

CP - Dec 1

CLT Define Kinetic and Potential energy and solve problems.

Potential Energy -
Energy that is stored in an object by it's:

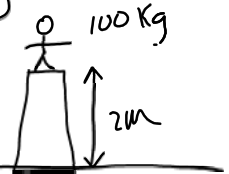
1. Position ✓
2. Condition - temperature
springs
3. Chemical Make up

$$w = mg$$

$$\boxed{PE = mgh}$$

PE - Potential Energy (Nm or J)
 Newton < m mass
 g acc due to gravity
 meters h height

What is the amount of energy stored in a 100kg Person standing on a 2m Ladder



$$PE = mgh$$

$$= 100\text{Kg} \left(\frac{9.8\text{N}}{\text{kg}} \right) (2\text{m})$$

$$= \boxed{1960\text{J}}$$

Kinetic Energy
Energy of moving things

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

KE = Kinetic Energy
 m mass (kg)
 v velocity ($\frac{m}{s}$)

Example

a 10 kg dog is running at 2.8 $\frac{m}{s}$. How much Kinetic Energy does the dog have?

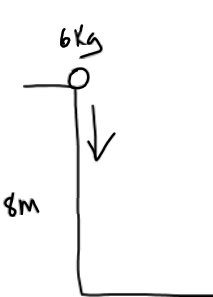
$$KE = \frac{1}{2} m v^2$$

$$= \frac{1}{2} (10 \text{ kg}) \left(2.8 \frac{m}{s} \right)^2$$

$$= (5 \text{ kg}) \left(7.84 \frac{m^2}{s^2} \right)$$

$39.2 \frac{\text{kg} \cdot m^2}{s^2}$

N $\frac{kg \cdot m}{s}$



1. What is PE?

$$PE = mgh$$

$$= 6 \text{ kg} \left(9.8 \frac{m}{s^2} \right) (8 \text{ m})$$

$= 470.4 \text{ J}$

KE at the bottom equals the PE at the top.

$$470.4 \text{ J} = \frac{1}{2} m v^2 = KE$$

PE = mgh

↓ KE = $\frac{1}{2} m v^2$

Before PE = KE
 470.4 J = 470.4 J

2(470.4 J) = $\frac{1}{2} m v^2$

$\frac{940.8 \text{ J}}{6 \text{ kg}} = \frac{m v^2}{2}$

$\frac{940.8 \text{ J}}{6 \text{ kg}} = v^2$

$156.8 \frac{m^2}{s^2} = v^2$

$v = 12.5 \frac{m}{s}$

$v_f^2 = v_0^2 + 2ad$
 $= 2(9.8)(8 \text{ m})$
 $v_f^2 = 156.8 \frac{m^2}{s^2}$

$v_f = 12.5 \frac{m}{s}$