Calculating Potential Energy

Gravitational Potential Energy refers to the energy stored in a system as a result of its position. A simple illustration of this is an object placed on a high shelf has more **potential** to fall than an object resting on the floor because the gravitational force acting upon it isn't able to move it any further. Calculating how much gravitational potential energy a system has is very simple.

$$Gravatational\ Potential\ Energy = mass \times gravity\ \times height$$

The mass of the object must be measured in grams (or fractions/multiples of a gram such as centigrams or kilograms). Height refers to how high above sea level/ground level the object is and is measured in meters (or fractions/multiples of a gram such as centimeters or kilometers). Gravity on earth has a constant acceleration rate of 9.8 m/s^2 (meters per second squared). In other words,

$$PE_{grav} = mgh$$

For a 10kg mass at a height of 3m,

$$PE_{grav} = (10kg)\ (9.8m/s^2)(3m)$$

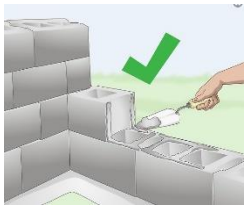
Energy is always measured in JOULES which is abbreviated with a J (note, the J is <u>always</u> capital).

$$\therefore PE_{grav} = 294\ J$$

Now you try! Be sure to use the correct units and show your work.

A baby carriage is sitting at the top of a hill that is 21 m high. The carriage with the baby has a mass of 1.5 kg. How much potential energy does the baby carriage have?

A cinder block is sitting on a platform 20 m high. It has a mass of 7.9 kg. How much potential energy does the block have?



There is a bell at the top of a tower that is 45 m high. The bell has a mass of 19 kg. How much potential energy does the bell have?