1. Timmy and Tommy are playing billiards. A billiard ball (mass = 0.15 kg) is moving at 1.0 . It rebounds from a side cushion with the same speed.
   1. What was the ball's change in momentum? *(Note: Be sure to designate which direction is "positive" and "negative.")*
   2. How is momentum conserved in this collision?
2. Kenny is doing an experiment. He has a 4.0 kg mass moving at 3.0 toward the right and a 6.0 kg mass moving at 2.0 to the left on a horizontal frictionless table. If the two masses collide and remain together after the collision, what is their final momentum?
3. Scotty Smalls is playing with his new train set. A toy train car with a mass of 200. g and a velocity of 0.80 collides with a second car that is at rest and has equal mass. The two cars couple together.
   1. Assuming no friction, what is the velocity of the 2 cars after collision?
   2. What is the momentum of the 2-car system before and after the collision?
   3. The two moving cars above collide with a 3rd car, mass of 150 g (at rest), and couple together. What is the resulting velocity of the 3 cars?
   4. What is the momentum before and after the collision?
4. A Squints is on a sled (total mass 45 kg) being pulled by Benny so that the sled goes from rest to 4.5 m/s.
   1. If the force applied is 40. N, what is the total distance covered during the impulse?
   2. What is the change in momentum of the child and sled? Is momentum conserved? Explain…
5. Ham and Bertram are at the rail yard. A 1200 kg railroad car travels alone on a level frictionless track with a constant speed of 18 . A 5750 kg additional load is dropped (initially at rest) onto the car. What will the cars speed be after the additional cargo is added?
6. Yeah-Yeah joins his friends at the rail yard and sees a 9500 kg boxcar traveling at 16 that strikes a second car at rest. The two stick together and move off with a speed of 6.0 . What is the mass of the second car?