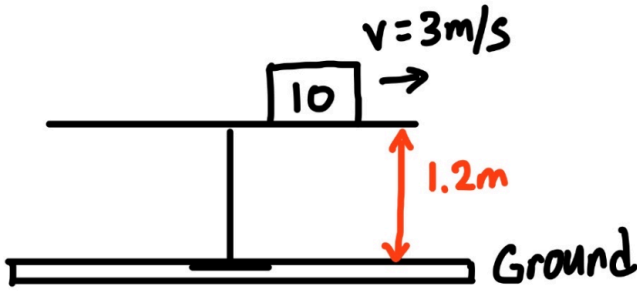
Kinetic and Potential Energy

1. A 10 kg box is stationary on the ground.
   a) What is the box's kinetic energy?
   b) What is the box's potential energy relative to the ground?
   c) What is the total energy of the box relative to the ground?

2. A 10 kg box is moving at a constant velocity of 3m/s on a table 1.2m from the ground.
   a) What is the kinetic energy of the box?
   b) What is the potential energy of the box relative to the ground?
   c) What is the potential energy of the box relative to the table?
   d) What is the total energy of the box relative to the ground?
   e) What is the total energy of the box relative to the table?



3. A 10 kg box is stationary on top of a 1m table.
   a) Set the "zero" to be the ground. What is the potential energy of the box?
   b) Set the "zero" to be the table. What is the potential energy of the box?
   c) Set the "zero" to be the table. The box is now moved to the ground. What is the potential energy of the box? (the answer is a negative number).

Notice that potential energy is actually <u>relative.</u> So then what's the "correct" answer? Well the answer is that it doesn't matter. You just pick the "zero" to be wherever is convenient to you for the problem/calculation.

4. Consider a 10kg ball dropped from 10m above the ground.
    a) How much potential energy does the ball have at the beginning relative to the ground?
    b) How much kinetic energy does the ball have at the beginning?
    c) As the ball falls, what happens to the height of the ball?
    d) As the ball falls, what happens to the potential energy of the ball?
    e) As the ball falls, what happens to the speed of the ball?
    f) As the ball falls, what happens to the kinetic energy of the ball?
    g) Calculate the final velocity of the ball just before hitting the ground using kinematics
    h) Calculate the kinetic energy of the ball just before hitting the ground. Compare it to your answer in a).
    i) What is the potential energy of the ball just before the ball hits the ground?