Chapter 6 · Work, Energy + Power

Work is not energy itself, but is related to the transfer of mechanical energy (kinetic energy, gravitational potential energy and elastic potential energy).

Work depends on the force acting on the object and the object's displacement. The force MUST act in the direction of the displacement.

$$W = F_{\parallel} \Delta d$$ ← use the magnitude of F and Δd.

where W is the work done on the object (J)

$F_{\parallel}$ is the force acting in the direction of the displacement (N)

Δd is the displacement (m)

Units:
$1\,J = 1\,N \cdot m$

NOTE:
Work is a scalar quantity

MP 220

$F_{\parallel} = 2.00 \times 10^2\,N$

$\Delta d = 3.00\,m$

$W = ?$

$W = F_{\parallel} \Delta d$

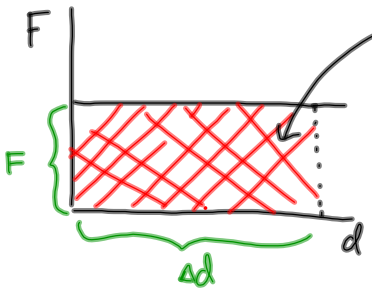
$W = (2.00 \times 10^2\,N)(3.00\,m)$

$W = 6.00 \times 10^2\,J$

When no work is done (p222-223)

1. When you apply a force, but there is no movement
   ex. pushing on a wall ($\Delta d = 0$)
2. When there is uniform motion but no force
   ex. hockey puck moving ($F_{\parallel} = 0$)
   across the ice (frictionless)
3. When the force acts perpendicularly to the motion.
   ex. carrying a suitcase (there is no $F_{\parallel}$)

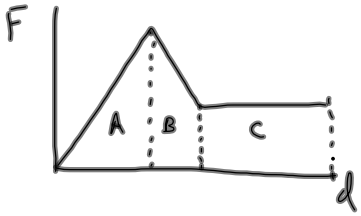
Work from a F-d graph:



area of rectangle = $l \times w$

area = $F \Delta d$

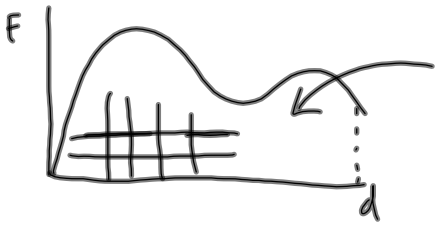
$\therefore$ area = Work (F-d graph)



Area of triangle = $\frac{1}{2} bh$

Area of trapezoid = $\frac{1}{2}(h_1 + h_2) b$

$W = A_A + A_B + A_C$



Count the "squares" + using the area of 1 "square", find the total area

OR use Calculus

OR use Logger Pro.

TO DO

1. PP|221
2. PP|225
3. Look over MP|227
4. PP|229|11