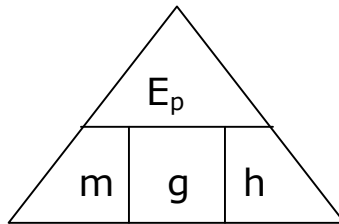


## Examples of Potential Energy Problems

Study these sample problems and the methods used to solve them.

You might want to use this triangle to help you with questions involving **potential energy**.



Example:

A box has a mass of 5.8kg. The box is lifted from the garage floor and placed on a shelf. If the box gains 145J of Potential Energy ( $E_p$ ), how high is the shelf?

Solution:

Use

$$E_p = mgh$$

$E_p$  = potential energy (Joules)

$m$  = mass of box (kg)

$g$  = gravitational field strength (N/kg)

$h$  = difference in height (m)

rearrange equation to find height

$$h = \frac{E_p}{mg} = \frac{145}{5.8 \times 9.8} = 2.55$$

The shelf is 2.55m high

Example:

A man climbs on to a wall that is 3.6m high and gains 2268J of potential energy. What is the mass of the man?

Solution:

Use:

$$E_p = mgh$$

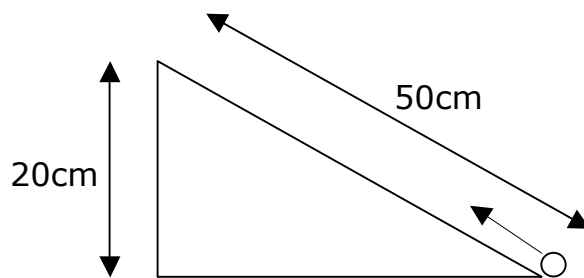
Rearrange to get an equation for m.

$$m = \frac{E_p}{gh} = \frac{2268}{9.8 \times 3.6} = 64.3$$

So the mass of the man is 64.3kg.

Example:

A 800g ball is pulled up a slope as shown in the diagram. Calculate the potential energy it gains.



Solution:

**In potential energy problems we are only interested in vertical distances**

Use  $E_p = mgh$ ,

so

$$E_p = 0.8 \times 9.8 \times 0.2 = 1.6\text{J}$$

$$h = 20\text{cm} = 0.2\text{m}$$
$$m = 800\text{g} = 0.8\text{kg}$$

remember to change units!

The ball gains 1.6J of potential energy