

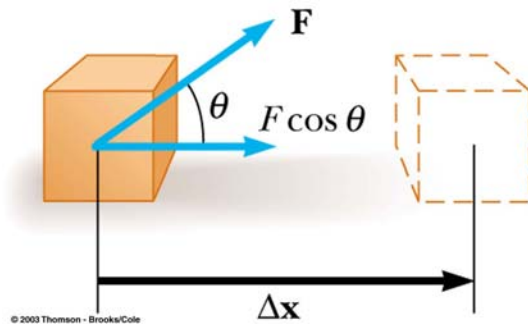
Chapter 5

Energy

Work done by a constant Force

$$W = F \cos \theta d$$

θ is the angle between F and the line of motion



SI unit of work is a $N \cdot m$ or a Joule (J)

US unit is a $ft \cdot lb$

Work-Energy Theorem-work = change in energy

- $KE = \frac{1}{2}mv^2$ units $kg \cdot m/s = \text{Joule}$ kinetic energy is energy of motion, must have a velocity

PE due to gravity= PE_g potential energy due to gravity or height above the lowest reference level

- $PE_g = mgh$ $kg \cdot m/s^2 \cdot m = \text{Joule}$

PE due to a spring= PE_s

- $PE_s = \frac{1}{2}kx^2$ k is the spring constant in N/m , x is the amount spring is compressed/stretched in units $N/m \cdot m^2$

Conservation of Energy

$$E_i = E_f$$

- initial $(KE + PE_s + PE_k) = \text{final}(KE + PE_s + PE_k)$

Friction is a non-conservative force which is not conserved; it takes away from the energy

Power=Work/time units J/s

$$P=W/t=F*v$$

Work done a varying force=area under a curve

