

### Momentum Problem-Solving

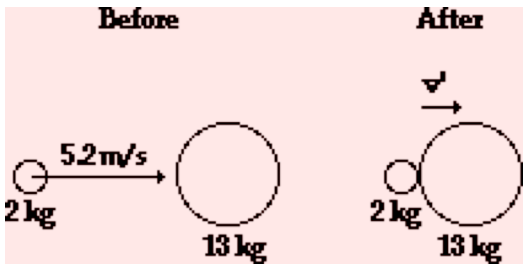
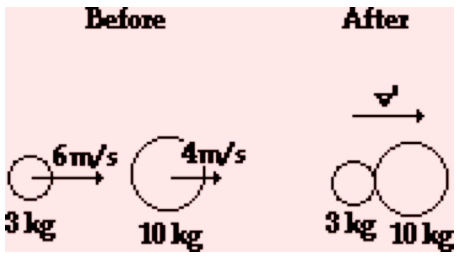
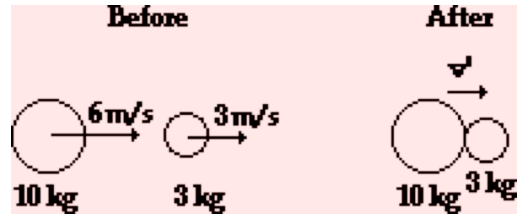
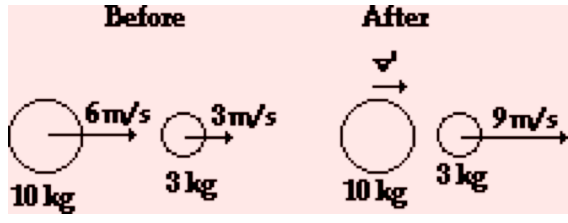
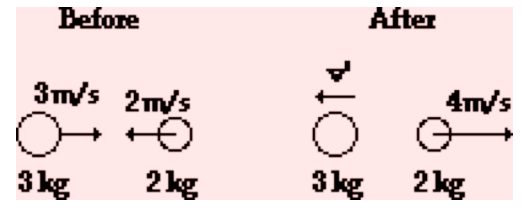
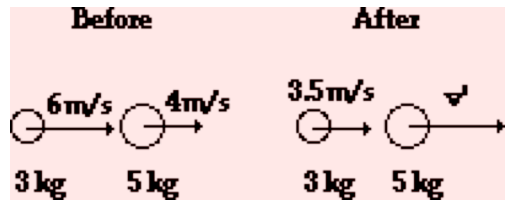
Read from **Lesson 2** of the **Momentum and Collisions** chapter at **The Physics Classroom**:

<http://www.physicsclassroom.com/Class/momentum/u4l2d.html>

<http://www.physicsclassroom.com/Class/momentum/u4l2e.html>

**MOP Connection:** Momentum and Collisions: sublevels 8 and 9

1. Determine the post-collision velocities of the following objects or combination of objects.

<p>a.</p>  <p><b>Before</b>                      <b>After</b></p> <p>2 kg                      2 kg                      13 kg</p> <p>52 m/s                      v                      v</p>	<p>b.</p>  <p><b>Before</b>                      <b>After</b></p> <p>3 kg                      3 kg                      10 kg</p> <p>6 m/s                      4 m/s                      v</p>
<p>c.</p>  <p><b>Before</b>                      <b>After</b></p> <p>10 kg                      10 kg                      3 kg</p> <p>6 m/s                      3 m/s                      v</p>	<p>d.</p>  <p><b>Before</b>                      <b>After</b></p> <p>10 kg                      10 kg                      3 kg</p> <p>6 m/s                      3 m/s                      v                      9 m/s</p>
<p>e.</p>  <p><b>Before</b>                      <b>After</b></p> <p>3 kg                      3 kg                      2 kg</p> <p>3 m/s                      v                      4 m/s</p> <p>2 m/s</p>	<p>f.</p>  <p><b>Before</b>                      <b>After</b></p> <p>3 kg                      3 kg                      5 kg</p> <p>6 m/s                      3.5 m/s                      v</p> <p>4 m/s</p>

## Momentum and Collisions

2. A 2.1-kg brick is placed gently upon a 2.9-kg cart originally moving with a speed of 26 cm/s. Determine the post-collision speed of the combination of brick and cart.
3. A 98-kg fullback is running along at 8.6 m/s when a 76-kg defensive back running in the same direction at 9.8 m/s jumps on his back. What is the post-collision speed of the two players immediately after the tackle?
4. A 0.112-kg billiard ball moving at 154 cm/s strikes a second billiard ball of the same mass moving in the opposite direction at 46 cm/s. The second billiard ball rebounds and travels at 72 cm/s after the head-on collision. Determine the post-collision velocity of the first billiard ball.
5. A 225-kg bumper car (and its occupant) is moving north at 98 cm/s when it hits a 198-kg car (occupant mass included) moving north at 28 cm/s. The 198-kg car is moving north at 71 cm/s after the head-on collision. Determine the post-collision velocity of the 225-kg car.
6. A 4.88-kg bowling ball moving east at 2.41 m/s strikes a stationary 0.95-kg bowling pin. Immediately after the head-on collision, the pin is moving east at 5.19 m/s. Determine the post-collision velocity of the bowling ball.