

# Warm Up Activity: Unit 6, Momentum

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## 1 Memory Bank

- $\vec{p} = m\vec{v}$  ... Definition of momentum.
- $\vec{p}_f = \vec{p}_i$  ... Momentum conservation: no net forces.

## 2 Momentum

1. A gas molecule has a mass of  $20 \times 10^{-25}$  kg and an average speed of 350 m/s. What is the momentum in kg m/s?

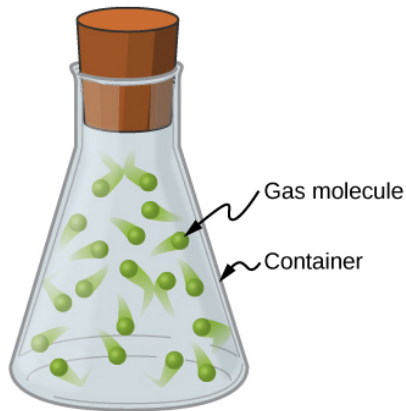


Figure 1: A beaker full of gas molecules.

2. Suppose this molecule collides with the side of the glass beaker, turns around, and flies off in exactly the opposite direction at the same speed. What is the *change* in momentum,  $\Delta\vec{p} = \vec{p}_f - \vec{p}_i$ ? (This is how we build up the **kinetic theory of gases** in Physics 3...stay tuned).

## 3 Momentum Conservation

1. Two molecules collide and stick together, forming one larger molecule. Each molecule weighs  $20 \times 10^{-25}$  kg. One has a velocity of 350 m/s, and the other has a velocity of -350 m/s. (a) What is the total initial momentum (adding the two momenta)? (b) What is the final speed of the big new molecule?