Lab: Conservation of Momentum Name Key

Part I: Elastic Collisions

BEFORE COLLISION AFTER COLLISION

Case #1

(1 kg)(1 m/s) + (1 kg)(0 m/s) = (1 kg)(0 m/s) + (1 kg)(1 m/s)

1 $\frac{kg \cdot m}{s}$ = 1 $\frac{kg \cdot m}{s}$

Case #2

(1 kg)(1 m/s) + (2 kg)(0 m/s) = (1 kg)(0 m/s) + (2 kg)(0,5 m/s)

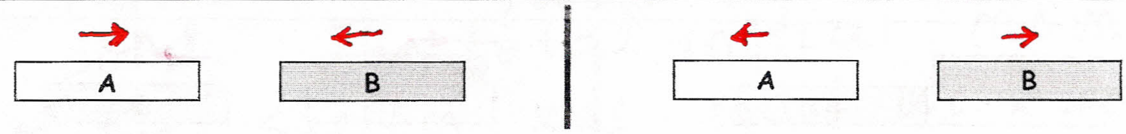
1 $\frac{kg \cdot m}{s}$ = 1 $\frac{kg \cdot m}{s}$

Case #3

(1 kg)(2 m/s) + (1 kg)(1 m/s) = (1 kg)(1 m/s) + (1 kg)(2 m/s)

3 $\frac{kg \cdot m}{s}$ = 3 $\frac{kg \cdot m}{s}$

Case #4



(1 kg)(1 m/s) + (1 kg)(-1 m/s) = (1 kg)(-1 m/s) + (1 kg)(1 m/s)

0 $\frac{kg \cdot m}{s}$ = 0 $\frac{kg \cdot m}{s}$

Lab: Conservation of Momentum **Name**________________________

Part II: Inelastic Collisions

BEFORE COLLISION AFTER COLLISION

Case #5

(1 kg)(1 m/s) + (1 kg)(0 m/s) = (2 kg)(0.5 m/s)

___1___ $\frac{kg \cdot m}{s}$ = ___1___ $\frac{kg \cdot m}{s}$

Case #6

(1 kg)(1 m/s) + (1 kg)(-1 m/s) = (2 kg)(0 m/s)

___0___ $\frac{kg \cdot m}{s}$ = ___0___ $\frac{kg \cdot m}{s}$

Part III: Explosions

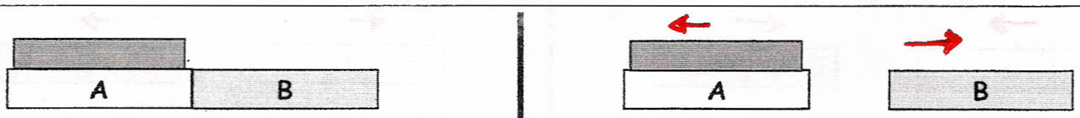
BEFORE EXPLOSION AFTER EXPLOSION

Case #7

(2 kg)(0 m/s) = (1 kg)(-1 m/s) + (1 kg) (1 m/s)

___0___ $\frac{kg \cdot m}{s}$ = ___0___ $\frac{kg \cdot m}{s}$

Case #8



(3 kg)(0 m/s) = (2 kg)(-0.5 m/s) + (1 kg) (1 m/s)

___0___ $\frac{kg \cdot m}{s}$ = ___0___ $\frac{kg \cdot m}{s}$

Lab: **Conservation of Momentum** Name____________________

<u>Conclusion Questions</u>

1. If a truck runs into a wall and stops, the truck loses momentum. Because momentum cannot be created or destroyed, where does it go?

the momentum will conserve according to law of conservation of momentum. The momentum lost by the truck will be absorbed by the wall. The motion of the wall will be very small because the wall is fixed in the building.

2. Someone throws a heavy ball to you when you are standing on roller skates. You catch it and roll backwards. How does your speed compare to the speed of the ball, and why?

The total momentum will conserve. The momentum lost by the ball will be transfered to you. The total mass after this inelastic collision is equal with the mass of the person + mass of the ball.

$$v_{after} = \frac{m_{ball} \cdot v_{ball}}{m_{ball} + m_{pers}}$$

3. A prospector finds himself holding his bag of gold and standing in the middle of a large pond of <u>frictionless</u> ice. How can he get to the side before he freezes?

The prospector will have the throw the bag toward the center of the pond. The ~~total~~ initial momentum of the system was equal with zero.

$$(m_1+m_2)\cdot v_{initial} = 0 = \underbrace{m_1 \cdot v_1}_{bag} - \underbrace{m_2 \cdot v_2}_{person}$$