



Energy

Enable an object to do work

Measured in Joules



Mechanical Energy

Mechanical Energy is the energy due to the position of something, or the movement of something.



Mechanical Energy

It is in the form of Potential Energy, Kinetic Energy, or a combination of the two.

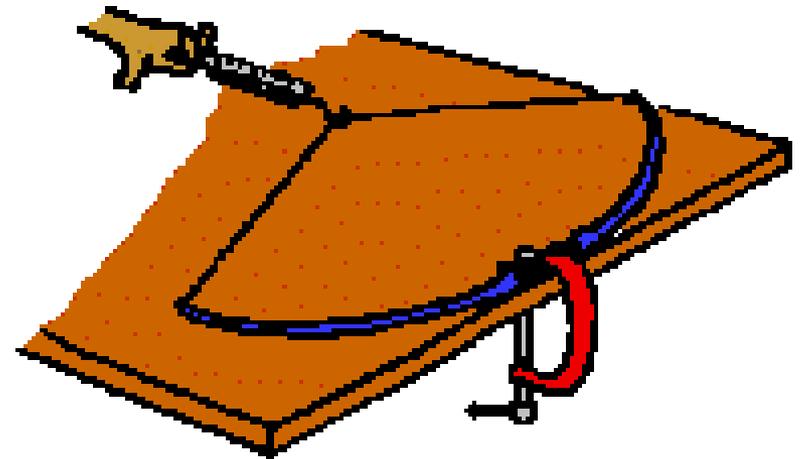
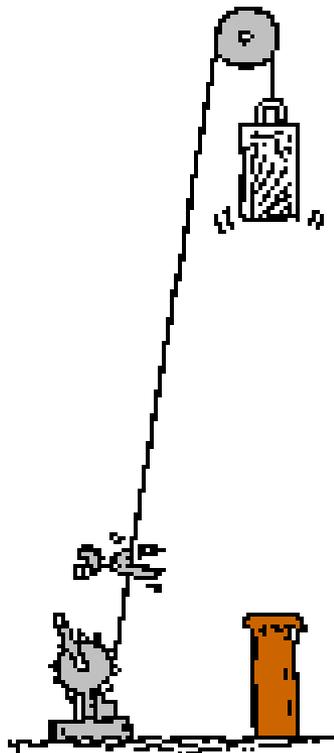


Potential Energy

An energy that is stored. It has the potential to do something.

Found in fossil fuels, electric batteries, and the food we eat.

Potential Energy



The heavy ram of a pile driver and the stretched bow possess stored energy of position - potential energy.

Potential Energy

The potential energy due to elevated positions is called **gravitational potential energy**

$$U_g = mgh$$



Potential Energy

gravitational potential energy:
depends on the height and weight
of an object, not the path taken.

Potential Energy

Diagram A

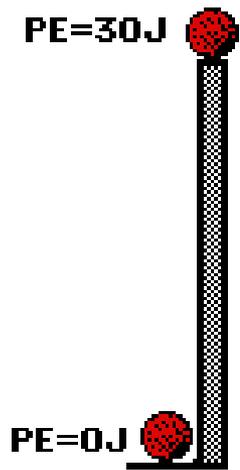


Diagram B

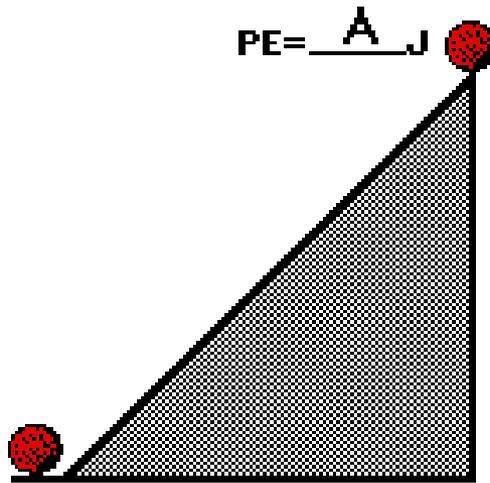
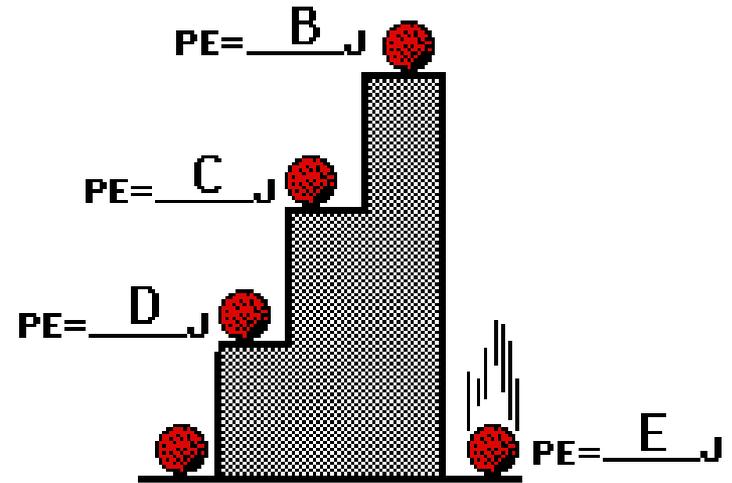


Diagram C



What is the U_g at the 5 locations, A, B, C, D, and E?

$A = 30\text{ J}$, $B = 30\text{ J}$, $C = 20\text{ J}$, $D = 10\text{ J}$, $E = 0\text{ J}$

Potential Energy

The potential energy stored in elastic materials as the result of their stretching or compressing is called **elastic potential energy**

$$U_s = \frac{1}{2}kx^2$$



Potential Energy

elastic potential energy: depends if an object is at a position on an elastic medium other than the equilibrium position.



Kinetic Energy

If an object is moving, it has kinetic energy.

Kinetic Energy depends upon an object's mass and speed

Kinetic Energy

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

Kinetic Energy

Determine the kinetic energy of a 1000-kg roller coaster car that is moving with a speed of 20.0 m/s.

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

$$KE = (\frac{1}{2})(1000)(20)^2$$

$$KE = 200,000 \text{ Joules}$$

Kinetic Energy

Missy Diwater, the former platform diver for the Ringling Brother's Circus had a kinetic energy of 15 000 J just prior to hitting the bucket of water. If Missy's mass is 50 kg, then what is her speed?

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

$$15,000 = \left(\frac{1}{2}\right)(50)v^2$$

$$v = 24.5 \text{ m/s}$$