Palak, Shivani, Abhikhya

Elastic Collision

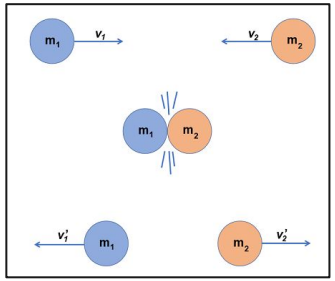
Goal: Prove that elastic collisions preserve momentum and kinetic energy before and after collision

total momentum before = total momentum after

$$m_A v_A + m_B v_B = m_A v'_A + m_B v'_B$$

total kinetic energy before = total kinetic energy after

$$\tfrac{1}{2} m_A v_A^2 + \tfrac{1}{2} m_B v_B^2 = \tfrac{1}{2} m_A v'^2_A + \tfrac{1}{2} m_B v'^2_B$$



Brief Description: Push two carts into each other from opposite ends. Both carts have magnets on them and repel one another upon collision. After each trial masses were added and subtracted from each cart to vary their overall masses and test different scenarios.

	Blue	Yellow	Kinetic Energy Before	Kinetic Energy After	% Difference
V before (m/s)	0.377	0.297	0.057	0.052	-5.2
V after (m/s)	-0.576	-0.076	Momentum Before	Momentum After	
Mass (g)	0.299	0.816	0.36	0.23	23.42

	Blue	Yellow	Kinetic Energy Before	Kinetic Energy After	% Difference
V before (m/s)	0.238	0.333	0.026	0.024	-2.4
V after (m/s)	-0.317	-0.238	Momentum Before	Momentum After	
Mass (g)	0.299	0.309	0.17	-0.17	0

Results:

- Kinetic energy and momentum before and after the collision are between a reasonable range to be considered preserved
- Error of margin likely due to technology, point on the graph, friction, etc.