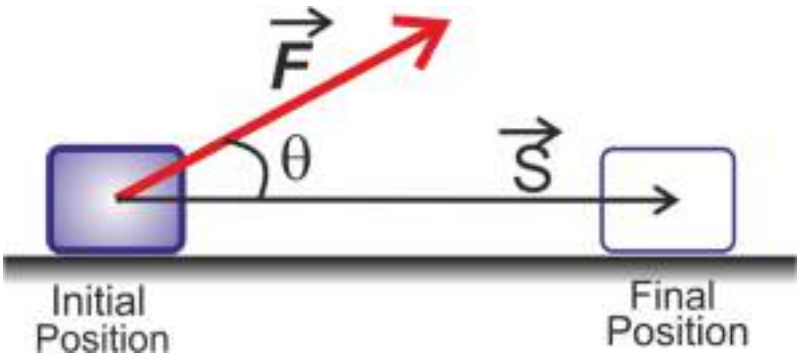
WORK

Whenever a force acts on a body makes a displacement in any direction other than normal, work is said to be done.



When a force $\vec{F}$ acts on a body and produces a displacement $\vec{S}$ then work done by force is given by

$$W = \vec{F}.\vec{S} \quad \text{.....(1)}$$

$$\text{Or} \quad W = F.S\cos\theta \quad \text{.....(2)}$$

Where θ is the angle between displacement vector and the force.

By Eq.(2)

$$W = (F\cos\theta).S$$

$$\text{Or} \quad W = F_x.\Delta x \quad \text{.....(3)}$$

Where F_x is the component of force in the direction of displacement (i.e along x - axis) and Δx is the magnitude of displacement.

Work is a scalar quantity and its SI unit is joule.

- If the value of force varies with position [x] then the work done by variable force is given by