

Answers to Review of Chapter 4

1. (2) 2. (3) 3. (1) 4. (4) 5. (2) 6. (2) 13. (2) 14. (4) 15. (2) 16. (1) 17. (1) 18. (2)
7. (3) 8. (2) 9. (1) 10. (3) 11. (2) 12. (1) 19. (4) 20. (3)

Answers to Questions in Reviewing Intermediate-Level Science

FORCE, MASS, AND MOTION

Page 129 Process Skill 1: Determining Average Speed of a Car Trip

1.

From/to	Distance (km)	Time (h)	Average Speed
Glens Falls to Buffalo	540	6.0	$s = \frac{d}{t} = \frac{540 \text{ km}}{6.0 \text{ h}}$ 90.0 km/h
Glens Falls to New York City	290	5.2	$s = \frac{d}{t} = \frac{290 \text{ km}}{5.2 \text{ h}}$ 55.8 km/h
Glens Falls to Cooperstown	170	2.4	$s = \frac{d}{t} = \frac{170 \text{ km}}{2.4 \text{ h}}$ 70.8 km/h
Glens Falls to Lake Placid	150	1.9	$s = \frac{d}{t} = \frac{150 \text{ km}}{1.9 \text{ h}}$ 78.9 km/h

2. Some factors that affected the speed of the trips might be weather conditions, traffic lights, rest stops, detours, traffic delays, etc.

Page 130 Process Skill 2: Determining the Acceleration of a Moving Car

1. (2)

$$2. a = \frac{v_f - v_i}{t} = \frac{100 \text{ km/h} - 70 \text{ km/h}}{3 \text{ min}}$$

$$= 10 \frac{\text{km}}{\text{h/min}} \quad (10 \text{ km/h/min})$$

3. Between the 2- and 4-minute marks the car decelerated and then accelerated.

Review Questions Pages 130-133

Part I

1. (4) 2. (1) 3. (4) 4. (3) 5. (1) 6. (2)
7. (1) 8. (2) 9. (4) 10. (4)

Part II

11. A pushing force is applied to the ball when it is served.
12. The purpose of the force is to change direction of the served volleyball.
13. The baseball glove stops the motion of the ball.
14. (a) A pushing force applied by Roberto caused the ball to go from A to C.
(b) Gravity is the force causing the ball to go from C to D.
15. At point C the two forces are balanced.
16. Roberto applied more force to the ball, which made the ball go higher.

LAWS OF MOTION

Page 136 Laboratory Skill: Using Math to Analyze Data

1. A force of one newton will cause a 1-kg mass to accelerate 1 m/s/s or 1 m/s².
2. Examples 2 and 3 show that if the force is doubled the acceleration is doubled.
3. (2)
4. 180 N

Review Question Pages 137-141

Part I

17. (3) 18. (4) 19. (4) 20. (1) 21. (1) 22. (3)
23. (3) 24. (3) 25. (2) 26. (3) 27. (3) 28. (1)

Part II

29. When the card is flicked the coin would resist motion and fall into the glass.

30. The quarter has the greatest resistance to motion because, of the three coins, it has the greatest mass or greatest inertia.
31. The investigation demonstrates Newton's first law of motion—a body at rest remains at rest unless a force affects it.
32. When the front wheels hit the curb, the student will continue moving forward and possibly fly off the board due to his or her inertia.
33. The stunt-car driver's inertia would continue to move him forward, and the seat belt would keep him from flying through the windshield of the car.
34. The student's inertia would make him or her feel like he or she was being pushed against the back of the seat.
35. When water comes out the nozzle the sprinkler will turn clockwise.
36. Newton's third law of motion—for every action there is an equal and opposite reaction—governs the direction the sprinkler moves.
37. If force of the water coming out the nozzle decreases, the sprinkler's speed of rotation will decrease.

MACHINES

Pages 147– Process Skill 3: Classifying Levers

1. The broom is a third-class lever. The tweezers are a third-class lever. The paper cutter is a sec-

ond-class lever. The shears are a first-class lever. The crowbar is a first-class lever. The can opener is a first-class lever.

2. A wheelbarrow is a second-class lever.

Review Questions Pages 147–151

Part I

38. (1) 39. (3) 40. (3) 41. (1) 42. (2) 43. (4)
44. (4) 45. (2) 46. (2)

Part II

47. The wheelbarrow has a wheel and axle and a lever. The ramp is an inclined plane.
48. Work is a force times a distance. In this case, there is a force, but the box did not move any distance. Therefore, no work was done.
49. The ramp is an inclined plane.
50. Pulling the weight over the sandpaper would require a greater effort. The effort would be more than 50 N.
51. If oil was placed under the block the effort would decrease. The effort would be less than 50 N.