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$m = 6.30\ kg$

$F_a = 30.0N$

$\Delta d = 13.9m$

$V_2 = ?$

$V_1 = 0$

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

$W = (30.0N)(13.9m)$

$W = 417J$

↑ 417J of work was done, therefore, 417J of kinetic energy was transferred to the rock.

using the work energy theorem:

$W = \Delta E_k$

$W = E_{k2} - E_{k1}$ ($E_{k1} = 0$)

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

$417J = \frac{1}{2}(6.30kg)v^2$

$\frac{2(417J)}{6.30kg} = v^2$

$V = 11.5\ m/s$

§6-3 Potential Energy & the Work-Energy Theorem

Gravitational Potential Energy

The energy of an object due to its position above a reference point:

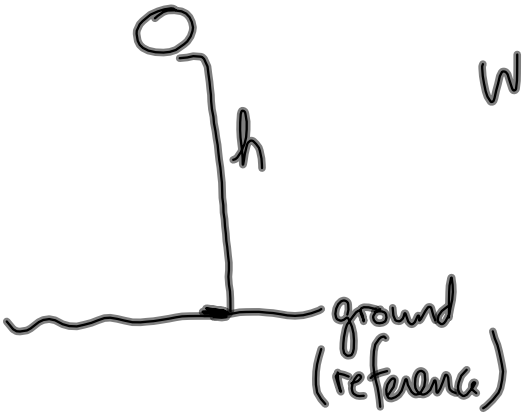
$$E_g = mgh$$

Where E_g is the gravitational potential energy (J)

m is the mass (kg)

h is the height above a reference level (m)

g is $9.81\ m/s^2$



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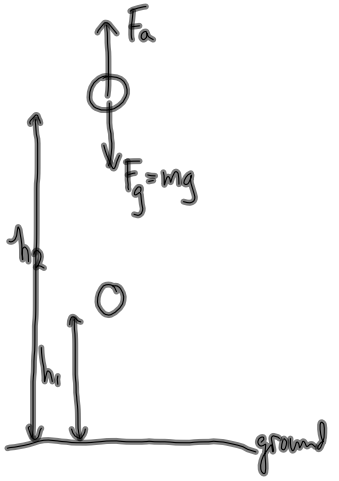
$E_g = mgh$

$E_g = (3.0kg)(9.81m/s^2)(0.68m)$

$E_g \doteq 2.0 \times 10^1 J$

with respect to the tent peg

Consider lifting an object at constant velocity:



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

$W = F_a \Delta d$ (but $F_a = F_g = mg$)

$W = mg \Delta d$

$W = mg(h_2 - h_1)$

$W = mgh_2 - mgh_1$

$W = E_{g_2} - E_{g_1}$

$\boxed{W = \Delta E_g}$

Work-Energy Theorem

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$W = E_{g_2} - E_{g_1}$

$W = mgh_2 - mgh_1$

$W = mg(h_2 - h_1)$

$W = mg \Delta h$

$1.60 \times 10^3 J = (65.0 kg)(9.81 m/s^2)(\Delta h)$

$\boxed{\Delta h = 25.1 m}$

The rocker ascended 25.1m.

OR

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

$W = mg\Delta d$ ← solve for Δd

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(HINT #28 .... find the volume of $1 m^3$ (in mL → L))