

Section 7.2: Gravitational Potential Energy

Gravitational potential energy is energy associated with height.

It can be calculated using the formula...

$E_p = mgh$

Joules (pointing to E_p)
kg (pointing to m)
height (m) (pointing to h)
N/kg or m/s^2 (pointing to g)

can be measured relative to wherever you want. Just be consistent for the whole problem

Example: A 15 kg textbook is sitting on a 1.2 m tall table. The book is lifted 0.8 m above the table.

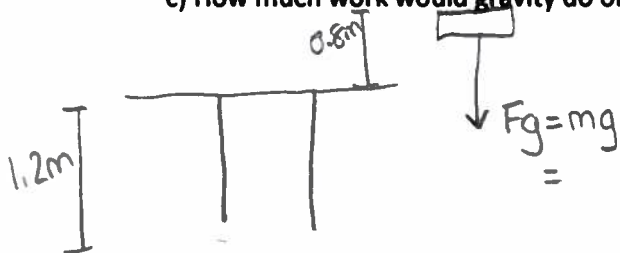
a) How much potential energy does it have with respect to the table?

$$E_p = mgh = (15)(9.8)(0.8)$$
$$= 117.6 \text{ J}$$

b) How much potential energy does it have with respect to the ground?

$$E_p = mgh = (15)(9.8)(0.8 + 1.2)$$
$$= 294 \text{ J}$$

c) How much work would gravity do on the book if it fell to the ground?



$$W = F_{\parallel} d$$
$$= (mg)h$$
$$= (15)(9.8)(0.8 + 1.2)$$
$$= 294 \text{ J}$$

So, gravitational potential energy is amount of work gravity has the potential to do.