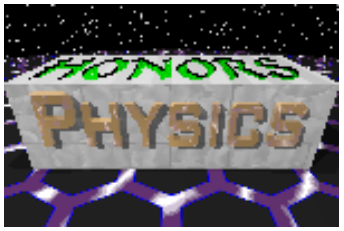
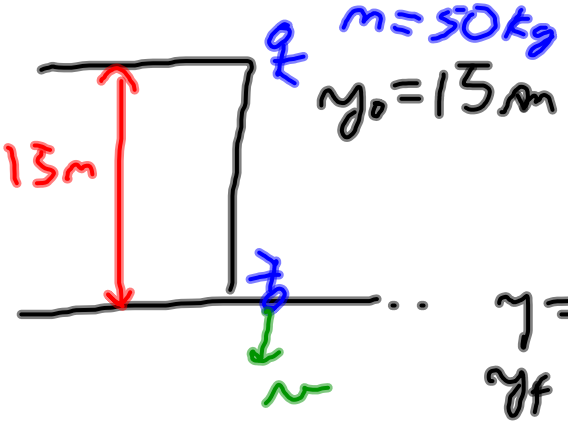


2010 Feb 22 Mon



$E_0 = E_F$

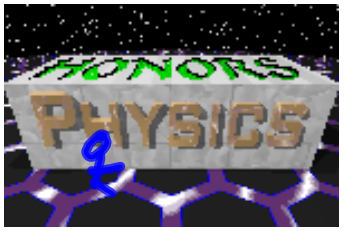
$U_0 + K_0 = U_F + K_F$

$mgy_0 = mgy_f + \frac{1}{2}mv^2$

$50kg\left(9.8\frac{m}{s^2}\right)15m = \frac{1}{2}(50kg)v^2$

$7350J = 25kg\,v^2$

$v = 17.1\,m/s$



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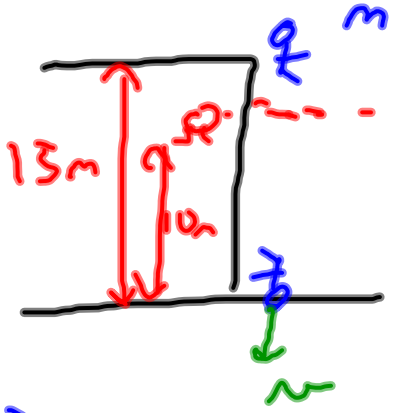
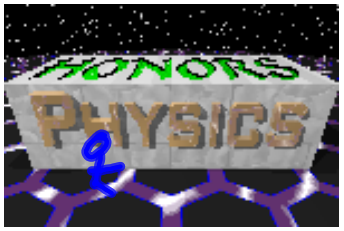


