

PhET Activity: Conservation of Momentum

Prof. Jordan C. Hanson

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1 Introduction

1. Using the PhET activity *Collision Lab*: <https://phet.colorado.edu/en/simulations/collision-lab>, we will understand how the conservation of momentum works. Go to the URL above, and load the Explore 1D tab.
2. Notice that there is a clock at the lower left displaying the time in seconds after the play button is pressed, and that the scale length in the top left is 0.5 meters. Use these tools to measure the velocity of the balls.
3. Set the mass of each ball to 0.5 kg, and set the velocity of the right-hand ball to zero by clicking and dragging the velocity vector.
4. Make the velocity of the left-hand ball non-zero, and click play. Write down the (a) initial velocity of the left-hand ball, (b) the initial velocity of the right-hand ball, (c) the final velocity of the left-hand ball, and (d) the final velocity of the right-hand ball.

2 Measurements and Graph

1. Using the procedure above, vary the mass of the right-hand ball. Create a graph below of the final velocity of the right-hand ball in m/s versus mass in kg.

2. Use the *conservation of momentum* to explain the data. (a) For the case of equal masses, use conservation of momentum to show that the speed of the right-hand ball should be equal to the initial velocity of the approaching one. (c) For the case in which the right-hand ball is much larger than the approaching one, show that the initial and final speed of the left-hand ball should be equal.