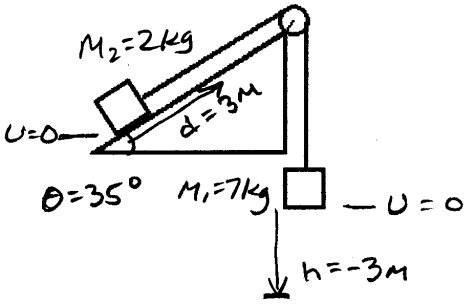
Conservation of Energy Quiz – Conservative Forces – quiz 27

M_2 M_1

A 2 kg block is pulled up a 35° ramp by 7 kg block hanging over the top of the ramp. There is no friction. Find the speed of the 2 kg block after is has moved 3 meters. You must use energy concepts. No tension, $\Sigma F = ma$, or kinematics are allowed.



$$K_i + U_i = K_f + U_f$$

$$0 + 0 = \frac{1}{2}(M_1 + M_2)V^2 + M_1 g h + M_2 g d \sin\theta$$

$$V = \sqrt{\frac{-M_1 g h - M_2 g d \sin\theta}{0.5(M_1 + M_2)}}$$

$$= \sqrt{\frac{-(7\,kg)(9.8\,\frac{M}{S^2})(-3\,m) - (2\,kg)(9.8\,\frac{M}{S^2})(3\,m)\sin 35^\circ}{0.5(7\,kg + 2\,kg)}}$$

$$\boxed{V = 6.18\,\frac{M}{S}}$$