**MOMENTUM & IMPULSE NOTES**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date: \_\_\_\_\_\_\_\_\_\_\_\_Period: \_\_\_\_\_\_\_\_\_

Momentum

Where:

p=

m=

v=

Any moving object has \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

which depends on:

1.

2.

Momentum is a …………………. quantity, meaning it has both ………………………… and …………………….…

The units are …………….…… but can also be written as …………….…….

Ex 1. Calculate the momentum of a 6.2 kg pumpkin traveling at a velocity of 5.0 m/s west.

Ex2. A baseball of mass 0.14 kg is moving at 35.0 m/s.

a. Find the momentum of the baseball.

b. Find the velocity at which a bowling ball, mass 7.6 kg, would have the same momentum as the baseball.

Remember that:

Δ=\_\_\_\_\_\_\_\_\_\_\_\_=

Ex3:

a) A 0.50 kg water balloon is thrown against a wall at 32 m/s coming to a stop. What was its change in momentum?

b) A 0.50 kg bouncy ball is thrown at 32 m/s, bouncing back with the same speed. How does its change in momentum compare to that of the water balloon.

IMPULSE (J)

**Impulse ( )**

Impulse: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

We can derive the change in momentum (Impulse) from Newton’s 2nd Law:

Ex2. A soccer player kicks a 0.450 kg ball at 25.0 m/s east. If the goalie stops the ball by exerting 215 N of force, how long does it take the ball to stop?

If the goalie stops the 6.5 kg bowling ball traveling at the same amount of time, how much force is required?

Ex1. Luigi is sick of taking orders. He swings a 9.0 kg hammer at 16 m/s when Mario’s mustache brings it to a stop in 0.25 s. what is the net force exerted on Mario’s mustache?

Example: Coaches for many sports such as baseball, tennis, and golf can often be heard telling their athletes to “follow through” with their swing. How does this help the weaker player hit the ball farther than the stronger player? Use the Impulse equation to answer this question.

Example: using the principles of Impulse, explain why an airbag can help people sustain less damage during a collision.

