

## Chapter 15 Energy

## Section 15.2 Energy Conversion and Conservation

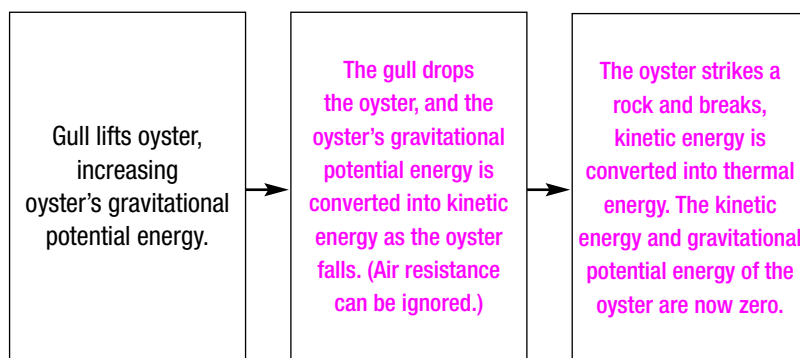
(pages 453–459)

*This section describes how energy is converted from one form to another. The law of conservation of energy also is presented.*

### Reading Strategy (page 453)

**Relating Cause and Effect** As you read, complete the flowchart to explain an energy conversion used by some gulls to obtain food. For more information on this Reading Strategy, see the **Reading and Study Skills** in the **Skills and Reference Handbook** at the end of your textbook.

**How Gulls Use Energy Conversions**



### Energy Conversion (page 454)

1. Is the following sentence true or false? Energy can be converted from one form to another. true
2. When a wind-up toy is set in motion, elastic potential energy that was stored in a compressed spring is converted into the kinetic energy of the toy's moving parts.
3. Is the following sentence true or false? The action of striking a match shows that stored chemical energy in the match can be converted into thermal energy and electromagnetic energy of the flame in a single step. false

### Conservation of Energy (page 455)

4. What does the law of conservation of energy state? Energy cannot be created or destroyed.
5. Is the following sentence true or false? When an object slows down because of frictional force acting on it, an amount of energy is destroyed that is equivalent to the decrease in kinetic energy of the object. false
6. A moving object slows down because friction causes a continual conversion of kinetic energy into thermal energy.

**Chapter 15 Energy**

**Energy Conversions (pages 456–458)**

7. As an object falls, the gravitational potential energy of the object is converted into kinetic energy.
8. Circle the letter of each sentence that is true about pendulums.
  - a. A pendulum consists of a weight suspended from a string that swings back and forth.
  - b. The weight at the end of a pendulum reaches maximum kinetic energy at the highest point in the pendulum’s swing.
  - c. Potential energy and kinetic energy undergo constant conversion as a pendulum swings.
  - d. Frictional forces enable a pendulum to continue swinging without slowing down.
9. At what point during a pole-vaulter’s jump is his gravitational potential energy the greatest? It is greatest at the highest point of the jump.
10. Circle the letter of the type of energy that increases as the pole bends before it propels a pole-vaulter up into the air.
  - a. kinetic energy
  - b. mechanical energy
  - c. frictional force
  - d. elastic potential energy
11. Is the following sentence true or false? For a mechanical change in an isolated system, the mechanical energy at the beginning equals the mechanical energy at the end of the process, as long as friction is negligible. true
12. Tell whether the following situations illustrate *kinetic energy*, *potential energy*, or *both*.

What Type of Energy Is It?	
Situation	Form of Energy
A stationary wind-up toy with a compressed spring	Potential energy
A descending roller coaster car	Both
A skier poised to take off at the top of a hill	Potential energy
A car driving on a flat road	Kinetic energy
A vibrating guitar string	Both

**Energy and Mass (page 459)**

13. What does Einstein’s equation imply about mass and energy? Mass and energy are equivalent, and mass and energy can be converted into each other.
14. Is the following sentence true or false? Einstein’s equation,  $E = mc^2$ , suggests that mass and energy together are conserved. true