

Work, Energy, Power Notes

12/2/19

Work - in order for work to occur, something must move.

$$W = Fd \cos \theta$$

$W = \text{work} = \text{Nm} = \text{Joules (J)}$

$F = \text{Force} = \text{Newtons (N)}$

$d = \text{distance} = \text{meters (m)}$

Power - rate of change of work

$$P = \frac{W}{t}$$

$P = \text{power} = \text{Watts (W)}$

$W = \text{work} = \text{Newton-meters (Nm)}$

$t = \text{time} = \text{Seconds (s)}$

Energy:

conservation of energy: energy cannot be created or destroyed. It can only change forms.

Kinetic Energy: moving object.

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

$KE = \text{kinetic energy (J)}$

$m = \text{mass (kg)}$

$v = \text{velocity (m/s)}$

Potential Energy (gravitational) = energy of position

$$PE_g = mgh$$

PE_g = gravitational potential energy (J)

m = mass (kg)

g = gravity (m/s^2)

h = height (m)

$$PE_e = \frac{1}{2} kx^2$$

Elastic Potential Energy

PE_e = elastic potential energy (J)

k = spring constant (N/m)

x = distance (m)

Work-Energy Theorem

$$\text{Work} = \Delta KE + \Delta PE_g + \Delta PE_e$$