2008 Momentum 7

M. $p_{1B} + p_{2B} = p_{1A} + p_{2A}$

N. $p_B - I = p_A$

O. $p_{1+2B} = p_{1A} + p_{2A}$

P. $0 = p_{1A} + p_{2A}$

Q. $p_B - I = 0$

R. $p_B + I = p_A$

S. $p_{1B} + p_{2B} = p_{1+2A}$

T. $0 + I = p_A$

U. $p_{1B} + p_{2B} = 0$

1. Choose the Conservation of Momentum Equation at the left that matches the following situations. You will not use all of the equations.

A. _____ A rocket starts at rest. It moves forward by shooting gases backwards.

B. _____ A rock at rest is thrown by someone. (*Give the equation for just the rock.*)

C. _____ Two ice skaters bump into each other and grab on.

D. _____ Two carts hit each other and stop.

E. _____ A car uses its brakes to slow down.

F. _____ A person rolling on a skateboard catches a football.

2. Impulse equals _____ or _____.
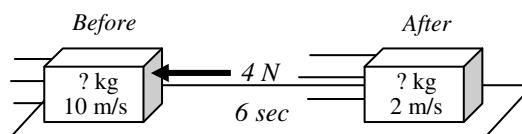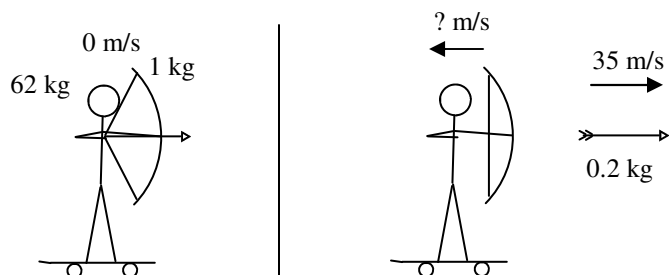
3. Slim Jim tries skateboard archery! Having gained a bit of weight during the holidays, Jim is now 62 kg. The bow is 1 kg and the arrow is 0.2 kg. If the arrow ends up going 35 m/s, how fast does Jim move backwards?

4. An object moving 10 m/s slows down to 2 m/s due to a 4 N for 6 seconds. What is the mass of the object?

5. When two objects collide, how does the total momentum afterwards compare with the total momentum before? (more, less or the same?)

6. When two objects push off from each other, how does the total momentum afterwards compare with the total momentum before?

7. When an object is pushed on by a positive force, how does the momentum of the object afterwards compare with the its momentum before?

8. Given $3K_2SO_4$
   A. How many molecules are there?
   B. How many total potassium atoms are there?
   C. How many total oxygen atoms are there?
   D. Give the reaction notation (*see example at the right*):

Reaction notation $\longrightarrow$

$6H_2O$

$H_{12}O_6$

9. Balance the following reactions. (*Hint: treat anything in parenthesis as if it were just another element.*)

___ $AlCl_3$ + ___ $Na_2(CO_3)$ → ___ $Al_2(CO_3)_3$ + ___ $NaCl$

____ Fe + ____ O_2 → ____ Fe_2O_3
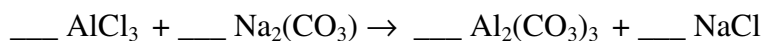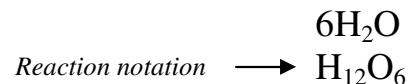
10. A 2 kg box and a 4 kg box fall.
    A.   If there is air friction and they are the same size, which one hits the ground first?
    B.   If they fall in a vacuum, which one hits first?

11. If the triangle and box at the right *fall thru air* (and have equal mass), which one hits the ground first?

12. Object A travels twice as far as Object B in the same amount of time. Object B's speed is _____ has much as the speed of Object A?

13. Object A travels the same distance as Object B, but Object A does it in half the time. The speed of Object A is _____ the speed of Object B.

14. If one of the masses is doubled, the gravity:

15. If the distance between two masses triples, the gravity: