

Momentum Problems

6. A 1.5 kg cart moving at 3 m/s crashes and sticks to a second cart initially at rest. If they are going at 2 m/s when they are stuck together, what is the mass of the second cart?

7. An archer shoots a 0.1 kg arrow with a speed of 60 m/s at an 0.5 kg apple. If the arrow sticks in the apple, what is the final speed of the apple and arrow?

8. Peggy (50 kg) and Bill (70 kg) are having an argument standing on an icy surface. Peggy pushes Bill so that Bill moves backward with a speed of 2 m/s?
 - a. How fast does Peggy move after she pushes Bill?

 - b. Who experiences more force?

9. Barry runs with a speed of 5 m/s and jumps on a stationary 7 kg skateboard. If Barry's mass is 60 kg, how fast are Barry and the skateboard moving?

10. Darlene is enjoying a relaxing day on her 20 kg canoe, when she drops her cell phone into the lake. Darlene jumps off the boat and into the lake with a speed of 2.5 m/s and the boat moves in the opposite direction with a speed of 4 m/s. What is Darlene's mass?

- *11. A car traveling at 30 m/s skids on some ice and crashes and sticks to a car of mass 1500 kg. The two cars move at 21 m/s when they are stuck together. What was the mass of the first car?

12. You are walking down the hall and you randomly over hear one student tell another student "Everyone knows that when two cars collide the smaller car always experiences more force." Is this statement correct?

Answers: 1. a) throw backpack b) 0.71 m/s 2) 6 m/s b, c, d.) same e, f) cannonball
 3. a) 1.2 m/s b) opposite 4) 1.56 m/s 5) a)10.7 m/s b) same
 6) 0.75 kg 7) 10 m/s 8. a) 2.8m/s b) same 9) 4.5 m/s
 10) 32 kg 11) 3500 kg 12) Incorrect, Newton's 3rd Law