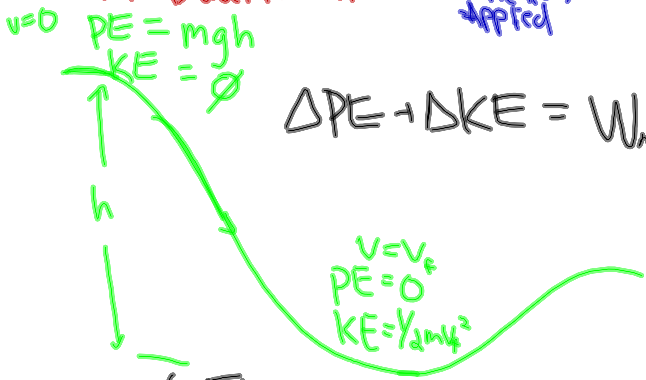
In the absence of any external or nonconservative forces, that total ME is conserved.

$$PE_i + KE_i = PE_f + KE_f$$

i.e. Gravity

conservative
- Path independent
  i.e. how you get from A to B doesn't matter.

non-conservative
- Depend upon Path
- Friction, Air Resistance Applied



$$\Delta PE + \Delta KE = W_{nc}$$

~~m=65kg~~

Skater $V_i = V_0$ 4 m/s $\qquad V_f = V_2$ 8 m/s

$W_a = +80J$

$W_f = -200J$

higher or lower?

$\Delta K = \frac{1}{2}m(v_f^2 - v_i^2)$

$$\Delta PE + \Delta KE = W_{nc}$$

$$\Delta PE + \tfrac{1}{2}(65)\left((8\,m/s)^2 - (4\,m/s)^2\right) = W_{nc}$$

$$\Delta PE + \tfrac{1}{2}(65)(64 - 16) = W_{nc}$$

$$\Delta PE + 1560 = -120$$

$$-1560 \qquad -1560$$

$$\Delta PE = -1680\,J$$

$$\Delta PE = mgh_f - mgh_i = mg(\Delta h)$$

$$mg(h_f - h_i)$$

$$-1680 = (65)(9.81)\Delta h$$

$$-1680 = 637.65\,\Delta h$$

$$-2.635\,m = \Delta h$$

$PE_s = \frac{1}{2} k x^2$

KE for mass attached to spring is still $\frac{1}{2} m v^2$

$F_s = -kx$

x = displacement from eq.

$$\text{Power} = \frac{\Delta W}{\Delta t}$$

or

$$\text{Watt} = J/s = \frac{W}{t}$$

$1W = 1 J/s$

$kW \cdot hr$

$1000 J/s \cdot 3600 s = 3{,}600{,}000 J$

$60W = 60 J/s$

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