temperature made this image. Dark colors represent cooler temperatures, and light colors represent warmer temperatures. Temperatures are cooler where the cat's body emits less radiant energy and warmer where the cat's body emits more radiant energy.



Lesson Outline**LESSON 1****Forms of Energy****A. What is energy?**

1. _____ is the ability to cause change.
2. Energy can cause an object to _____ its position or its motion.

B. Kinetic Energy—Energy of Motion

1. Energy due to motion is _____.
2. The faster an object moves, the _____ kinetic energy it has.
3. The kinetic energy of an object depends on its _____ as well as its speed.
4. If two objects move at the same speed, the object with the _____ mass will have more kinetic energy.

C. Potential Energy—Stored Energy

1. _____ is stored energy.
2. When you are holding a book energy is stored between the book and Earth; this type of energy is called _____ potential energy. This type of potential energy stored between an object and Earth depends on the _____ and _____ of the object.
3. Elastic potential energy is energy stored in objects that are compressed or _____.
4. When you stretch a rubber band, you are storing _____ potential energy. When you let go of the rubber band, stored elastic potential energy is transformed into _____ energy.
5. Food has _____ potential energy, which is the energy stored in the bonds between atoms. This energy is released when _____ occur.

D. Energy and Work

1. _____ is the transfer of energy that occurs when a force is applied over a distance.
2. _____ is sometimes described as the ability to do work.

Lesson Outline continued

E. Other Forms of Energy

1. Energy can be measured in units of _____.
2. _____ is the total kinetic energy and potential energy in an object or group of objects.
3. The energy carried by sound waves is _____. It is produced by objects that _____.
4. All materials are made of atoms and molecules that are always _____. The energy of atoms and molecules due to their motion is _____.
5. _____ is the energy carried by an electric current.
6. _____, such as microwaves, can travel through a vacuum.
7. The energy of electromagnetic waves is called _____.
8. _____ is stored in the nucleus of an atom.
9. The Sun releases nuclear energy when the _____ of atoms join together.
10. Nuclear power plants release energy by _____ nuclei.

Content Practice A**LESSON 1****Forms of Energy**

Directions: On each line, write the term from the word bank that correctly completes each sentence. Some terms may be used more than once or not at all.

electrical	energy	kinetic	mechanical	nuclear
potential	radiant	sound	thermal	work

1. Energy due to motion is _____ energy.
2. The amount of _____ energy an object has depends on the object's speed and mass.
3. Energy that is stored in the nucleus of an atom is _____ energy.
4. The ability to cause change is _____.
5. _____ energy is stored energy.
6. Energy that is carried by an electric current is _____ energy.
7. Gravitational, elastic, and chemical are three forms of _____ energy.
8. The transfer of energy that occurs when a force is applied over a distance is _____.
9. Energy that is the total of the kinetic energy and potential energy in an object or group of objects is _____ energy.
10. The energy of atoms and molecules in an object due to their motions is _____ energy.
11. Energy is the ability to do _____.
12. Energy carried by electromagnetic waves is called _____ energy.

Content Practice B

LESSON 1

Forms of Energy

Directions: Answer each question or respond to each statement on the lines provided.

1. What are two definitions of energy?

2. Which form of energy do all moving objects have? Which two factors determine the amount of this energy that an object has?

3. **Define** potential energy and list three forms of potential energy.

4. **Define** work.

5. What does an object need before it can perform work?

6. Objects have kinetic energy and potential energy. **List** six other forms of energy and write a phrase that describes each form.

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

Key Concept Builder 

LESSON 1

Forms of Energy

Key Concept What is energy?

Directions: Put a check mark on the line before each example of a change caused by energy.

- _____ 1. a fireworks show

- _____ 2. a child growing

- _____ 3. a ball on the ground

- _____ 4. a plant making food from the Sun

- _____ 5. a car starting

- _____ 6. a bat hitting a ball

- _____ 7. an oven heating up

Directions: Respond to the statement on the lines provided.

