1. A 3.0-kilogram object is placed on a
    frictionless track at point A and released
    from rest. (Assume the gravitational
    potential energy of the system to be zero at
   point C and there are no frictional effects.)
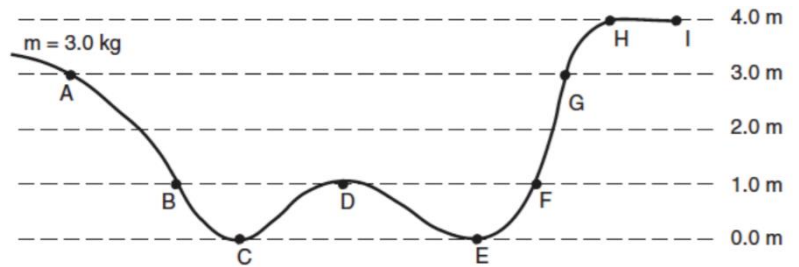
a) Calculate the gravitational potential energy
    of the object at point A. (Show your work.)

b) Calculate the kinetic energy of the object at point B. (Show your work.)

c) Calculate the velocity of the object at point B. (Show your work.)

d) How does the velocity of the object at point D compare to the velocity of the object at point B? **Explain** your
    reasoning. Justify your answer.

e) Which letter represents the farthest point on the track that the object will reach? **Explain** your reasoning. Justify
    your answer.

2. A block is placed at the top of a frictionless, curved ramp as shown
    in the diagram. The height of the ramp is 0.40 m above the floor. If
    the block is released from rest at the top of the ramp, what is the
    velocity of the block as it slides onto the floor? (Show your work.)
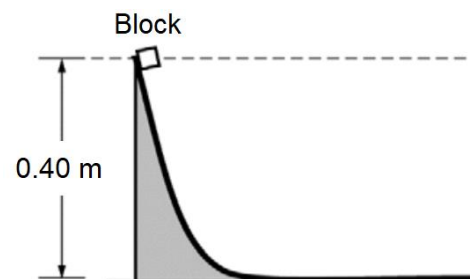
3. A block with a mass of 0.50 kg is sliding on a horizontal, frictionless surface at 3.0 m/s. The block then slides up a curved ramp with a height of 0.30 m and reaches the next horizontal level.

block

h
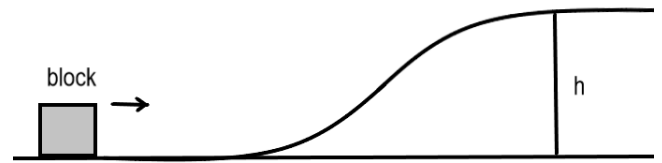
a) At the top level, what is the velocity of the block?

b) The experiment is repeated with the same conditions, but this time a 2.0 kg block is used. How would the velocity of the 2.0 kg block at the top level compare to the initial setup? **Explain** your reasoning. Justify your answer.

4. A pendulum mass is dropped from a height of 0.5 m above the bottom of its swing. [neglect friction]

A. What is the velocity of the pendulum mass at point A?

B. What is the velocity of the pendulum mass at point B?

initially at rest
h = 0.5 m

h = 0.5 m
B

A
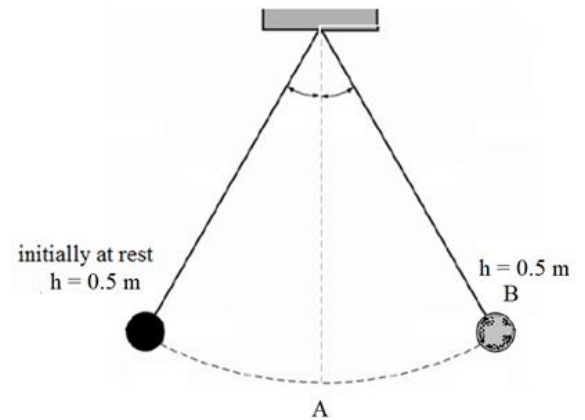
5. A bowling ball is rolling with a velocity of 5 m/s when it encounters an upward slope. [neglect friction]

A. What is the maximum height the ball the ball will reach?

B. What is its velocity at half the maximum height?

v = 5 m/s

frictionless

h = ???