# Vocabulary and Section Summary

## SECTION: GRAVITY AND MOTION

1. terminal velocity: the constant velocity of a falling object when the force of air resistance is equal in magnitude and opposite in direction to the force of gravity
2. free fall: the motion of a body when only the force of gravity is acting on the body
3. projectile motion: the curved path that an object follows when thrown, launched, or otherwise projected near the surface of Earth

## SECTION: NEWTON'S LAWS OF MOTION

1. inertia: the tendency of an object to resist being moved or, if the object is moving, to resist a change in speed or direction until an outside force acts on the object

## SECTION: MOMENTUM

1. momentum: a quantity defined as the product of the mass and velocity of an object

# Section Review

## SECTION: GRAVITY AND MOTION

1. Sample answers: The sky diver stopped accelerating downward because she reached her terminal velocity. A feather dropped on the moon is in free fall.
2. B
3. Air resistance reduces the acceleration of falling objects and causes them to fall more slowly.
4. Gravity has no effect on the horizontal component of projectile motion. Gravity changes the vertical component of projectile motion by accelerating an object downward.
5. The acceleration due to gravity is the same for all objects. (Note: This is true only near the surface of Earth and when no air resistance acts on the objects.) Also acceptable: The force of gravity causes the acceleration of falling objects.
6. A heavier object experiences a greater gravitational force than a lighter object does. But a heavier object is also harder to accelerate because it has more mass. The greater gravitational force is exactly balanced by the greater mass. So all objects fall with the same acceleration.
7. $3.5 \text{ s} \times 9.8 \text{ m/s}^2 = 34.3 \text{ m/s}$
8. Sample answer: Basketball: a player jumping to dunk the ball, a ball passed between players, a ball shot toward the basket, and a ball bounced on the floor before it hits the floor
9. The feather and the hammer would hit the moon's surface at the same time because there is no air resistance. The feather and the hammer are in free fall.
10. Jon should either aim higher when throwing the newspaper or he should throw the newspaper with a greater horizontal velocity.

## SECTION: NEWTON'S LAWS OF MOTION

1. Sample answer: Inertia is the tendency of an object to resist changes in motion.
2. D
3. Accept all reasonable answers. Students should list three examples of force pairs. Partial sample answer: using a pencil or pen (action: hand pushing on pencil; reaction: pencil pushing back on hand OR action: pencil pushing on paper; reaction: paper pushing on pencil).
4. Newton's first law states that objects at rest stay at rest and objects in motion stay in motion unless acted on by an unbalanced force.
5. Newton's second law states that the acceleration of an object increases as the force acting on it increases but the acceleration decreases as the mass of the object increases.
6. $F = 70 \text{ kg} \times 4.2 \text{ m/ s}^2 = 294 \text{ N}$
7. The action and reaction forces do not balance each other because the forces are acting on two different objects. Because they act on two different objects, you cannot combine them to determine a net force.

Original content Copyright © by Holt, Rinehart and Winston. Additions and changes to the original content are the responsibility of the instructor.