Pretest

1. Speed describes how fast an object moves—how much distance is traveled in a given period of time by the object. Velocity is the speed at which and direction in which an object travels.
2. d
3. Its acceleration would also triple.
4. a
5. a. the object accelerates
   b. the object accelerates in the direction of the greater force
   c. the object maintains its state of motion, whether it is at rest or traveling with a constant velocity
6. the mass of the object and the value of the free-fall acceleration at the location of the object
7. A baseball traveling at 15 m/s has more momentum and more energy than a golf ball traveling at 15 m/s.
8. A baseball traveling at 16 m/s has more momentum and more energy than a baseball traveling at 4 m/s.

Quizzes

SECTION: WORK, POWER, AND MACHINES

1. b
2. d
3. a
4. b
5. b
6. d
7. d
8. c
9. a
10. a

SECTION: SIMPLE MACHINES

1. c
2. b
3. c
4. d
5. a
6. b
7. c
8. b
9. d
10. a

SECTION: WHAT IS ENERGY?

1. d
2. d
3. c
4. a
5. b
6. b
7. d
8. c
9. a
10. b

SECTION: CONSERVATION OF ENERGY

1. a
2. d
3. c
4. b
5. a
6. a
7. b
8. c
9. b
10. d

Chapter Tests

TEST A (4 points per item)

1. c
2. d
3. d
4. d
5. a
6. c
7. c
8. c
9. b
10. b
11. c
12. d
13. c
14. power
15. time
16. watt
17. compound machine
18. $KE = 1/2\ mv^2$
19. potential energy
20. mechanical energy
21. chemical
22. screw
23. open
24. efficiency
25. When energy seems to disappear, it is actually being converted into other forms of energy that cannot be observed directly such as chemical, nuclear, potential, or kinetic energy.

TEST B (4 points per item)

1. c
2. b
3. d
4. b
5. c
6. d
7. c
8. d
9. b
10. c
11. a
12. b
13. b
14. work
15. mechanical advantage
16. fulcrum
17. screw
18. energy
19. kinetic energy
20. nonmechanical
21. open
22. heat

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23. photosynthesis
24. Work is defined as force times distance. If the rock has not moved any distance, no work has been done.
25. When a pendulum swings back and forth, it goes from having zero kinetic energy at the top of its path to having a maximum amount of kinetic energy at the bottom of its path. At the same time, it goes from having a maximum amount of gravitational potential energy to having a minimum amount of gravitational potential energy.

Standardized Test Practice

1. A
2. B
3. C
4. C

Inquiry Lab: Kitchen Tools

1. Answers may vary depending on the tools chosen for the lab, but in all simple machines, the applied force is transferred to another part of the tool.
2. Answers may vary depending on the tools chosen for the lab, but in all simple machines, the output force is greater than the input force.

Quick Lab: Power Output

ANALYSIS

1. Your power output would be greater if you walked up the stairs faster.
2. Answers may vary depending on data. Answer should be slightly larger than the power output calculated in item 5 of the procedure.
3. Students are lifting themselves up the stairs against the force of gravity. The gravitational force is equivalent to their weight.

Quick Lab: A Simple Inclined Plane

ANALYSIS

1. Lifting the object straight up requires more force than dragging it up the ramp.
2. The work done is the same in either case, if friction is ignored.

Quick Lab: Energy Transfer

PROCEDURE

3. The wire feels hot. This is because the mechanical energy involved in moving the wire is transformed into kinetic energy of atoms in the wire. The wire is displaced by a force during the flexing, so work is done on the wire.

Inquiry Lab: Is Energy Conserved by a Pendulum?

ANALYSIS

1. The bob's *PE* at the beginning is converted into *KE* at the bottom of the swing. The *KE* at the bottom is converted back into *PE* as the bob rises. When the pencil is low enough, the bob cannot rise enough to convert all *KE* into *PE*, so the bob continues to travel, looping over the pencil.
2. The energy of the pendulum is lost to friction between the string and hook, and very slightly to air friction. This causes the string and nail to heat up and the air to move, respectively.

Chapter Lab: Energy of a Rolling Ball

DATASHEETS A, B, & C

Analysis

1. Answers may vary. All answers should be between 0.25 m/s and 0.35 m/s for the ramp heights used in the experiment.
2. Answers may vary. Unreasonable answers should be checked for errors in calculation.
3. Answers may vary. Answers should all be less than 1.0 J.

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