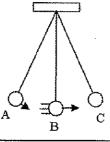| 1. Kinetic Energy C	A. The units for energy.
2. Potential Energy D	B. The ability to create forces or motion.
3. Energy B	C. Energy because of an object's motion.
4. Height E	D. Energy because of an object's position above the ground due to gravity.
5. Joules A	E. Vertical distance above the ground.

How can you *prove* that something has energy?

It can make something move.
(or create forces)

Potential (E_p) or Kinetic (E_k) Energy

E_k A car is traveling 45 mph.

E_p A rock is on a ledge 5 meters high.

E_p A car is resting at the top of a hill.

$E_p + E_k$ A ball is thrown into the air and is still moving. E_p ... E_k

E_k A ball rolling on the ground.

What kind of energy does the pendulum have in each of its positions?

A) E_p

B) E_k

C) E_p

A B C

What kind of Energy?
Thermal; Nuclear; Radiant; Mechanical; Chemical; Electrical

M A ball on top of a hill.	R Given off by the sun.
C Gasoline.	M A car going 50 mph.
E Used to run a clock.	T Heat from a fire.
T A hot stove.	R Light from a match.
N Uranium in reactors.	C Stored in plants.
C Stored in food.	R Powers photosynthesis.

Give all the types of energy in a camp fire.
Chemical - wood
Thermal - heat   Radiant - light

Give all the types of energy in a light bulb.
electrical
Radiant   Thermal

Give all the types of energy when a bullet is fired.
Thermal - friction   chemical
Mech - moving   (the gun powder)

1. Thermal C	A. Energy of the atom being split or fused.
2. Nuclear A	B. Energy of moving electrons.
3. Radiant D	C. Heat energy. Also caused by friction.
4. Mechanical E	D. Light energy—electromagnetic radiation.
5. Chemical F	E. Energy (kinetic or potential) stored in object and can do work.
6. Electrical B	F. Energy of molecular bonds.

Circle the one with more Potential Energy

A 25 kg mass or a (30 kg mass) at the top of a hill?

A car at (the top) of the hill or the bottom of a hill?

A plane on the ground or a plane in (the air?)

(A full plane) or an empty plane (both are flying)? more M

Circle the one with more Kinetic Energy

A 25 kg mass or a (30 kg mass) going 5 m/s.

Two 10 kg masses, one going (75 m/s) one going 45 m/s.

A car at rest or a car (rolling down) a hill.

(A heavy bike) or a light bike.

A 4 kg rock is rolling 10 m/s. Find its kinetic energy.
$m = 4 kg$ $E_k = \frac{1}{2}mv^2$
$v = 10 m/s$ $= \frac{1}{2}(4)10^2 = 2(100) = 200 J$
$E_k = \_\_\_$

Calculate the potential energy of a 10 kg rock at the top of a 6 m tall table.
$m = 10 kg$ $E_p = mgh$
$h = 6m$ $= 10(10)(6)$
             $= 100(6) = 600 J$

A 8 kg cat is running 4 m/s. Find the cat's kinetic energy.
$m = 8 kg$ $E_k = \frac{1}{2}mv^2$ $= 4(16) =$
$v = 4 m/s$ $= \frac{1}{2}(8)(4)^2$ $64 J$
$E_k = \_\_\_$

Find the potential energy of a 2 kg ball 15 m in the air.
$m = 2 kg$ $E_p = mgh$
$h = 15m$ $= 2(10)(15) = 2(150) = 300 J$
$g = 10$

A rolling ball going 3 m/s has 18 joules of kinetic energy. Find its mass.
$v = 3 m/s$ $E_k = \frac{1}{2}mv^2$ $18 = \frac{1}{2}mg$
$E_k = 18 J$ $18 = \frac{1}{2}(m)(3)^2$ $2 = \frac{1}{2}m$
$m = \_\_\_$ $m = 4 kg$

A box is 4 m in the air and has 120 J of potential energy. What is the box's mass.
$120 = m(10)(4)$
$120 = 40m$
$m = 3 kg$

A 4 kg bird has 8 joules of kinetic energy. How fast is it flying?
$E_k = \frac{1}{2}mv^2$ $v^2 = \frac{8}{2} = 4$
$8 = \frac{1}{2}(4)v^2$
$8 = 2v^2$ $v^2 = 4$
            $v = 2 m/s$