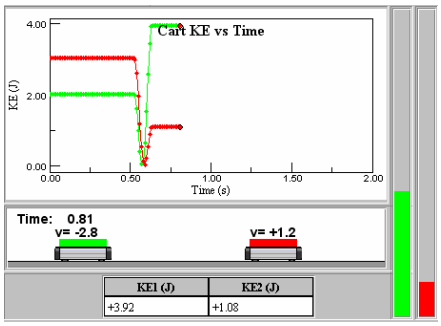
Worksheet for Exploration 7.3: Elastic Collision



The initial velocities of the two carts in the above animation can be changed by entering new values into the text fields **(position is given in meters, time is given in seconds, and energy on the bar graph is given in joules)**. As the carts approach one another, they begin to repel due to the magnets carried by each of them, thereby changing their velocities. The two color-coded bar graphs on the right show the instantaneous kinetic energy of the carts. Restart.

When you get a good-looking graph, right-click on it to clone the graph and resize it for a better view.

a. Run the animation using 2 m/s and -2 m/s for the velocities of the left and right carts, respectively. What is the change in kinetic energy of the left cart? The right cart? What is total change in energy?
   i. Fill out the table.

$\|V_o\|$=2m/s	KE_i	KE_f	ΔKE
Red			
Green			

b. Simulate collisions using other values of equal but opposite velocities. How does this effect each cart's change in kinetic energy? The change in the total energy?

$\|V_o\|$= ___	KE_i	KE_f	ΔKE
Red			
Green			

c. Stop the animation just as the collision is about to take place and step forward in time so that the animation is paused during the collision process. What happens to the total energy during the collision process?

i. If you are not sure about what happens to energy, discuss what forms of energy you have in this system (be specific)?

d. Does the last result imply that the two-cart system is not isolated?

Repeat the above experiments using velocities with unequal magnitude.

v_{red}=_____ v_{green}=_____

	KE_i	KE_f	ΔKE
Red			
Green			

e. Run the animation using 1 m/s and -2 m/s for the velocities of the left and right carts, respectively. What is the change in total kinetic energy produced by the collision?

	KE_i	KE_f	ΔKE
Red			
Green			