

Wednesday Reading Assessment: Unit 8, Momentum

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1 Memory Bank

- $\vec{p} = m\vec{v}$... Definition of momentum.
- $\vec{p}_{1,i} + \vec{p}_{2,i} = \vec{p}_{1,f} + \vec{p}_{2,f}$... Momentum conservation for two objects interacting.

2 Momentum

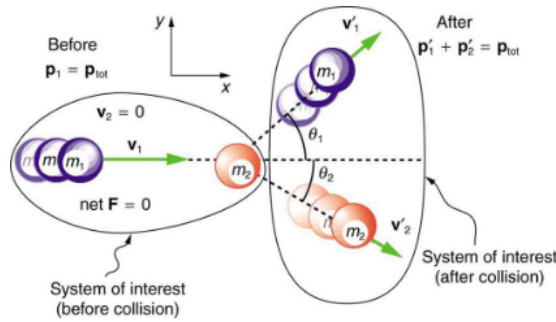


Figure 1: A particle interacts with one at rest.

1. Suppose a mass m_1 approaches another mass m_2 with velocity $v_{1,i}$, while m_2 is at rest. Apply momentum conservation to show that, in the x-coordinate,

$$m_1 v_{1,i} = m_1 v_{1,f} \cos \theta_1 + m_2 v_{2,f} \cos \theta_2 \quad (1)$$

2. Similarly, show that, in the y-coordinate,

$$0 = m_1 v_{1,f} \sin \theta_1 + m_2 v_{2,f} \sin \theta_2 \quad (2)$$

3. Let $m_1 = 0.1$ kg, and $m_2 = 0.05$ kg. Also, θ_1 is observed to be 25 degrees, and θ_2 is observed to be 50 degrees. If $v_{1,f} = 1.0$ m/s, what is $v_{2,f}$?