8. Describe the effects of energy in your school and community.

Key Concept Builder 

LESSON 1

Forms of Energy

Key Concept What are potential and kinetic energy?

Directions: Circle the object in each pair that has the most kinetic energy.

1. a moving car **OR** a parked car
2. a fast-moving soccer ball **OR** a slow-moving soccer ball
3. a 1,500-kg car traveling 20 m/s **OR** a 1,500-kg car traveling 30 m/s
4. a 1,500-kg car traveling 15 m/s **OR** a 2,000-kg car traveling 15 m/s

Directions: Answer each question or respond to each statement on the lines provided.

5. **Explain** how you decided which objects above to circle.

6. What is the difference between kinetic energy and potential energy?

7. How could you increase an object's gravitational potential energy?

8. Two objects are at the same height, but one has more gravitational potential energy. What else can you tell about the two objects?

9. **Name** two types of actions that can result in an object storing elastic potential energy.

Key Concept Builder **LESSON 1****Forms of Energy****Key Concept** How is energy related to work?**Directions:** On the line before each statement, write T if the statement is true or F if the statement is false. If the statement is false, change the underlined word(s) to make it true. Write your changes on the lines provided.

- _____ 1. When you lift an object, you do work on the object.

- _____ 2. When you lift an object higher, you decrease its gravitational potential energy.

- _____ 3. Work is the transfer of energy that occurs when a force is applied over a distance. _____
- _____ 4. An object that has energy can do work. _____
- _____ 5. When you lift an object, energy is transferred from the object to you.

- _____ 6. Energy is the ability to do work. _____
- _____ 7. When a bowling ball hits bowling pins, the pins transfer kinetic energy to the ball. _____
- _____ 8. A ball rolling down a hill has increasing potential energy.

- _____ 9. When you push a shopping cart, you transfer energy to it.

- _____ 10. A child climbing a ladder is transforming kinetic energy into potential energy.

- _____ 11. The child climbing the ladder is doing work. _____
- _____ 12. When a pool ball hits another ball and causes it to move, potential energy has transferred from one ball to the other. _____

Key Concept Builder **LESSON 1****Forms of Energy****Key Concept** What are different forms of energy?**Directions:** On each line, write the term from the word bank that matches the description correctly. Some terms may be used more than once, but only one term may be used per line.**electrical mechanical nuclear radiant sound thermal**

1. shooting a basketball _____
2. the total of the potential energy and kinetic energy in an object or group of objects

3. a phone ringing _____
4. the energy of moving atoms _____
5. Light is an example. _____
6. energy given off by the Sun _____
7. carried by an electric current _____
8. Microwaves are an example. _____
9. Heat is the movement of this type of energy. _____
10. energy that is stored in the nucleus of an atom _____
11. a radio playing _____
12. an ocean wave _____
13. a microwave heating food _____

Lesson Quiz A**LESSON 1****Forms of Energy****Multiple Choice**

Directions: On the line before each question or statement, write the letter of the correct answer.

- _____ 1. Energy is the ability to
A. use gravity.
B. hold objects.
C. cause change.
- _____ 2. A moving truck has more _____ energy than a parked truck.
A. sound
B. kinetic
C. potential
- _____ 3. A large truck parked on a hill has more _____ energy than a car parked next to it.
A. sound
B. kinetic
C. potential
- _____ 4. Which situation is an example of work?
A. a person holding several tools
B. a person sitting in a parked car
C. a person hitting a pitched baseball
- _____ 5. Which type of energy is the total energy of kinetic energy and potential energy in a system of objects?
A. sound energy
B. radiant energy
C. mechanical energy

Matching

Directions: On the line before each definition, write the letter of the term that matches it correctly. Each term is used only once.

