

Assessment

Momentum and Collisions**Section Quiz: Conservation of Momentum**

Write the letter of the correct answer in the space provided.

- _____ 1. A batter hits a baseball back to the pitcher at the same speed as the pitch. Which of the following is true?
- The momentum of the ball is the same before and after the batter hits the ball.
 - The magnitude of the ball's momentum is greater after the batter hits the ball.
 - The magnitude of the ball's momentum is less after the batter hits the ball.
 - The magnitude of the ball's momentum is the same before and after the batter hits the ball.
- _____ 2. A small marble collides with a billiard ball that is initially at rest. Which of the following is true?
- The momentum of each object increases.
 - The momentum of each object decreases.
 - The momentum of the billiard ball increases, and the momentum of the marble decreases.
 - The total momentum before and after the collision is zero.
- _____ 3. When two ice skaters initially at rest push off one another, their final momenta are
- equal in magnitude and direction.
 - equal in magnitude and opposite in direction.
 - in the same direction but of different magnitudes
 - in opposite directions and possibly of different magnitudes.
- _____ 4. When two objects interact in an isolated system,
- the momentum of each object is conserved.
 - the total momentum of the system is zero.
 - the total momentum is conserved only if the objects move in opposite directions.
 - the total momentum is always conserved.
- _____ 5. Which of the following expresses the law of conservation of momentum?
- The total momentum of an isolated system is zero.
 - The total momentum of any system always remains constant.
 - Every object in an isolated system maintains a constant momentum.
 - The total momentum of an isolated system remains constant regardless of the forces between the objects in the system.

Momentum and Collisions *continued*

- _____ 6. Conservation of momentum follows from
- a. Newton's first law.
 - b. Newton's second law.
 - c. Newton's third law.
 - d. the law of conservation of energy.
- _____ 7. A billiard ball hits the edge of another billiard ball that is initially at rest. The second ball moves off at an angle. Which of the following is true?
- a. The momentum of the first ball doesn't change.
 - b. The momentum of the second ball doesn't change.
 - c. The total momentum of the system increases.
 - d. The momentum lost by the first ball is gained by the second ball.
- _____ 8. A croquet ball moving at 2.0 m/s strikes another ball of equal mass. The first ball stops moving after the collision. What is the velocity of the second ball after the collision?
- a. -2.0 m/s
 - b. 0 m/s
 - c. 2.0 m/s
 - d. 4.0 m/s

9. Describe the changes in momentum that take place when two billiard balls of equal mass but moving at different speeds collide head-on.

10. A 55 kg boy running at 2.0 m/s jumps onto a 2.0 kg skateboard. Calculate the final velocity of the boy and the skateboard.