$$\Delta K + \Delta U + \Delta E_{th} = W$$

W = is the work done on the system by forces external to the system

$W = 0$ for an isolated system

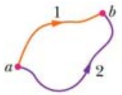
$\Delta U_c = -W_c$

$\Delta U = \Delta U_s + \Delta U_g$

$\Delta U_s = -W_s = \frac{1}{2}k\left(x_f^2 - x_i^2\right)$

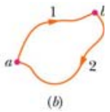
$\Delta U_g = -W_g = mg\,\Delta y$

path inependance of conservative forces



$W_{ab,1} = W_{ab,2}$

The work done by a conservative force on a particle moving between two points does not depend on the path taken by the particle.



$W_{ab,1} + W_{ba,2} = 0$

The net work done by a conservative force on a particle moving moving around every closed is zero.

$\Delta E_{th} = +f_k d = +\mu F_N d$

Power as the rate at which energy is transferred from one form to another

$P_{av} = \frac{\Delta E}{\Delta t} \qquad P_{inst} = \frac{dE}{dt}$

The rate at which the work is done $\left(P = \frac{dW}{dt}\right)$

is a special case of energy being transferred

to (or from) kinetic energy (one form of energy).

Dr. Kariapper