- | | |
|--|-----------------------------|
| _____ 6. released when nuclei split | A. elastic potential energy |
| _____ 7. stored in a stretched rubber band | B. thermal energy |
| _____ 8. moves from warmer objects to cooler objects | C. nuclear energy |
| _____ 9. used when your body moves | D. radiant energy |
| _____ 10. carried by electromagnetic waves | E. chemical energy |

Lesson Quiz B

LESSON 1

Forms of Energy

Completion

Directions: *On each line, write the term that correctly completes each sentence.*

1. _____ can create sound and light and cause changes in the motion of objects.
2. As a ball rolls faster downhill, its _____ energy increases.
3. A large boulder at the edge of a high cliff has more _____ energy than a smaller boulder.
4. When you do _____ on an object, the energy of that object increases.
5. An object's _____ energy is a combination of its kinetic energy and potential energy.

Short Answer

Directions: *Respond to each statement on the lines provided.*

6. Forms of energy include thermal, radiant, and nuclear. **Define** these three forms of energy.

7. **Compare** and **contrast** chemical potential energy and elastic potential energy.

Lesson 2

Reading Guide

Key Concepts

ESSENTIAL QUESTIONS

- What is the law of conservation of energy?
- How does friction affect energy transformations?
- How are different types of energy used?

Vocabulary

law of conservation of energy

p. 430

friction p. 431



Multilingual eGlossary

Energy Transformations

Inquiry

What's that sound?

Blocks of ice breaking off the front of this glacier can be bigger than a car. Imagine the loud rumble they make as they crash into the sea. But after the ice falls into the sea, it will melt gradually. All of these processes involve energy transformations—energy changing from one form to another.



Lesson Outline**LESSON 2*****Energy Transformations*****A. Changes Between Forms of Energy**

1. A microwave oven changes electrical energy to _____ energy.
2. The changes from electrical energy to radiant energy to thermal energy are called energy _____.

B. Changes Between Kinetic and Potential Energy

1. When you throw a ball upward, the ball has its greatest speed and the most _____ energy when it first leaves your hand.
2. As the ball reaches its highest point, the ball gains its greatest _____ energy.
3. As the ball moves downward, _____ energy decreases and _____ energy increases.

C. The Law of Conservation of Energy

1. According to the _____, energy can be transformed from one form into another or transferred from one region to another, but energy cannot be created or destroyed.
2. _____ is a force that resists the sliding of one surface over another.
 - a. There is always some _____ between any surfaces that are in contact with each other.
 - b. As you pedal a bicycle, you do _____ and transfer _____ to the bicycle.
 - c. Because of _____ between moving parts of a bicycle, some of the work you do changes to _____ energy.
 - d. One way to reduce friction is to apply a(n) _____ to surfaces that rub against each other.
 - e. When you apply brakes on a bicycle, the bicycle's _____ energy is not destroyed; instead, the bicycle's _____ energy is transformed into thermal energy. The _____ amount of energy remains the same.

Lesson Outline continued

D. Using Energy

1. You use _____ energy for cooking and heating.
2. Gas stoves and furnaces change _____ energy from natural gas into thermal energy.
3. During photosynthesis, plants transform _____ energy from the Sun into chemical energy stored in food.
4. Your body changes the chemical energy stored in food into _____ energy as you move and into _____ energy, which keeps your body temperature high.
5. A television transforms _____ energy into sound energy and _____ energy.
6. Many devices you use every day are powered by _____ energy from electrical power plants.
7. With battery-powered devices, _____ energy is transformed into electrical energy for power.
8. When energy changes form, some _____ energy is always released. Scientists often refer to this energy that cannot be used as _____.
9. Cars transform most of the chemical energy in gasoline into _____ energy.

Content Practice B

LESSON 2

Energy Transformations

Directions: Respond to each statement on the lines provided.

1. Write a definition of *energy transformation*.

2. Describe the energy transformations that occur when you toss a ball upward and it falls. Include the causes of the transformations.

