Bullet   Baseball
$m_1 = .030\ kg$ $m_2 = .15\ kg$
$V_1 = 200\ m/s$ $V_2 = 0\ m/s$
$V' = ?$ $V' = ?$

$$p_1 + p_2 = p_1' + p_2'$$

$$m_1 v_1 + m_2 v_2 = (m_1 + m_2) \cdot v'$$

$$(.03\ kg)(200\ m/s) + (.15\ kg)(0\ m/s) = (.03\ kg + .15\ kg) \cdot v'$$

$$v' = 33.\overline{3}\ m/s \quad \text{(velocity of combination}$$
$$\text{immediately after collision)}$$

Find maximum height

$h_2 = ?\ \square\ V_2 = 0\ m/s$

$m = .03\ kg + .15\ kg$
$\quad = .18\ kg$

$h_1 = 0\ \square\ \uparrow V_1 = 33.3\ m/s$ (from above)

$$PE_1 + KE_1 = PE_2 + KE_2$$

$$m \cdot g \cdot h_1 + \tfrac{1}{2} \cdot m \cdot v_1^2 = m \cdot g \cdot h_2 + \tfrac{1}{2} m \cdot v_2^2$$

$$\tfrac{1}{2}(.18\ kg)(33.\overline{3}\ m/s)^2 = (.18\ kg)(9.8\ m/s^2) \cdot h_2$$

$$\boxed{h_2 = 57\ m}$$