

Part 1

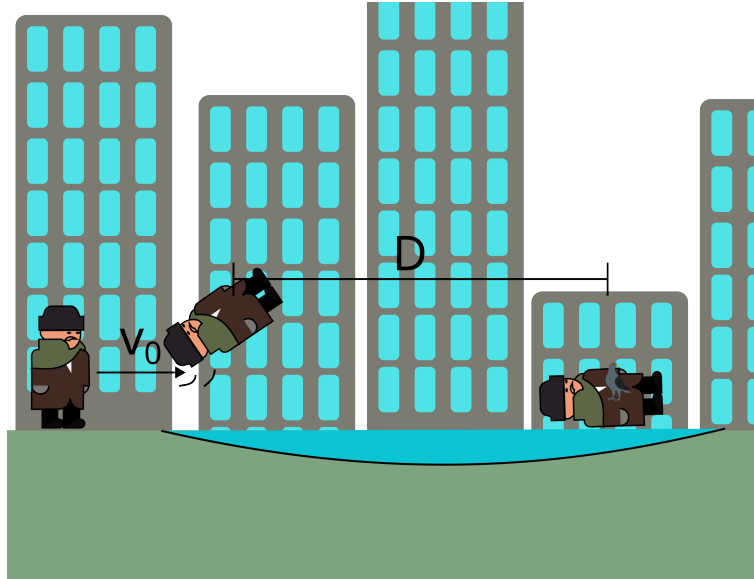


Figure 1: Harry slipping on the ice and sliding to a stop

Harry and Marv are chasing Kevin McAllister through New York City on Christmas eve. Harry ($m = 70 \text{ kg}$) tries to take a shortcut across a frozen pond in Grand Central park. At a full sprint ($v_0 = 5 \text{ m/s}$), Harry comically slips on the ice. He slides for 15 meters and comes to a stop.

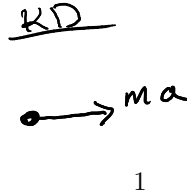
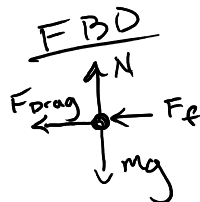
- Draw a free body diagram and kinetic diagram for Harry while he's sliding on the ice (include any forces that you think will bring him to a stop on the ice)
- If you only consider friction between the ice and Harry, the equation of motion is $a = -\mu g$. What is the value of dynamic coefficient of friction, μ , for Harry sliding on ice?

Part 2

In Module 01, we discussed definitions of **kinetics** and **kinematics**. Define the following three **kinetic** terms,

- Force
- Impulse
- Work

1 a



b)

$$T_1 = \frac{1}{2}mv^2$$

$$T_2 = 0$$

$$W^{\text{fr}} = -\mu mg \Delta x$$

$$T_1 - \mu mg \Delta x = 0$$

$$v^2 - 2\mu g \Delta x = 0$$

$$\mu = \frac{v^2}{2mg\Delta x}$$

Part 1

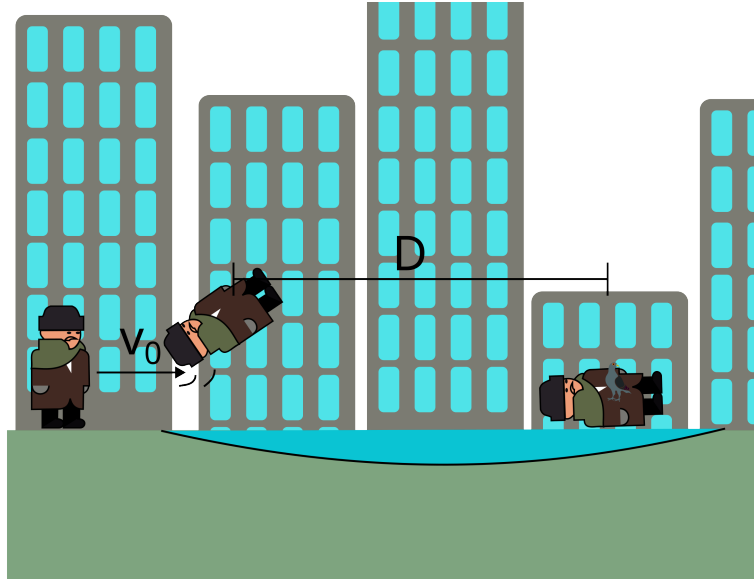


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Part 2

In Module 01, we discussed definitions of **kinetics** and **kinematics**. Define the following three **kinetic** terms,

- Force $\rightarrow (mass)(acceleration) = \frac{d}{dt}(momentum)$
- Impulse $\rightarrow (mass)(change \text{ in velocity}) = change \text{ in momentum}$
- Work $\rightarrow change \text{ in } (kinetic + potential \text{ energy}) = [force \times distance]$