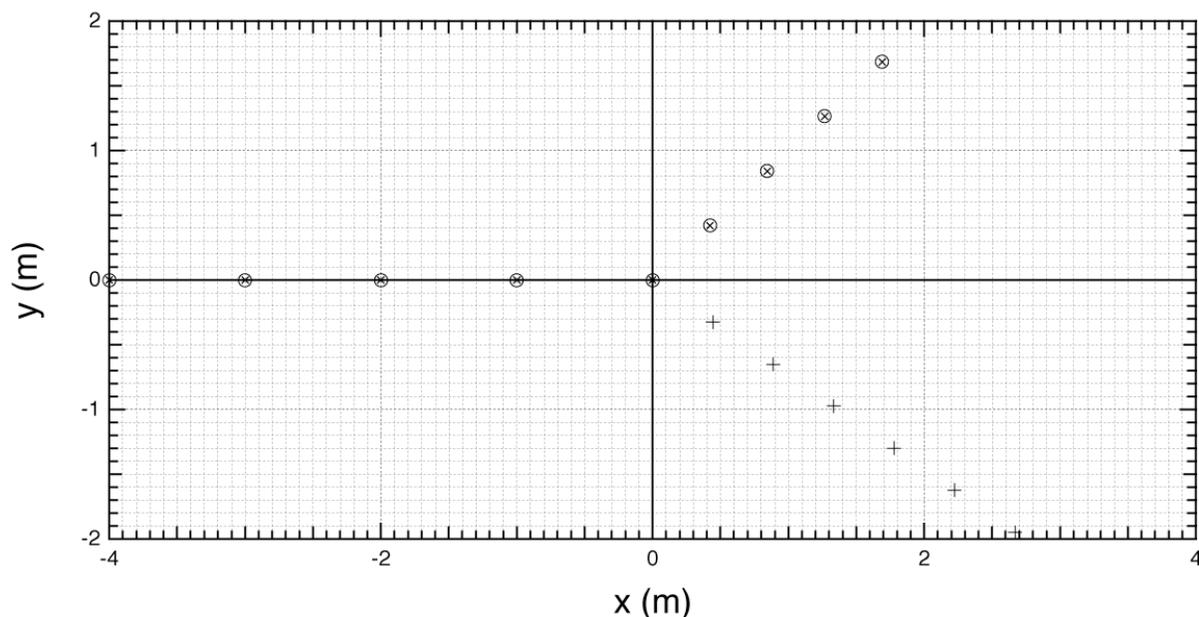


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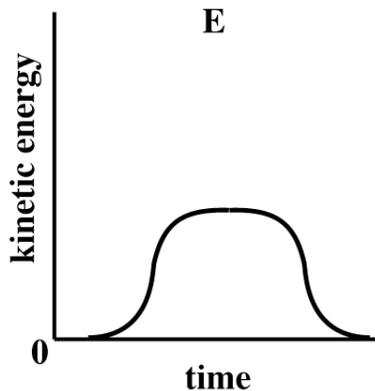
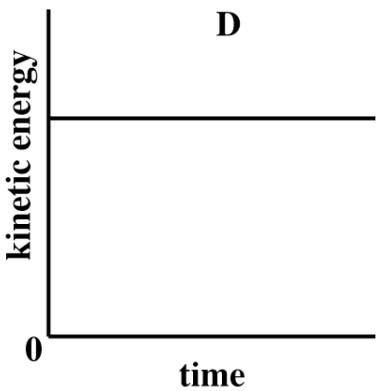
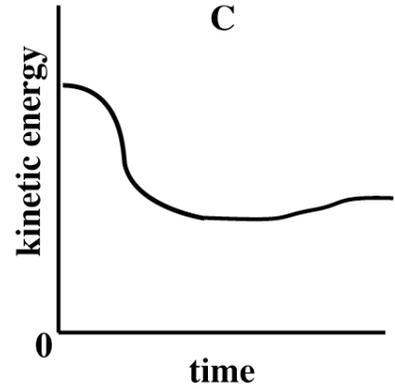
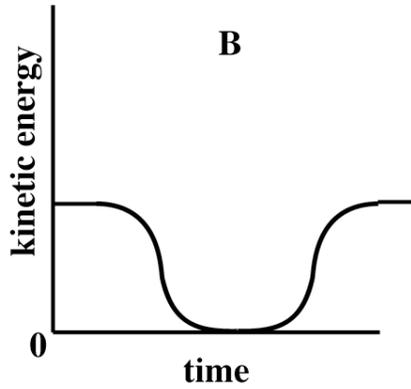
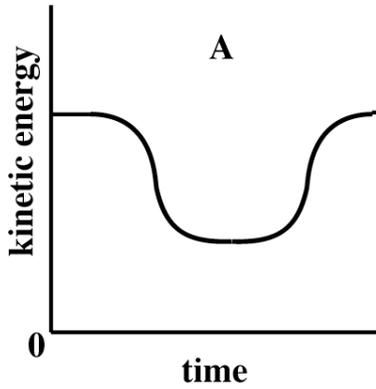
1. A machine gun is fired at a steel plate. Is the force on the plate from the bullet impact greater if the bullets bounce off or if they are squashed and stick to the plate? Why?
2. A 5.00 g bullet is shot through a 1.00 kg wood block suspended on a string 2.000 m long. The center of mass of the block rises a distance of 0.45 cm. Find the speed of the bullet as it emerges from the block if its initial speed is 400 m/s.
3. The Figure shows the result of a collision of a 1-kg ball with an object located at the origin. The positions of the objects are shown at 1-s intervals. What is the mass of the object that was originally located at the origin?



4. A tennis ball hits a wall and bounces off. Is momentum conserved for the ball? Is momentum conserved for the wall? Is momentum conserved for the system consisting of the ball and the wall?
5. At the LA Lakers' basketball arena in Los Angeles, a maintenance man has tried out a new type of floor wax that has unfortunately rendered the floor of the court *completely frictionless*. Shaquille O'Neal has been standing in the middle of the court dreaming of another NBA championship during the waxing process, and is now stranded there. Luckily, he is carrying his NBA Most Valuable Player trophy, which weighs 50 pounds. If O'Neal, who weighs 300 pounds, hurls the trophy away from himself at 6 m/s, how long will it take him to reach the unwaxed edge of the court, 30 meters away?
6. In a zero-gravity environment, can a rocket-propelled spaceship ever attain a speed greater than the relative speed with which the burnt fuel is exhausted?

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7. Two magnets are mounted on Dry Ice pucks and placed on a smooth horizontal surface. Initially, one is at rest and the other is moving in from a distance so as to make an off-center interaction with the first. Which of the statements below regarding the kinetic energy graphs are correct?



- Graph C best shows the kinetic energy of the incoming puck as a function of time.
- Graph B best shows the kinetic energy of the incoming puck as a function of time.
- Graph A best shows the sum of the kinetic energies of the two pucks as a function of time.
- Graph C best shows the sum of the kinetic energies of the two pucks as a function of time.
- None of the graphs are even close to showing the sum of the kinetic energies of the two pucks as a function of time.