

Sample test questions:

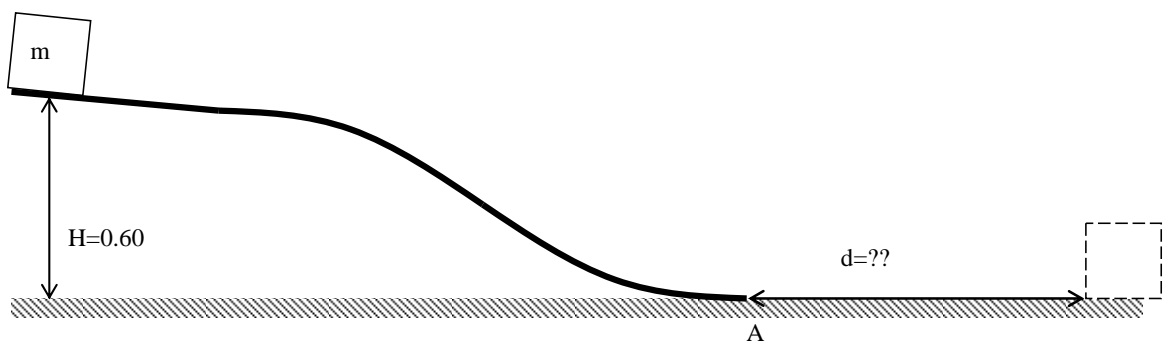
Multiple choices: (Only one answer is correct. Please choose the best answer you think.)

1. In which one of the following systems is there a decrease in gravitational potential energy?
  - (a) A boy stretches a horizontal spring.
  - (b) A girl jumps down from a chair.
  - (c) A crate rests at the bottom of an inclined plane
  - (d) A car ascends a steep hill.
  - (e) Water is forced upward through a pipe.
  
2. Which one of the following has the largest kinetic energy?
  - (a) A raindrop falling.
  - (b) A person swimming
  - (c) A jet airplane flying at its maximum speed
  - (d) The earth moving in its orbit around the sun
  - (e) A space shuttle orbiting the earth.

Answer: 1. B 2. D

Comprehensive questions:

3. A small object, whose mass is 0.050 kg, is sliding down a **frictionless** track. The height of the track is .60 m. At the end of the track, shown as point A in the graph, the object keeps sliding on the ground whose coefficient of friction is  $\mu_k = 0.20$ . How far does the object slide on the ground beyond point A?



*Brief Solution:*

*When the object is on the track, only gravity does the work, the normal force doesn't do the work. We can apply the work-energy theorem.*

$$W_{total} = \Delta KE \text{ where}$$

$$W_{total} = W_{mg} + W_N + W_{friction} = mg(h_i - h_f) + 0 + F_{friction} \cdot d \cdot \cos(\theta)$$

**(What is  $\theta$  here???)**

$$\text{and } f = N \cdot \mu_k = (0.050\text{kg})(9.8\text{m/s}^2)(0.20) = 0.098\text{ N}$$

$$\Delta KE = KE_f - KE_i = 0 - 0$$

Plug in  
we have  $d = 3.0\text{ m}$