

Discussion Worksheet 7 - Momentum and Collisions

1. Write expressions showing the conservation of momentum for the following scenarios. What can you say about the conservation of energy?

a. Elastic Collision

$$\frac{1}{2}mv_i^2 = \frac{1}{2}mv_f^2$$

I think energy is conserved

b. Inelastic Collision

2. Your gym teacher throws a heavy medicine ball to you for you to catch. She is next going to throw you a baseball that has a mass one-tenth of that of the medicine ball. You can have the baseball thrown with

- (i) the same speed as the medicine ball,
- (ii) the same momentum as the medicine ball, and
- (iii) the same kinetic energy as the medicine ball.

$$v = \frac{d}{t}$$
$$p = m\vec{v}$$
$$KE = \frac{1}{2}mv^2$$

Rank these choices from the slowest to the fastest speed of the baseball

2
1
3 ↓

3. A fragile plate is placed on a table. You drop two identical eggs from the same height toward the plate, but in one scenario, the egg lands on a soft pillow placed on the plate, and in the other, it lands directly on the hard plate.

Which egg experiences a greater impulse during the collision, and why?

The one that strikes the hard plate; while the egg that strikes the pillow, dissipating the impulse via the pillow.

Which scenario is more likely to break the plate, and how does this relate to the concept of impulse?

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