Physics

Conservation of Momentum

Name:_____ Block:_____

Learning Target: I can apply the law of conservation of momentum to solve real-life problems.

Today you will apply what you have already learned about momentum to real-life scenarios to calculate masses and velocities. You will be playing with several different simulations, so make sure you stay on task so that you don't have to finish it on your own.

Part 1 – http://zebu.uoregon.edu/nsf/mo.html.

A. The first picture is of a cannon and a railcar. You get to control how much mass the railcar has and how much momentum the cannonball has. Underneath the picture are 4 hands with questions. Answer those questions below:

   1. _____
      _____
      _____

   2. _____
      _____
      _____

   3. _____
      _____
      _____

   4. _____
      _____
      _____

B. The second picture on this website is of a 2 train cars having an *inelastic collision*. The first train car has a mass of 100 kg. You get to pick the numbers for the momentum and the mass of the second train car. Since momentum before the collision is equal to the momentum after the collision the following formula applies:

$$\mathbf{m_1v_1 + m_2v_2 = (m_1+m_2)v'}$$

   Pick your momentum and mass 4 different times and predict what the final velocity will be for 4 different trials. Then run the trials and see if your predictions are correct.

Trial	m_1	p	$v_1=p/m_1$	m_2	v_2	v′	correct?
1	100 kg				0 m/s		
2	100 kg				0 m/s		
3	100 kg				0 m/s		
4	100 kg				0 m/s		

C. The third picture is another picture of an *inelastic collision* between 2 train cars. This time you have to determine the mass of the <u>initial</u> car. Use the space below to help you work on it. The following formula will help:

$$\mathbf{m_2 = (p/v')-m_1}$$

m_1 =

m_2 =

p =

v′ =

D. The last picture is just like the one from letter c above, but the mass of the 1st car is different. Figure out its mass. Again:

$$\mathbf{m_2 = (p/v')-m_1}$$

m_1 =

m_2 =

p =

v′ =

Part 2 – http://www.sciencewithmrnoon.com/projectarise/physics1st/newtoncradle.swf

Play with Newton's Cradle. Drag the balls up and release to see what happens, then answer the questions below.

What happens when you swing one ball?

What happens when you swing two balls?

What happens when you swing three balls?

What happens when you swing four balls?

What happens when you swing five balls?

Why are you getting the reaction you are getting in terms of momentum? (What law is being observed?)