Momentum #1

1. A deer with a mass of 146 kg is running head-on toward you with a speed of 17 m/s. What is the momentum of the deer?

2. An 800-kg car is going 15 m/s before the engine applies a force of 750 N for 8 seconds. What is the car's velocity now?

3. A 12-kg hammer strikes a nail at a velocity of 8.3 m/s. It comes to a rest in 0.012 seconds. What is the average force that acts on the nail?

4. A baseball is thrown by a pitcher with a velocity of 43 m/s. The batter hits **straight back** at the pitcher with a velocity of 56 m/s. If the ball was in contact with the bat for 0.45 s, and has a mass of 0.145 kg, what is the force on the baseball? (*Hint:* Be careful with your knowns and unknowns; one should be negative.)

5. A piece of putty and a bouncy ball, each of mass 0.035 kg, are thrown up against a wall. They each have an initial velocity of 5 m/s, but the bouncy ball returns towards the thrower with the same velocity, while the putty sticks to the wall. Which object has the larger change in momentum?