

Work

-The work done by a constant force applied to an object is the product of the object's displacement and the force in the direction of the displacement.

-1 Joule work is done when a force of 1N displaces an object over a distance of 1m.

$$- W = F \Delta x - F \Delta x \cos \theta$$

Work- Energy principle

-The work done by the non-conservative forces that act on an object = total change in E_k and E_p .

- $F_{net}\Delta x = \Delta E_k \rightarrow$ objects on a straight level.

Power

- $P = w/t$ (work rate)

- $P =$ applied force

- $P = F_v$ (v has to be constant)

-Rate at which work is being done

Work, Power and Energy

Energy

-The ability to do work

-Mechanical energy is the sum of E_k and E_p .

$$-E_M = E_k + E_p$$

-Potential energy: the stored energy that an object has because of its position.

$$-E_p = mgh$$

-Kinetic energy: energy that is associated with the movement of an object.

$$-E_k = \frac{1}{2} mv^2$$

-Energy cannot be created or destroyed.

Friction through work

-Scalar

-Friction is always against the direction of movement

-If work is negative then force is removed.

-When work is positive the energy is given to the object.

Constant speed, $F_{net} = 0$, $\therefore W = 0$.

Retention of mechanical energy

-The sum of the gravity potential energy and the kinetic energy in a closed system is constant.

-When something comes to a standstill then: $W = F\Delta x \cos \theta$

$$-(E_M)_{BO} = (E_M)_{ONDER}$$

$$(E_p + E_k)_{BO} = (E_p + E_k)_{ONDER}$$