Answer on Question #54734, Physics / Mechanics | Kinematics | Dynamics

A hammer of mass 200g is dropped from the top of a roof of the two storey building to the ground. Another hammer of equal mass fell from a coffee table to the ground. Given than the height of the two storey building and the coffee table are 10 m and 5 m respectively.

a. Show that a hummer dropped from two storey building roof does more work than a hammer falling from a coffee table.

b. Calculate the potential energy from the two heights.

Solution:

a. In order to accomplish work on an object there must be a force exerted on the object and it must move in the direction of the force.

$$Work = Force * distance\ moved\ in\ direction\ of\ force$$

Energy can be defined as the capacity for doing work. It may exist in a variety of forms and may be transformed from one type of energy to another. However, these energy transformations are constrained by a fundamental principle, the Conservation of Energy principle.

In our case

$$work = decreasing\ of\ potential\ energy$$

$$W = mgh$$

The potential energy at a height h is equal to the work which would be required to lift the object to that height.

For hammer droped from two storey building

$$W_1 = (0.2\ kg)(10\ m/s^2)(10\ m) = 20\ Joules$$

For hammer droped from a coffee table

$$W_2 = (0.2\ kg)(10\ m/s^2)(5\ m) = 10\ Joules$$
$$W_1 = W_2$$

b.

$$PE_1 = W_1 = mgh_1 = 20\ Joules$$
$$PE_2 = W_2 = mgh_2 = 10\ Joules$$