

Answer on Question #48990, Physics, Mechanics - Kinematics - Dynamics

A 70 kg person is at the top of a 10 m tall slide. Ignoring friction, what is his or her speed at the halfway point where he or she is 5 m from the bottom of the slide? What is his or her speed at the bottom of the slide?

By the law of energy conservation:

$$E_p = E_k$$

$$mgh = \frac{mv^2}{2} \rightarrow v = \sqrt{2gh}$$

At the halfway the speed is:

$$v_{\frac{1}{2}} = \sqrt{2 \cdot 9.8 \frac{m}{s^2} \cdot 5m} = 9.9 \frac{m}{s}$$

At the bottom:

$$v_1 = \sqrt{2 \cdot 9.8 \frac{m}{s^2} \cdot 10m} = 14 \frac{m}{s}$$

Answer: $v_{\frac{1}{2}} = 9.9 \frac{m}{s}$

$$v_1 = 14 \frac{m}{s}$$