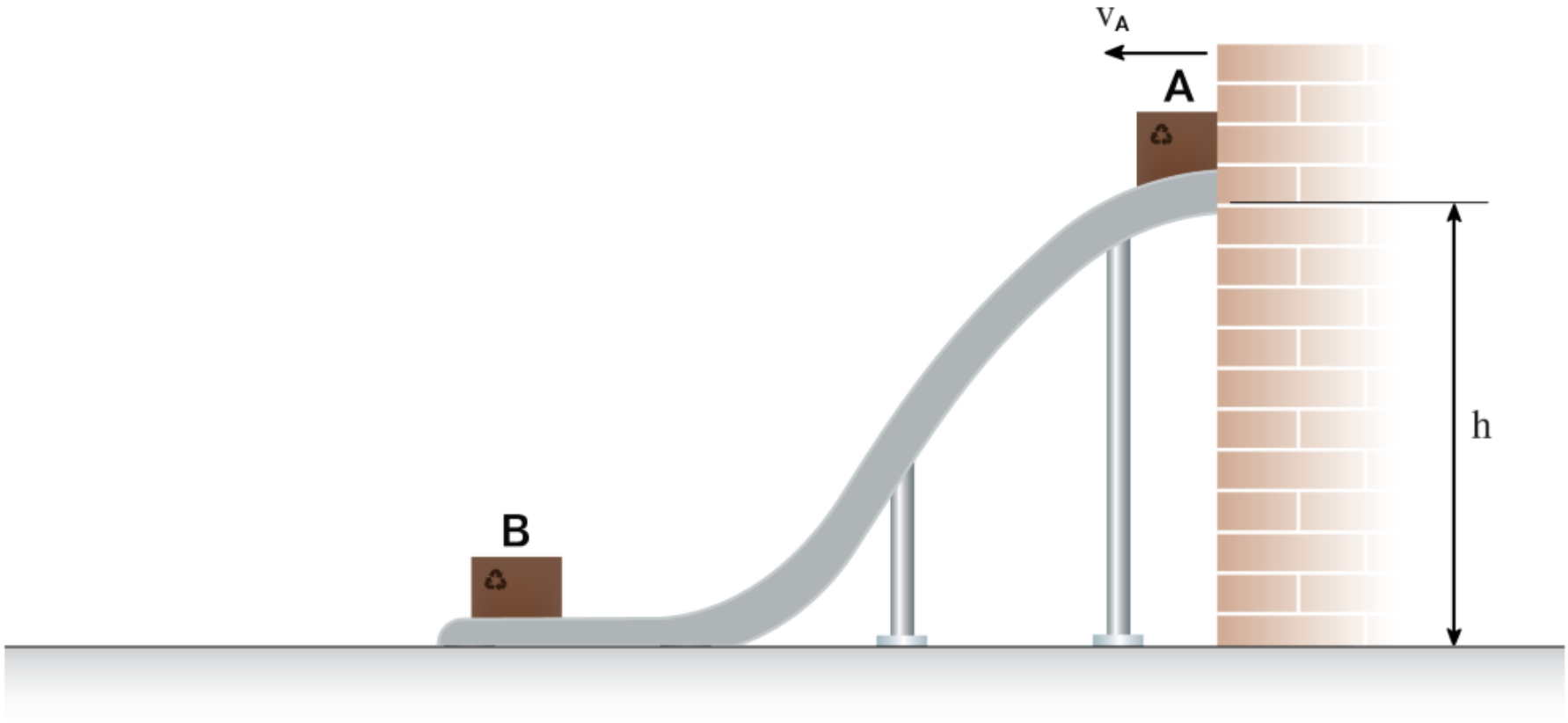
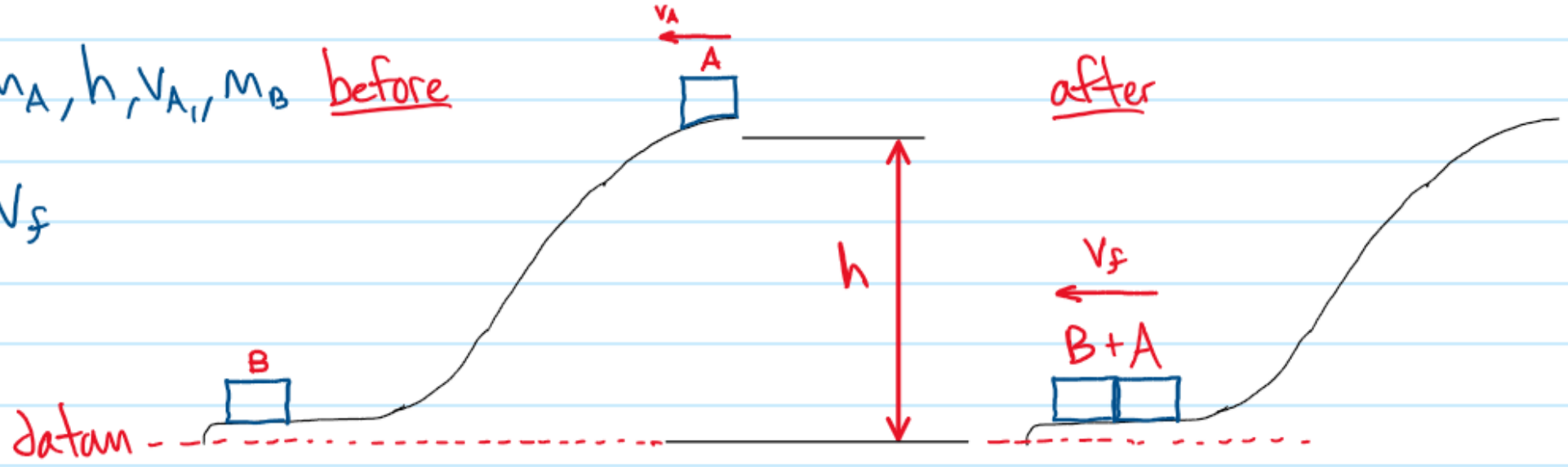
21-P-MOM-GD-004



A m_A Kg box (A) slides down a h m frictionless ramp with an initial velocity of v_{A_i} m/s. At the bottom of the ramp, box A collides with an m_B Kg stationary box (B). What is the boxes shared velocity right after the collision if they stick together?

given m_A, h, v_{A_1}, m_B before

find v_f



Work & Energy (v_A from top to bottom before collision)

$$T_1 + V_1 = T_2 + V_2$$

$$\tfrac{1}{2} m v_{A_1}^2 + mgh = \tfrac{1}{2} m v_{A_2}^2 + mgh^{0}$$

$$v_{A_2} = \sqrt{v_{A_1}^2 + 2gh}$$

Conservation of Linear Momentum (boxes stick together)

$$m_A v_{A_2} + m_B v_B = (m_A + m_B) v_f$$

$$v_f = \frac{m_A v_{A_2}}{(m_A + m_B)}$$