1. What is conservation of energy?

Energy cannot be created or destroyed, only transformed from one type to another.

Energy is measured in joules (J). All energy in a system is conserved. This means that if we start with 100 J, we must have 100 J of total energy after any change has taken place in a perfect situation.

2. Energy Loss

The problem is that it doesn't always change the way we want.
E.g. a filament lamp. When we turn it on, the desired transformation is from electrical energy to light energy. This is the main transformation, but the lamp gets very warm when it is switched on. This transformation from electrical to heat energy is undesired so this is energy is 'lost'. Friction also contributes to energy loss.

3. Energy Equations

Gravitational Potential Energy – an object which is raised up to a high position has gravitational potential energy.

$$Ep = mgh$$

Kinetic Energy – this is the energy associated with a moving object.

$$E_k = {}^1/_2\, mv^2$$

We can use the conservation of energy in calculations.
https://www.bbc.com/bitesize/guides/z4yj6sg/video

3. Energy Equations continued...

Work Done – this is the energy required or transferred to an object when moving it from one point to another.

$$E_w = Fd$$

Example 1

A 0.50kg stone is dropped down a well. The distance from the top of the well to the water is 12.0 m. Calculate the speed of the stone as it hits the water, ignoring the effects of friction.

$$Ep = mgh = 0.5x9.8x12 = 58.8J$$

$$Ek = \frac{1}{2}mv^2$$

$$58.8 = 0.5x0.5xv^2$$

$$v^2 = \frac{58.8}{0.5x0.5}$$

$$v = 15.34ms^{-1}$$

9. ENERGY CONSERVATION

N5 Past Papers HW

2014 MC Q4
2015 MC Q16
2016 MC Q16
2018 MC Q4 + Q3
2019 Q9c

Example 2

a) $Ep = mgh = 750x9.8x7.2 = 5.3x10^4J$

bi) $5.3x10^4J$

bii) $Ek = \frac{1}{2}mv^2$

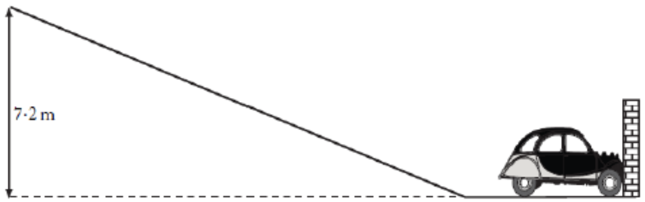
$$5.3x10^4 = 0.5x750xv^2$$

$$v^2 = \frac{5.3x10^4}{0.5x750}$$

$$v = 11.9ms^{-1}$$

2008 Int2 24

An early method of crash testing involved a car rolling down a slope and colliding with a wall. In one test, a car of mass 750 kg starts at the top of a 7.2m high slope.



(a) Calculate the gravitional potential energy of the car at the top of the slope. 3

(b) (i) State the value of the kinetic energy of the car at the bottom of the slope, assuming no energy losses. 1

(ii) Calculate the speed of the car at the bottom of the slope, before hitting the wall. 3