3. Compare the forms and amounts of energy before and after you apply the brakes of a bicycle and stop.

4. Define *friction*.

5. Give an example of how mechanical energy can be transformed into another type of energy.

Language Arts Support**LESSON 2****Writing Activity: Organizing Information in Tables****Learning the Skill**

Tables are organizational tools that can be used to categorize, organize, and compare information. Tables are made up of vertical columns and horizontal rows. Table 1 below, for example, has three columns and five rows. A table's title summarizes the content that the table presents.

Table 1. Examples of Different Types of Energy Transformations

Initial Form of Energy	Final Form of Energy	Example of the Energy Transformation
chemical	thermal	gas stove
chemical	kinetic	human body breaking down food
radiant	chemical	photosynthesis
electrical	radiant	lightbulb

Directions: Use the table below to answer the questions that follow.

Potential Energy	Factors Involved	Example of How or Where This Type of Potential Energy Is Stored
gravitational	an object's weight and height	a bag lifted off of the floor
elastic	extent of stretching or compressing	a stretched rubber band
chemical	chemical bonds	firewood

1. How many rows and columns make up the chart above?

2. Write a title for this table.

3. Which type of potential energy is stored in a stretched rubber band?

Language Arts Support**LESSON 2****Applying the Skill**

Directions: Read Table 1 in Lesson 1 of your textbook. Then use what you have learned about creating tables to reorganize the information into the table below. Include a new title for your table.

Title: _____

Type of Energy	Definition	Example
mechanical energy		
	the energy sound carries	
		a warm oven
	the energy carried by an electric current	
		sunlight
nuclear energy		

Solve a One-Step Equation

Electricity can be measured in kilowatt-hours (kWh). One kilowatt-hour is equal to the use of 1 kilowatt of energy for 1 hour. A kilowatt (kW) is 1,000 watts (W). To calculate the amount of energy in kilowatt-hours, multiply the number of watts times the hours used and then divide by 1,000.

$$kWh = \frac{W \times h}{1,000}$$

If a household uses **4,500** W each hour for **12** hours, how many kilowatt-hours are used?

Step 1 Multiply the watts times the number of hours.

$$4,500 \times 12 = 54,000$$

Step 2 Divide by **1,000**.

$$\frac{54,000}{1,000} = 54 \text{ kWh}$$

Practice

- If a household uses 1,800 W each hour for 15 hours, how many kilowatt-hours are used?
- If a household uses 3,200 W each hour for 8 hours, how many kilowatt-hours are used?
- An electric company charges customers for the number of kilowatt-hours used. A household uses 2,400 W for 300 hours. How many kilowatt-hours will be on their electric bill?
- A household uses 1,400 W for 310 hours. How many kilowatt-hours will be on their electric bill?
- A household uses a daily average of 1,100 W each hour for 12 hours. What is the average daily energy use in kilowatt-hours?
- A household uses a daily average of 1,400 W each hour for 10 hours. What is the average daily energy use in kilowatt-hours?

Key Concept Builder 

LESSON 2

Energy Transformations

Key Concept What is the law of conservation of energy?

Directions: On each line, write the term from the word bank that correctly completes each energy transformation. Some terms may be used more than once.

electrical energy radiant energy sound energy thermal energy

1. making toast in a toaster

_____ changes to _____.

2. watching television

_____ changes to _____ and _____.

3. using a curling iron to curl hair

_____ changes to _____.

4. turning on a lamp

_____ changes to _____ and _____.

Directions: Respond to each statement on the lines provided.

5. **Describe** another example of energy changing form that does not include electrical energy.

