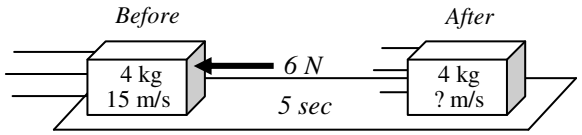
A-Day: Due Mon., Dec 10 (Assigned: 12/8)
B-Day: Due Tues., Dec 11 (Assigned: 12/9)

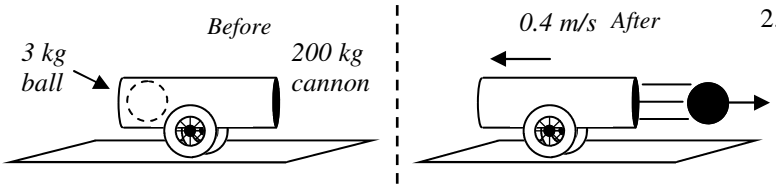
2008 Momentum 2

1. A 4 kg object moving 15 m/s is pushed on by a 6 N force for 5 seconds. How fast is it going afterwards?
   A. How many objects are moving before?
   B. Is the impulse positive or negative?
   C. Does the impulse add or subtract momentum?
   D. Since $\Sigma p_{before} \pm I = \Sigma p_{before}$ and impulse changes momentum, how much final momentum must the object have?
   E. Below the diagram I have already given you the Conservation of Momentum equation. Put in the equations for "p" and "I" and solve for the final velocity.



$\Sigma p_{before} \pm I = \Sigma p_{before}$

$p_B - I = p_A$

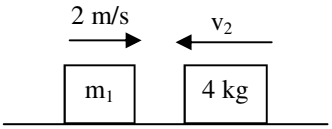


$\Sigma p_{before} \pm I = \Sigma p_{before}$

$0 = p_{cannon} + p_{ball}$

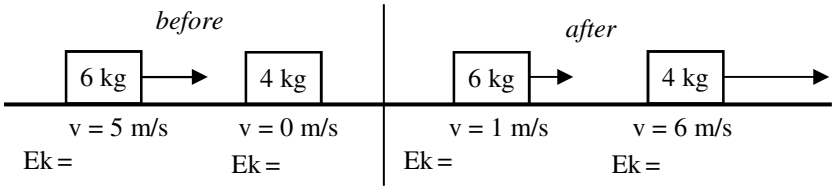
2. A 3 kg cannonball is shot from a 200 kg cannon. The cannon recoils backwards at 0.4 m/s backwards. What is the velocity of the ball after it is shot?
   A. Since the ball is sitting in the cannon, beforehand, what is the initial velocity of the cannon and ball?
   B. What is the net momentum before?
   C. Since momentum MUST be conserved, how much total momentum must there be afterwards?
   E. Is the final velocity of the cannon + or −?
   F. Use the given equation to solve for the final velocity of the ball.

3. What is the net momentum of the two objects shown? (*Your answer will have variables in it.)*



Use the "Types of Collisions" notes to answer the following:

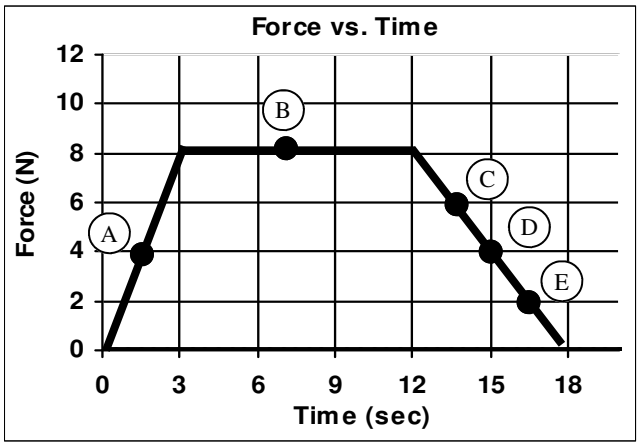
4. What kind of collision: elastic (E), inelastic (I), or perfectly inelastic (PI) (can be more than one or all)?
   A. _____ Two object collide and stick together.
   B. _____ Two objects collide, do not combine, and Ek is conserved.
   C. _____ Two objects collide, do not combine, and Ek is NOT conserved.
   D. _____ The spaceshuttle when it docks with the International Space Station (it attaches).
   E. _____ A superball drops from 2 m and rebounds back to 2 m.
   F. _____ Two cars collide, do not stick, and the cars are badly damaged.



$\Sigma Ek_{before} =$ $\Sigma Ek_{before} =$

5. The diagram at the left shows two objects colliding and their velocities before and after.
   A. Calculate the Ek of each object before and after.
   B. Calculate the net Ek before and the net Ek after (add them together).
   C. Was Ek conserved?
   D. Is this an elastic or inelastic collision?

6. If a positive force is acting on an object already moving to the right does it speed up or slow down?



7. The graph at the right shows the force acting on an object. The object begins at rest.
   A. At letter A, is the force positive or negative?
   B. So, from 0 to 3 seconds, will the object will move to the right or left?
   C. At letter B is the force positive or negative?
   D. From 3 to 12 seconds, does the object speed up or slow down?
   E. At letter C is the force positive or negative?
   F. At letter D is the force positive or negative?
   G. From 12 to 18 seconds, does the object speed up or slow down?
   H. Which letter shows a negative force?

8. Given $3Na_2CO_3$,
   A) What is the coefficient?
   B) What is the subscript on oxygen?
   C) How many sodium atoms are there in each molecule?
   D) How many molecules of sodium carbonate are there?
   E) How many total oxygen atoms are there?
   F) How many total sodium atoms are there?

9. Give reaction notation for A) $3CaCrO_4$ = B) $6Na_2O$ =

Studying for the final.

10. An object is at rest
    A) Give two kinds of energy it could have.

    B) Give a kind of energy it could not have.

11. The picture at the right shows an object ***moving to the left*** at 8 m/s.
    A) Identify force A:
    B) Identify force B:
    C) Identify force C:
    D) Calculate force B:

    E) Calculate force C:

    F) Calculate how much energy it has.

    G) If all the forces are shown, will the object have a positive or negative acceleration?