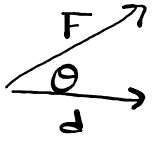
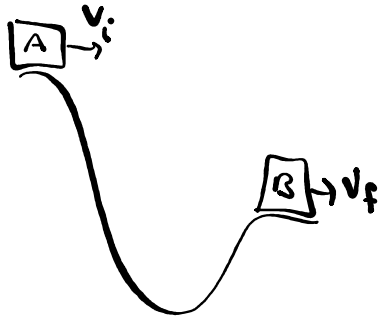
Unit 4 - Pt 1

① $W = F_{//} \cdot d$ or if diagrammed as 

then $W = |\vec{F}||\vec{d}|\cos\theta$

② Rollercoaster 

$E_i \rightarrow E_f$

$mgh_i + \frac{1}{2}mv_i^2 \rightarrow mgh_f + \frac{1}{2}mv_f^2$

Sometimes $E_{P_i} \rightarrow E_{K_f}$

③ Power

$P = \frac{W}{t}$ or $P = \frac{\Delta E}{\Delta t}$ or $P = \frac{W}{t} = \frac{(Fd)}{t} = F \cdot v_{avg}$

$P = \frac{\frac{1}{2}mv^2}{t}$ $P = \frac{mgh}{t}$

$P = Fv_{avg}$

Memorize

Memorize

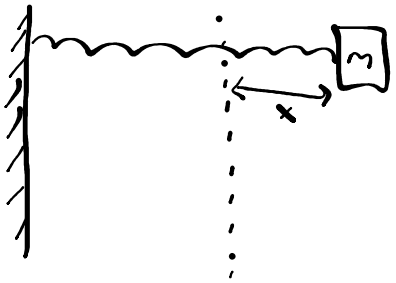
$$Eff(\%) = \frac{\text{Useful } E_{out}}{\text{Total } E_{in}} \times 100\%$$

$$Eff(\%) = \frac{\text{Useful } P_{out}}{\text{Total } P_{in}} \times 100\%$$

(4) Springs

$F = kx$ $\quad E_p = \frac{1}{2}kx^2$ $\quad T = 2\pi\sqrt{\frac{m}{k}}$

$a = \frac{F_{net}}{m}$ $\quad E_K = \frac{1}{2}mv^2$



$a = \frac{F_{net}}{m} = \frac{kx}{m}$

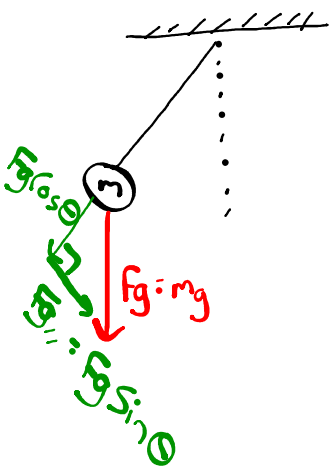
$E_i \rightarrow E_f$

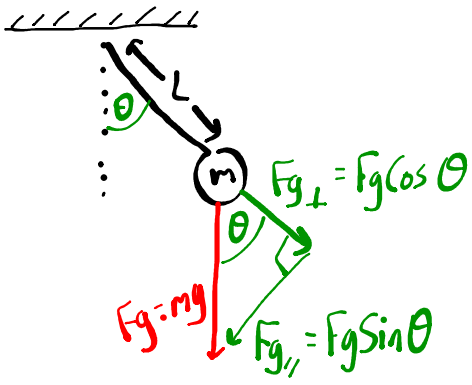
Maybe $E_p \rightarrow E_K$

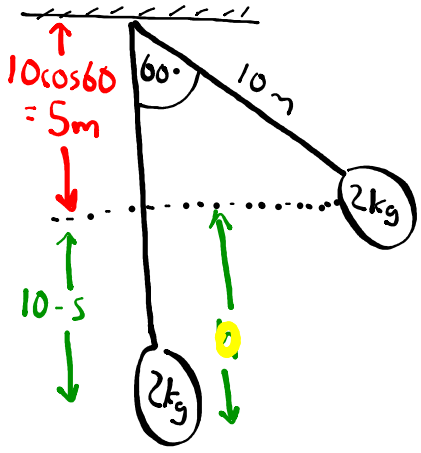
or $E_{p_i} \rightarrow E_{p_f} + E_{K_f}$

⑤ Pendulums

$T = 2\pi\sqrt{\frac{L}{g}}$







$E_p \rightarrow E_k$

$mgh = \frac{1}{2}mv^2$