

1. Two objects, A & B, are traveling at the same speed. Object A has 3 times the mass of object B. Compare the momentum of each object.

2. Two other objects, C and D, have identical masses. Object C has twice the speed of object D. Compare the momentum of each object.

3. While being thrown, a net force of 132 N acts on a baseball for 4.5×10^{-2} sec. What is the magnitude of the change in momentum of the ball?

4. When Billy the batter hits the ball, a net force of 1320 N acts on the ball for 9.0×10^{-3} s during the hit. What is the change in momentum of the ball? If the mass of the ball is 0.140kg what will its velocity be?

5. a) What force does the ball exert on the bat in the question above?

b) What is the change in momentum of the bat?

1. Kim holds a 2.0 kg air rifle loosely and fires a bullet of mass 0.001 kg. The velocity of the bullet is 150 m/s. What is the recoil speed of the gun?
2. If the girl in the previous question holds the gun tightly against her body, the recoil speed is less. Explain why. Calculate the new recoil speed assuming the girl has a mass of 48 kg.
3. An empty freight car, coasting at 10 m/s, strikes a loaded car that is stationary, and the cars couple together. The empty car has a mass of 3000. The loaded car has a mass of 15,000 kg. What is the speed of the two cars coupled together?
4. An astronaut of mass 80. kg carries an empty oxygen tank of mass 10. kg. He throws the tank away from himself with a speed of 2.0 m/s. With what speed does he start to move off into space?
5. One girl with mass of 50.0 kg is skating on frictionless in-line skates at a speed of 10.0 m/s. She collides with another girl with a mass of 70.0 kg at rest. What is the speed of the 2 girls if they hold hands after the collision and move together?