

Momentum in Two Dimensions

Video lesson: www.physicsbydiscovery.com → 12th Physics → Unit 4: Momentum

1) Two billiard balls (156 g each) undergo a glancing collision. Before the collision, Ball 1 has a velocity of 7.5 m/s in the +x direction, and Ball 2 is at rest. After the collision, the velocity of Ball 1 is 5.4 m/s at 61°. Find the velocity of Ball 2 after the collision.

Applying the Momentum Principle

1. Pictures and Variables

- Define a coordinate system
- Draw “before” and “after” pictures, labeling variables

2. System Analysis

- Define the system
- Analyze external forces
- Is the system isolated?

3. Mathematics

1st: Write the Momentum Principle.

2nd: Substitute mass and velocity symbols for non-zero terms

3rd: Substitute values

4th: Solve

4. Momentum Bar Chart

- Draw a bar chart for each component direction
- Compute a value for each bar and label
- Do an audit