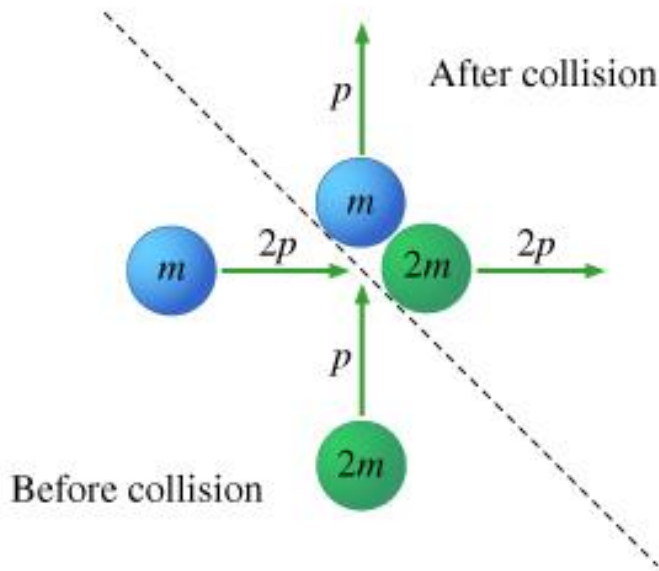# 2D Conservation of Momentum

The world isn't linear. When things collide or explode, the objects involved in those events will move in 2 or even 3 dimensions.
Let's take a look at how we can examine these events in 2-dimensions.

2D-Collisions and Conservation of Momentum

- *During a 2D collision or explosion **Momentum is conserved in the x and y directions independently**. Momentum is a vector; This allows us to state:*

- **Momentum in the x-direction is conserved.**

    ΣP_x (before) = ΣP_x (after)
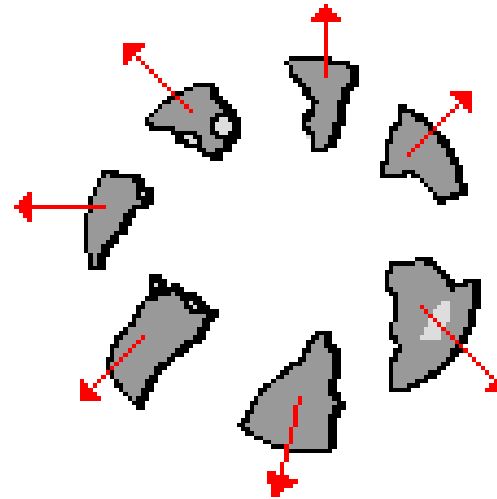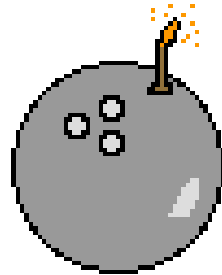
- **Momentum in the y-direction is conserved.**

    ΣP_y (before) = ΣP_y (after)
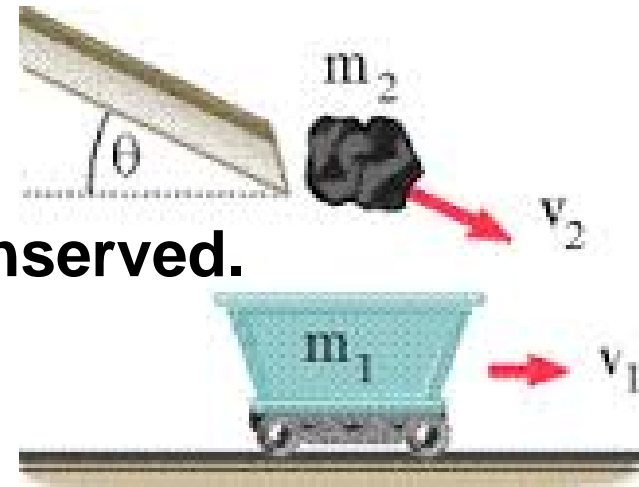
*We can treat x and y directions **independently** with respect to momentum because it is a vector quantity.*

Momentum Conservation in Explosions

A firecracker placed in a stationary object will cause the object to explode. Before the explosion, the total system momentum is zero. Upon explosion, the object will break into a variety of fragments. The vector sum of the momenta of the individual fragments is zero. The total system momentum is the same before and after the explosion.