$$E_0 = E_f$$

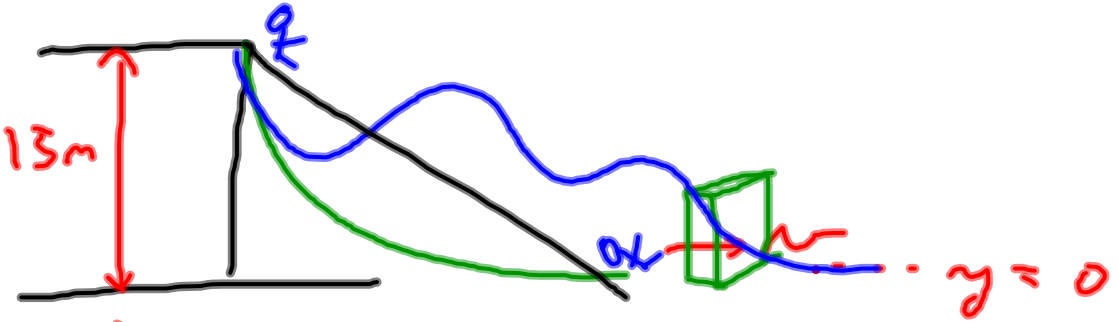
$$mgy_0 + 0 = mgy_f + \frac{1}{2}mv^2$$

$$2450\,J = -4900\,J + \frac{1}{2}mv^2$$

$$7350\,J = \frac{1}{2}(50\,kg)v^2$$



2010 Feb 22 Mon



$E_0 = E_F$

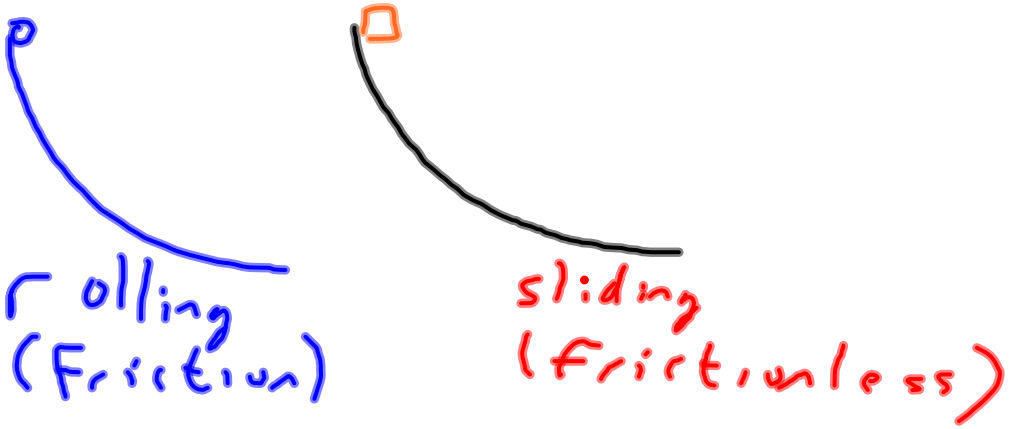
$mgy_0 = 0 + \frac{1}{2}mv^2$

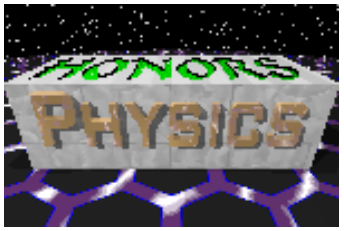
$7350J = \frac{1}{2}(50kg)v^2$

$v = 17.1\frac{m}{s}$

$mgy_0 = \frac{1}{2}mv^2$

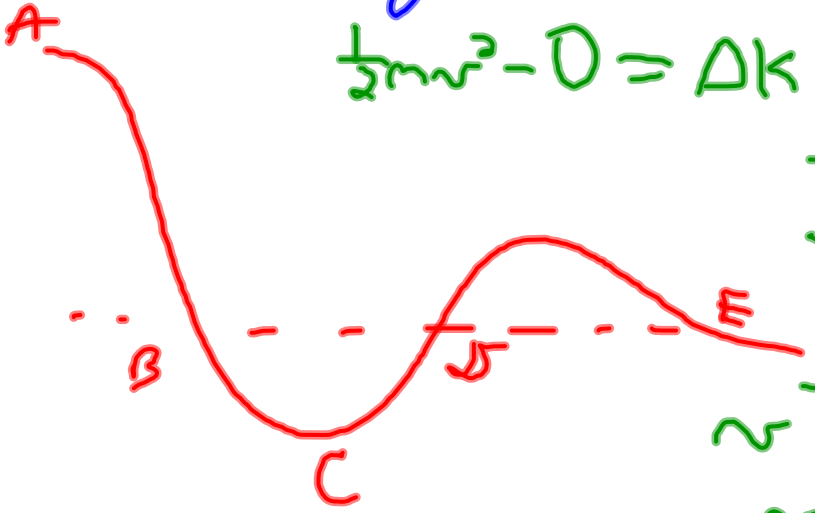
$$mgy_0 = \frac{1}{2}mv^2$$
$$mgy_0 = \frac{1}{2}mv^2 + K_{ROT}$$





2010 Feb 24 Wed

Please get your workbooks.



