Momentum and Impulse Review:

Momentum --- think Pomentum

Momentum is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Formula:

momentum = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ x \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

p stands for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ measured in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

m stands for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ measured in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

v stands for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ measured in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Impulse --- think Jimpulse

Impulse is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Formula:

Impulse = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ x \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

J stands for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ measured in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

F stands for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ measured in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

T stands for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ measured in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The unit for impulse is the same as the unit for momentum.

Unit for impulse is Ns. This equals kg(m/s2)(s). The seconds cancel out to equal kgm/s. Which is the same unit for momentum.

**Impulse- Momentum Theorem**

**Formulas you will need to be able to use:   
Ft = m (vf – vi)**   
**Ft = mvf – mvi**

Impulse equals change in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Example 1:**  
A 0.75kg baseball is moving to the left at 30m/s. A bat is being swung with 900 N of force for 0.5 s.

What is the final velocity of the baseball?

The law of conservation of momentum

In a system, momentum is neither created nor destroyed. In other words, total momentum is constant.

**Two Types of Collisions**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**: Kinetic energy is not lost to friction, acoustical (sound) energy, heat, etc.

Object’s “bounce” off each other

For example: collisions on ice, in space, air hockey table

**Draw a picture of this type of collision:**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**: Kinetic is lost to friction, heat, acoustical energy, etc.

For example: car crash, train cars connecting

**Draw a picture of this type of collision:**

**Formulas:**

**Elastic collision:**

m1 = the mass of object A

v1 = velocity of object A BEFORE collision

v1f = velocity of object A AFTER collision

m2 = mass of object B

v2 = velocity of object B BEFORE the collision

v2f = velocity of object B AFTER the collision

**Inelastic collision:**

m1 = the mass of object A

v1 = velocity of object A BEFORE collision

m2 = mass of object B

v2 = velocity of object B BEFORE the collision

vf = velocity of objects A and B AFTER collision

A car of mass 500kg travelling at 30 m/s rear ends another car with a mass of 600kg travelling at 20 m/s in the same direction. The collision is great enough that the two cars stick together after they collide. What type of collision is this and how fast will the cars be moving after the collision?

A 3000kg truck moving at 10 m/s hits a 1000kg parked car. The impact causes the 1000kg car to be set into motion at 15 m/s and the 3000kg truck then bounces off in the opposite direction. Determine the velocity of the truck after the collision.