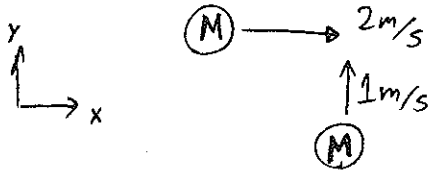
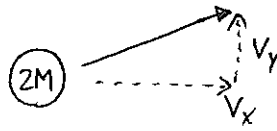


BEFORE :



AFTER :



Momentum is separately conserved in the x and y directions.

We have :

$$P_x^{\text{BEFORE}} = M \cdot (2 \text{ m/s}) \quad \text{using } p_x = mv_x$$

$$P_y^{\text{BEFORE}} = M \cdot (1 \text{ m/s}) \quad \text{using } p_y = mv_y$$

By x-momentum conservation,

$$P_x^{\text{AFTER}} = P_x^{\text{BEFORE}}$$

$$\text{so } (2M)v_x = M \cdot (2 \text{ m/s})$$

$$\Rightarrow v_x = 1 \text{ m/s}$$

By y-momentum conservation,

$$P_y^{\text{AFTER}} = P_y^{\text{BEFORE}}$$

$$\text{so } (2M) \cdot v_y = M \cdot (1 \text{ m/s})$$

$$\Rightarrow v_y = 0.5 \text{ m/s}$$

Thus, the x and y components of the final blob's velocity

are $v_x = 1 \text{ m/s}$ and $v_y = 0.5 \text{ m/s}$.