$\frac{1}{2}mv^2 - 0 = \Delta K = -\Delta U$

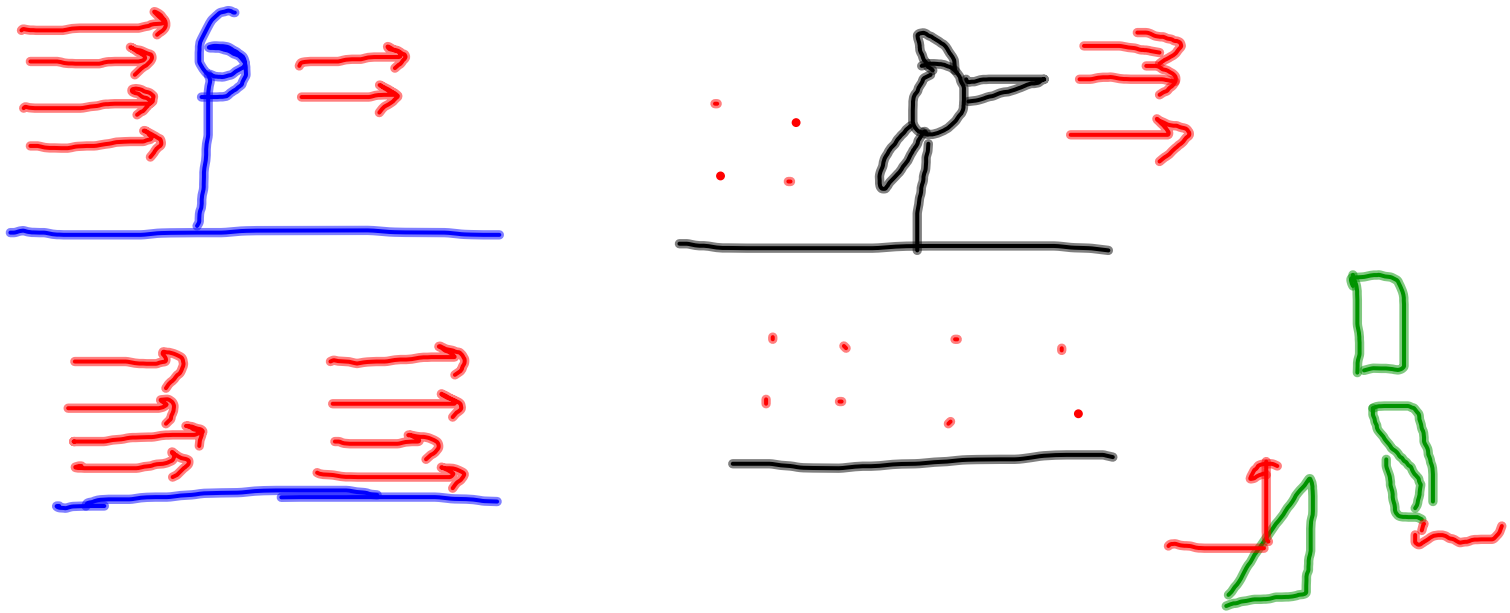
$= -(mgy - mgy_0)$

$= mgy$

$v^2 = 2gy$

$v = \sqrt{2(10)5}$

$= 10\ m/s$



$$K = \frac{1}{2} m v^2$$

$$10^6 J = \frac{1}{2} m \left(30 \frac{km}{h} \cdot \frac{1\,h}{3600\,s} \cdot \frac{1000\,m}{km} \right)^2$$

$$K^* = \frac{1}{2} m v^{*2}$$

$$\frac{K^*}{K} = \frac{\frac{1}{2} m v^{*2}}{\frac{1}{2} m v^2}$$

$$\frac{K^*}{K} = \left(\frac{v^*}{v} \right)^2$$

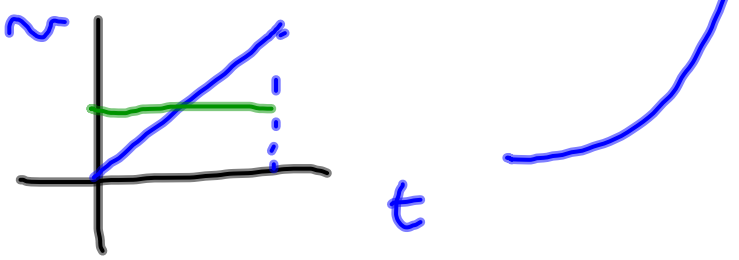
At $t = 3s$, $v = 30 \frac{m}{s} \rightarrow v_{Avg} = 15 \frac{m}{s}$

