Highlights

KEY TERMS

momentum (p. 198)

impulse (p. 200)

perfectly inelastic collision (p. 212)

elastic collision (p. 216)

KEY IDEAS

Section 1 Momentum and Impulse
- Momentum is a vector quantity defined as the product of an object's mass and velocity.
- A net external force applied constantly to an object for a certain time interval will cause a change in the object's momentum equal to the product of the force and the time interval during which the force acts.
- The product of the constant applied force and the time interval during which the force is applied is called the impulse of the force for the time interval.

Section 2 Conservation of Momentum
- In all interactions between isolated objects, momentum is conserved.
- In every interaction between two isolated objects, the change in momentum of the first object is equal to and opposite the change in momentum of the second object.

Section 3 Elastic and Inelastic Collisions
- In a perfectly inelastic collision, two objects stick together and move as one mass after the collision.
- Momentum is conserved but kinetic energy is not conserved in a perfectly inelastic collision.
- In an inelastic collision, kinetic energy is converted to internal elastic potential energy when the objects deform. Some kinetic energy is also converted to sound energy and internal energy.
- In an elastic collision, two objects return to their original shapes and move away from the collision separately.
- Both momentum and kinetic energy are conserved in an elastic collision.
- Few collisions are elastic or perfectly inelastic.

Variable Symbols		
Quantities		**Units**
p	momentum	kg•m/s kilogram-meters per second
FΔt	impulse	N•s Newton-seconds = kilogram-meters per second