# Thursday Reading Assessment: Unit 8, Momentum

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## 1 Memory Bank

- $\vec{p} = m\vec{v}$ ... Definition of momentum.
- $\vec{p}_1 + \vec{p}_2 = \vec{p}_1{}' + \vec{p}_2{}'$ ... Momentum conservation for two objects interacting.
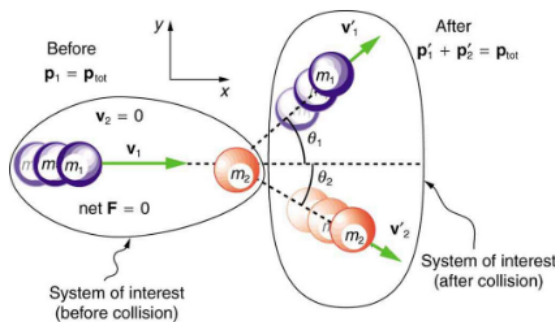
## 2 Momentum



Figure 1: A particle interacts with one at rest.

1. Suppose a mass $m_1$ approaches another mass $m_2$ with velocity $v_1$, while $m_2$ is at rest. Break the momenta into x and y-components to show:

$$m_1 v_1 = m_1 v_1' \cos\theta_1 + m_2 v_2' \cos\theta_2 \tag{1}$$
$$0 = m_1 v_1' \sin\theta_1 + m_2 v_2' \sin\theta_2 \tag{2}$$

Equation 1 applies to the x-coordinate, and Equation 2 applies to the y-coordinate.

2. Let $m_1 = 0.1$ kg, and $m_2 = 0.1$ kg. Also, $\theta_1$ is observed to be 30 degrees, and $\theta_2$ is observed to be 60 degrees. If $v_1' = 1.0$ m/s, what is $v_2'$?