$$\Delta x = v_{Avg} \Delta t$$

$$s = rt$$

$$= 15 \frac{m}{s}(3s) = 45m$$

$$v_{Avg} = \frac{1}{2}(v_i + v_f)$$

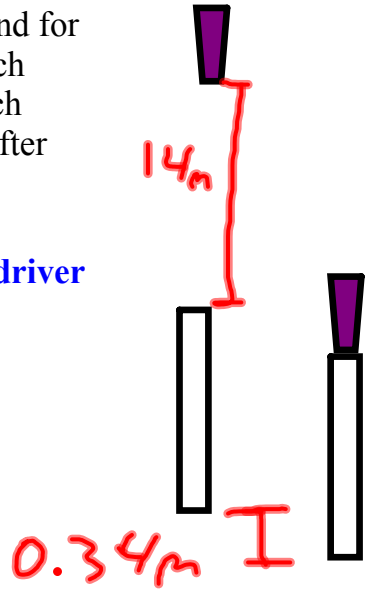


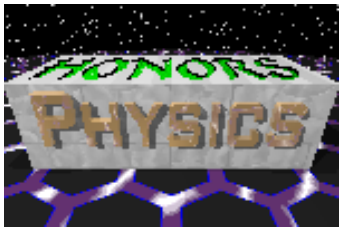
A pile driver is a device used to drive posts into the ground for use in foundations. Consider a particular pile driver which masses 1500 kg and is raised 14 m above an I-beam which masses 11500 kg. The driver is released from rest and, after hitting the post, drives it 0.34 m into the ground.

(a) Assuming that the ground is the zero point for gravitational energy, how much energy does the pile driver have at the moment of release?

(b) How fast is it moving when it hits the post?

(c) What is the average force exerted on the post?





2010 Feb 25 Thu

Energy

Work $W = F\Delta x$

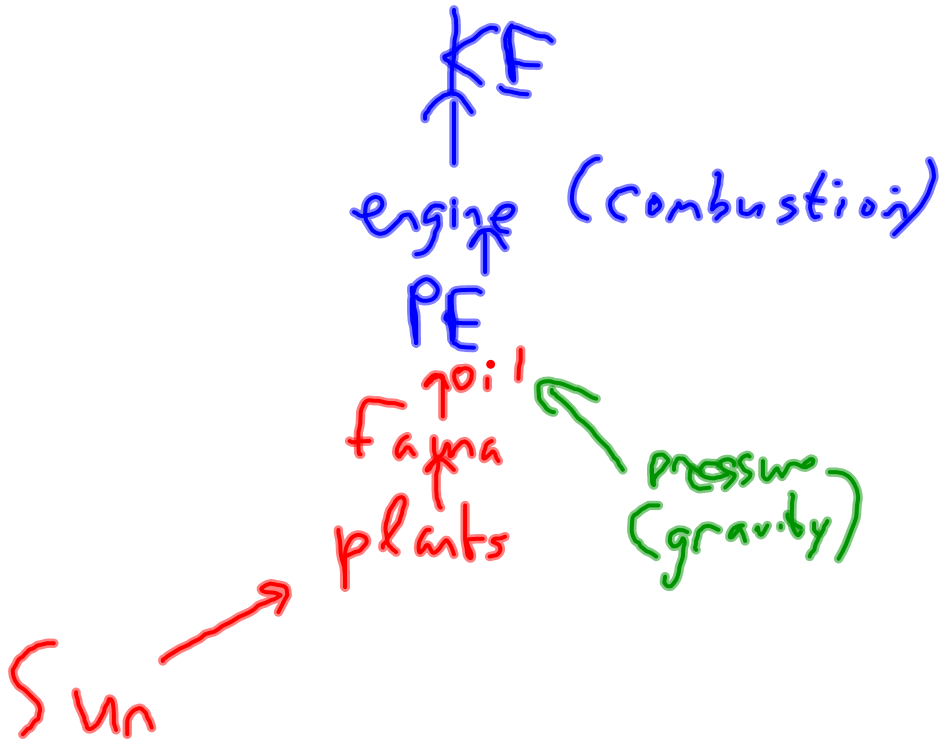
$W_{tot} = \Delta K$

Power $P = \frac{W}{\Delta t}$ $[P] = \frac{J}{s}$ $= 1\ watt$ $= 1\ W$

Energy $K = \frac{1}{2}mv^2$

$U_g = mgy$

$E = E$


KE
engine
(combustion)
PE
soil
fauna
plants
pressure
(gravity)
Sun