LAB 7
Conservation of Momentum

OBJECTIVES
(1) Design your own experiments to test the principle of conservation of momentum for both elastic and completely inelastic collisions.

EQUIPMENT
Anything we have in the Stockroom

PROCEDURE

Part 1: Completely Inelastic Collisions
(1) Design an experiment that will test whether or not momentum is conserved during a completely inelastic collision between two objects.

(2) Run the experiment for a total of four separate cases:

   Case (1) \( m_1 = m_2 \) with \( v_1 \neq 0 \) and \( v_2 = 0 \)
   Case (2) \( m_1 < m_2 \) with \( v_1 \neq 0 \) and \( v_2 = 0 \)
   Case (3) \( m_1 > m_2 \) with \( v_1 \neq 0 \) and \( v_2 = 0 \)
   Case (4) \( m_1 = m_2 \) with \( v_1 \neq v_2 \neq 0 \)

(3) Organize your data into tables. For each of the four cases, determine the total momentum before and after the collision. Do your results show that momentum was conserved? Why or why not?

(4) For each of the four cases, determine the total energy before and after the collision. Do your results show that energy was conserved? Why or why not?

Part 2: Elastic Collisions
(5) Design an experiment that will test whether or not momentum is conserved during an elastic collision between two objects.

(6) Run the experiment for a two different cases:

   Case (1) \( m_1 = m_2 \) with \( v_1 \neq 0 \) and \( v_2 = 0 \)
   Case (2) \( m_1 < m_2 \) with \( v_1 \neq 0 \) and \( v_2 = 0 \)
   Case (3) \( m_1 > m_2 \) with \( v_1 \neq 0 \) and \( v_2 = 0 \)
   Case (4) \( m_1 = m_2 \) with \( v_1 \neq v_2 \neq 0 \)
(7) For each of the four cases, determine the total momentum before and after the collision. *Do your results show that momentum was conserved? Why or why not?*

(8) For each of the four cases, determine the total energy before and after the collision. *Do your results show that energy was conserved? Why or why not?*