Worksheet for Collision Applet                                    Name: _____

For this initial activity, we will only use the 1D mode of the collision applet. Note that positive velocity is taken to be to the right in this simulation. Make sure velocity vectors are turned on (they are by default).

Thanks!

1.  How can you adjust the velocity of ball 1?


2.  How can you change the mass of the balls?


3. Initially have mass 1 move with some velocity to the right, and set m1 = 0.5 kg, and m2 = 1.5 kg (Leave elasticity at 100%). Draw a before and after picture with qualitative velocity vectors on both balls for this collision.

                    Before                              After




4. Adjusting ONLY THE MASS OF BALL 1, how does the result of the collision change? There are three qualitatively different results you can achieve. Draw the different results and conditions needed to get those results (state how mass 1 compares to mass 2).

Condition 1:
                    Before                              After




Condition 2:
                    Before                              After




Condition 3:
                    Before                              After




Write three sentences describing the three patterns you see in relation to mass 1.

5. Check the box on the right labeled "Kinetic Energy." This calculates the total kinetic energy of the system. Is KE lost on your current settings? What determines whether KE is lost or conserved? Adjust the variables that you have access to in order to see (mass, velocity, elasticity).


6. Now, set the two masses to be equal (at this point you should be able to tell me what happens with these settings). Keeping velocity and mass constant, how does elasticity affect the result of the collision? Again, there are three qualitatively different results.

Condition 1:
                        Before                                After



Condition 2:
                        Before                                After



Condition 3:
                        Before                                After



7. When do the two objects 'stick together'? Is energy conserved in this case? Does mass have an effect?


8. Click the "More data" button at the bottom. Adjust the velocity and mass of your objects and observe the value for momentum and run some collisions. What is the equation that is being used to determine momentum?


9. Adjust the mass, velocity, and elasticity of both balls. What can be said about the total momentum before and after a collision?


10. Check the 'Center of Mass' box on the right. Without running the simulation, observe how the x moves as you vary M1 and M2. Describe below.


11. Observe the motion of the center of mass for collisions. How is this motion best described?