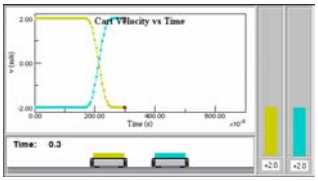
# *Worksheet for Exploration 8.4: Elastic and Inelastic Collisions and Δp*




Enter in a new value and click the "set values and play" button to register your values and run the animation **(position is given in meters and time is given in seconds)**. We have set limits on the values you can choose:

0.5 kg < $m_1$ < 2 kg, 0 m/s < $v_1$ < 4 m/s, and -4 m/s < $v_2$< 0 m/s.

The bar graph gives an instantaneous reading of each cart's energy and the check box changes the collision type from perfectly elastic to perfectly inelastic. Restart.

Answer the following questions for both the elastic and inelastic collisions.

For elastic collisions:

a. Vary the mass and velocities, is $\Delta\mathbf{p}_1 = -\Delta\mathbf{p}_2$?
   i. Measure $v_{1\ final}$ and $v_{2\ final}$ to determine the change in momentum for each cart.

b. Why should this be the case?

c. Is the energy of the system constant (kinetic)? If not, where is it going?
   i. Calculate the total kinetic energy before the collision and after.

For inelastic collisions:

d. Vary the mass and velocities, is $\Delta\mathbf{p}_1 = -\Delta\mathbf{p}_2$?
   i. Again measure velocities and calculate the change in momentum for each cart.

e. Why should this be the case?

f. Is the energy of the system constant? If not, where is it going?