Warm Up

1. What is the force needed to accelerate a 67 kg person from 3 m/s to 15 m/s in 4 sec?
2. What is the position of a baseball that was thrown into the air with a velocity of 25.0 m/s after 1.25 sec?
3. What is the distance covered, in km, of a person moving at 2.00 m/s for a time of 2.00 hours?

Targets

- I can describe momentum, impulse, and conservation.

Momentum

Momentum-Impulse

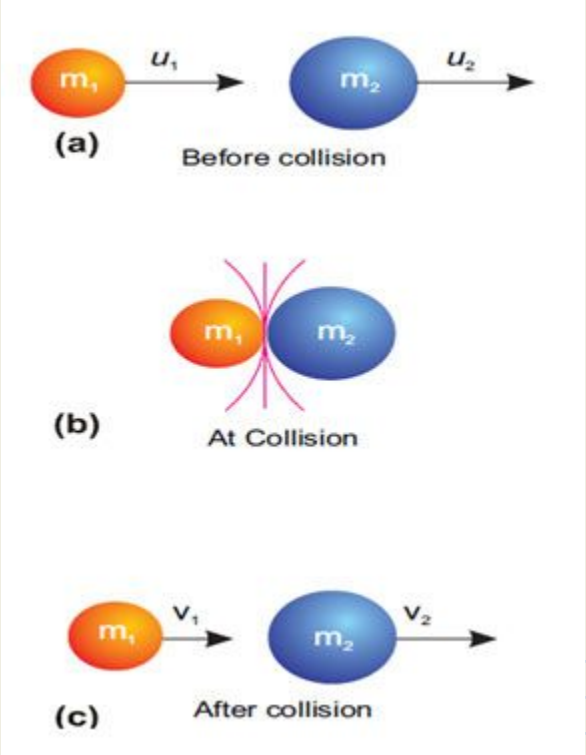
- Momentum is the product of an object's mass and its velocity.
- $Ft = mv$
- Impulse involves the force and time.

Practice

- What is the momentum of a 350 kg object moving at 15 m/s?
- What is the velocity of a 7.0 kg ball with a momentum of 475 kg•m/s?
- What is the force produced with a 45 kg object traveling at 7.0 m/s impacts over 2.0 sec?
- What is the velocity of an 8.5 kg object that applied 350 N of force over 1.25 sec?

Law of Conservation of Momentum

- Law of conservation of momentum states that if no net force acts on the system, then the total momentum of the system does not change.



https://www.guyhowto.com/law-of-conservation-of-momentum/

- In a closed system, there is no external force cause a change in the system.
- $p_{ia} + p_{ib} = p_{fa} + p_{fb}$

Practice

- A 1875 kg car going 23 m/s rear ends a 1025 kg compact car going 17 m/s on ice in the same direction. The two cars stick together. How fast do the two cars move together immediately after the collision?
- V_f = 21 m/s

Practice

- A 35.0 g bullet moving at 475 m/s strikes a 2.5 kg bag of flour on a frictionless surface, at rest. The bullet passes through the bag and exits it at 275 m/s. How fast is the bag moving when the bullet exits?
- 2.8 m/s

Summary

- Momentum describes the interaction of collisions between objects.
- Momentum and impulse make up a system.
- Momentum is conserved before and after a collision that is elastic.

Assignment

- Momentum Packet