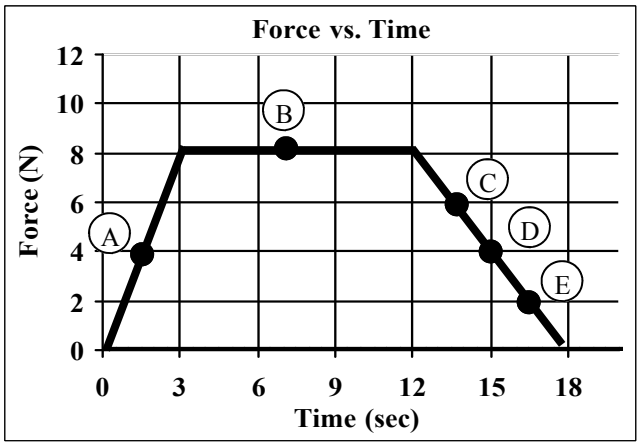
Momentum 2



1. The graph at the left shows the force acting on an object. The object begins at rest.

A. Which letter (s) show a negative force?

B. At letter A, is the force positive or negative?

C. So, from 0 to 3 seconds, will the object will move to the right or left?

D. Calculate the change in momentum from 0 to 3 seconds.

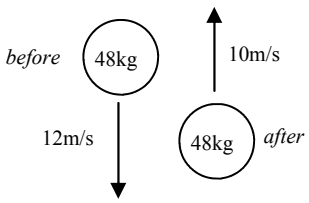
E. At letter B is the force positive or negative?

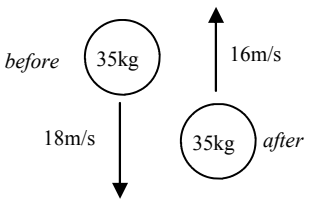
F. From 3 to 12 seconds, does the object speed up or slow down?

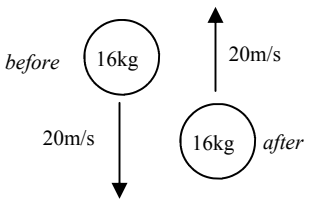
G. From 12 to 18 seconds, does the object speed up or slow down?

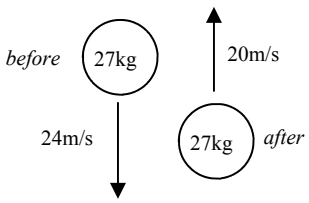
H. Calculate the change in momentum from 0 to 18s.

I. If a 5 kg object was moving 2.5 m/s before the impulse shown, calculate its final velocity









2. A. Calculate the change of momentum for each of the above masses.
   B. Rank the above masses from greatest to least magnitude. If any are the same, put them on the same number.
   1. _____ 2. _____ 3. _____ 4. _____

3. Two cars collide and stick together upon impact. The first car (m_1=1000kg) was initially moving at 20 m/s. The second car (m_2=1500 kg) was stopped at a stop sign. After the collision, the cars move with a velocity of 8 m/s.

a. Which car experienced the greatest force?

b. Which car experienced the greatest change in momentum?

c. What was the impulse experienced by each car?

d. If the collision took place over 0.5 s, what was the force experienced by each car?

e. If the collision took place over 0.5 s, what was the acceleration of each car?

3. Two eggs (.25 kg each) are dropped from the top of a 20 m high building. Each hits the ground with the same velocity and stops.

a. What is the velocity of each egg before it hits the ground?

b. What is the change in momentum of each egg?

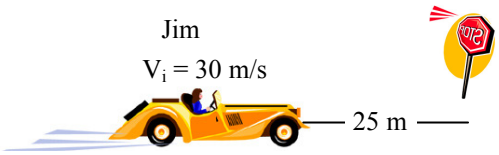
c. What is the impulse experienced by each egg?

d. The first egg hits the ground and stops in 0.002 s. The other egg is protected by a drinking-straw scaffolding and stops over a time of 0.05 seconds. What is the average stopping force experienced by each egg?

e. Which egg has the better chance of surviving the fall?

p_i = p_f =

Δp =



p_i = p_f=

Δp =

4. John and Jim driving identical 1,000 kg cars.

A. Calculate and label the initial momentum of each.
B. When they stop, what is their final momentum?
C. * Calculate and label the momentum for each car.
D. Which one had a bigger change of momentum?

E. Which one took more time to stop?
F. Which one needed a bigger force to stop?

G. Which one had the bigger impulse?

H. Using a kinematic equation, find the time for John to stop.

I. If Jim's brakes apply 18,000 N of force in stopping, calculate his stopping time.