6. What are two statements you can make about energy based on the law of conservation of energy?

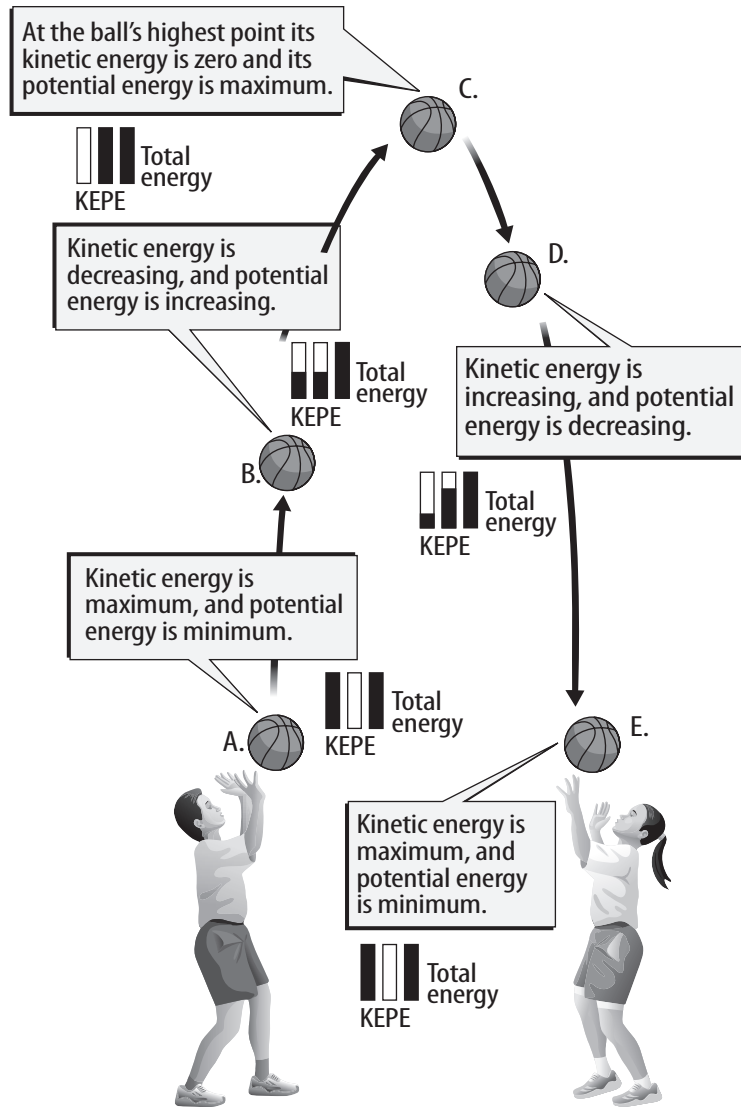
Key Concept Builder 

LESSON 2

Energy Transformations

Key Concept What is the law of conservation of energy?

Directions: In the diagram, a ball has just been thrown and is about to be caught. Use the diagram to answer each question. Write the letter of the correct stage on the lines provided. Some stages may be used more than once.



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

1. At which stages is kinetic energy at the maximum value? _____ and _____
2. At which stage is the kinetic energy zero? _____
3. Which stage has increasing kinetic energy and decreasing potential energy? _____
4. At which stage is the potential energy at the maximum value? _____
5. At which stages is potential energy at its minimum? _____ and _____
6. Which stage has decreasing kinetic energy and increasing potential energy? _____

Key Concept Builder 

LESSON 2

Energy Transformations

Key Concept How does friction affect energy transformations?

Directions: Answer each question or respond to each statement on the lines provided.

1. What happens to a bicycle’s mechanical energy when you apply the brakes and stop?

2. **Compare** a bicycle’s total energy when the rider is coasting, applying brakes, and stopped.

3. Which force resists the sliding of two surfaces that are touching?

4. When you ride a bicycle, when is friction helpful and when is it not helpful? Explain.

5. How can friction between a bicycle’s parts be reduced?

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

Key Concept Builder 

LESSON 2

Energy Transformations

Key Concept How are different types of energy used?

Directions: Respond to each item on the lines provided. Use complete sentences.

1. Give an example of how you might use each form of energy. Include any changes that occur from one form to another.

a. thermal energy _____

b. chemical energy _____

c. radiant energy _____

d. electrical energy _____

2. **Explain** how waste energy is produced when an inefficient lightbulb converts electrical energy into radiant energy.

Lesson Quiz A

LESSON 2

Energy Transformations

Multiple Choice

Directions: *On the line before each question or statement, write the letter of the correct answer.*

- _____ 1. An energy _____ occurs when energy changes from one type to another type.
 - A. increase
 - B. conversion
 - C. transformation

- _____ 2. What happens to potential energy when a ball is tossed into the air?
 - A. It never changes.
 - B. It increases as the ball approaches its highest point.
 - C. It decreases as the ball approaches its highest point.

- _____ 3. According to the law of conservation of energy, energy cannot
 - A. be created or destroyed.
 - B. transferred from one region to another.
 - C. transformed from one form into another.

- _____ 4. When a ball is thrown into the air, its kinetic energy is lowest
 - A. at its highest point.
 - B. at the moment it is released.
 - C. as it begins to fall back to the ground.

- _____ 5. What type of energy transformation occurs during photosynthesis?
 - A. Radiant energy becomes chemical energy.
 - B. Thermal energy becomes chemical energy.
 - C. Nuclear energy becomes mechanical energy.

Matching

Directions: *On the line before each definition, write the letter of the term that matches it correctly. Each term is used only once.*

- | | |
|--|---|
| <ul style="list-style-type: none"> _____ 6. transforms gravitational potential energy into kinetic energy _____ 7. transforms mechanical energy into thermal energy _____ 8. transforms radiant energy into sound energy _____ 9. force that reduces kinetic energy and produces heat _____ 10. reduces friction's creation of thermal energy | <ul style="list-style-type: none"> A. friction B. lubricant C. electric heater D. cell phone E. a marble falling off a table |
|--|---|

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

Lesson Quiz B

LESSON 2

Energy Transformations

Completion

Directions: *On each line, write the term that correctly completes each sentence.*

1. The changes from electrical energy to radiant energy to thermal energy are energy _____.
2. The _____ energy of a ball being tossed into the air increases as the ball rises.
3. According to the law of conservation of energy, energy can be _____ but not _____.
4. When a ball is thrown into the air, its _____ energy is lowest at the top of its arc.
5. During photosynthesis, a plant changes radiant energy into _____ energy.

Short Answer

Directions: *Respond to each statement on the lines provided.*

6. **Describe** the way friction transforms energy and the way friction can be reduced.

7. **Show** how the law of conservation of energy is proved to be accurate by the energy changes that happen when an object falls from a table to the floor.

8. **List** examples of two energy transformations—one produced by an electric heater and the other by a mobile phone.

Lesson Outline for Teaching

Lesson 1: Forms of Energy

A. What is energy?

1. Energy is the ability to cause change.
2. Energy can cause an object to change its position or its motion.

B. Kinetic Energy—Energy of Motion

1. Energy due to motion is kinetic energy.
2. The faster an object moves, the more kinetic energy it has.
3. The kinetic energy of an object depends on its mass as well as its speed.
4. If two objects move at the same speed, the object with the greater mass will have more kinetic energy.

C. Potential Energy—Stored Energy

1. Potential energy is stored energy.
2. When you are holding a book, energy is stored between the book and Earth; this type of energy is called gravitational potential energy. This type of potential energy stored between an object and Earth depends on the weight and height of the object.
3. Elastic potential energy is energy stored in objects that are compressed or stretched.
4. When you stretch a rubber band, you are storing elastic potential energy. When you let go of the rubber band, the stored potential energy is transformed into kinetic energy.
5. Food has chemical potential energy, which is the energy stored in the bonds between atoms. This energy is released when chemical reactions occur.

D. Energy and Work

1. Work is the transfer of energy that occurs when a force is applied over a distance.
2. Energy is sometimes described as the ability to do work.

E. Other Forms of Energy

1. Energy can be measured in units of joules.
2. Mechanical energy is the total kinetic energy and potential energy in an object or group of objects.
3. The energy carried by sound waves is sound energy. It is produced by objects that vibrate.
4. All materials are made of atoms and molecules that are always moving. The energy of atoms and molecules due to their motion is thermal energy.
5. Electrical energy is the energy carried by an electric current.
6. Electromagnetic waves, such as microwaves, can travel through a vacuum.

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

Lesson Outline continued

7. The energy of electromagnetic waves is called radiant energy.
8. Nuclear energy is stored in the nucleus of an atom.
9. The Sun releases nuclear energy when the nuclei of atoms join together.
10. Nuclear power plants release energy by splitting nuclei.

Discussion Question

List six forms of energy and give several examples of each form whose effects are observable in your everyday life.

Mechanical energy—examples might include the energy of any moving objects, of turbines, and of motors.

Sound energy—examples might include any common sounds, sonar, and ultrasound.

Thermal energy—examples might include energy from heating, cooking, and fires.

Electrical energy—examples might include energy from a wall socket, a battery, and a generator.

Radiant energy—examples might include light from the Sun or any other source and all other electromagnetic waves, including microwaves and radio waves.

Nuclear energy—examples might include energy from the Sun and from nuclear power plants and submarines.

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

Lesson Outline for Teaching

Lesson 2: Energy Transformations

A. Changes Between Forms of Energy

1. A microwave oven changes electrical energy to radiant energy.
2. The changes from electrical energy to radiant energy to thermal energy are energy transformations.

B. Changes Between Kinetic and Potential Energy

1. When you throw a ball upward, the ball has its greatest speed and the most kinetic energy when it first leaves your hand.
2. As the ball reaches its highest point, the ball gains its greatest potential energy.
3. As the ball moves downward, potential energy decreases and kinetic energy increases.

C. The Law of Conservation of Energy

1. According to the law of conservation of energy, energy can be transformed from one form into another or transferred from one region to another, but energy cannot be created or destroyed.
 2. Friction is a force that resists the sliding of one surface over another.
 - a. There is always some friction between any surfaces that are in contact with each other.
 - b. As you pedal a bicycle, you do work and transfer energy to the bicycle.
 - c. Because of friction between moving parts of a bicycle, some of the work you do changes to thermal energy.
 - d. One way to reduce friction is to apply a(n) lubricant to surfaces that rub against each other.
 - e. When you apply brakes on a bicycle, the bicycle's mechanical energy is not destroyed; instead, the bicycle's mechanical energy is transformed into thermal energy. The total amount of energy remains the same.
- #### D. Using Energy
1. You use thermal energy for cooking and heating.
 2. Gas stoves and furnaces change chemical energy from natural gas into thermal energy.
 3. During photosynthesis, plants transform radiant energy from the Sun into chemical energy stored in food.
 4. Your body changes the chemical energy stored in food into kinetic energy as you move and into thermal energy, which keeps your body temperature high.
 5. A television transforms electrical energy into sound energy and radiant energy.

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

Lesson Outline continued

6. Many devices you use every day are powered by electrical energy from electrical power plants.
7. With battery-powered devices, chemical energy is transformed into electrical energy for power.
8. When energy changes form, some thermal energy is always released. Scientists often refer to this energy that cannot be used as waste energy.
9. Cars transform most of the chemical energy in gasoline into waste energy.

Discussion Question

Describe transformations in energy that occur as someone rides a bicycle.

Chemical energy from food transforms into mechanical energy as the leg and foot muscles pump the pedals of the bicycle. The potential energy of the pedal transforms into kinetic energy as you push down on the pedal. The mechanical energy of the moving parts of the bicycle is transformed into thermal energy due to friction. The total amount of energy never changes.

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

