Energy

- can be defined as the ability to do work.

Work?

- the ability to move matter

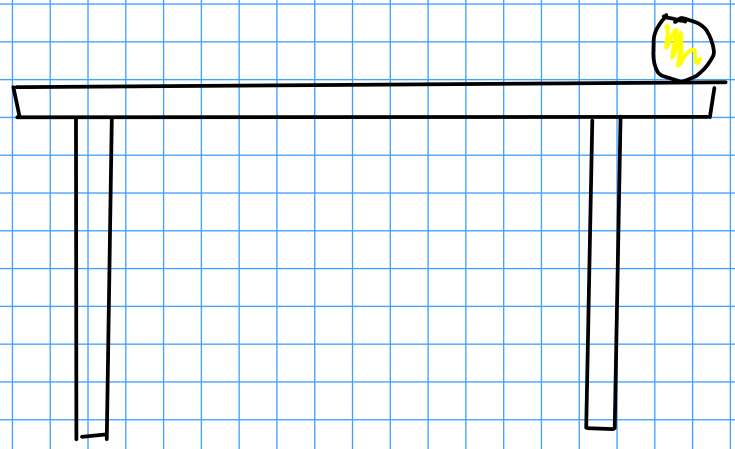
Kinds of energy

KINETIC ENERGY is the energy of matter in motion

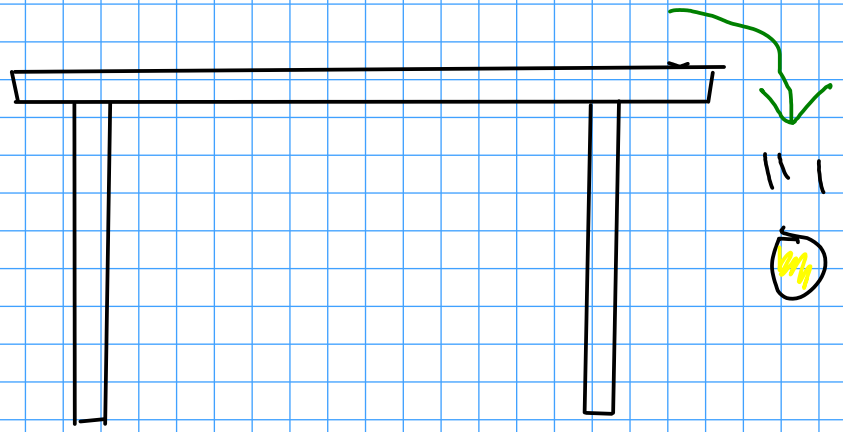
Throwing a ball gives it kinetic energy!

POTENTIAL ENERGY is energy of matter that is being acted on by a FIELD OF FORCE

- Fields of force may be things like gravity, magnetism, electricity, etc.



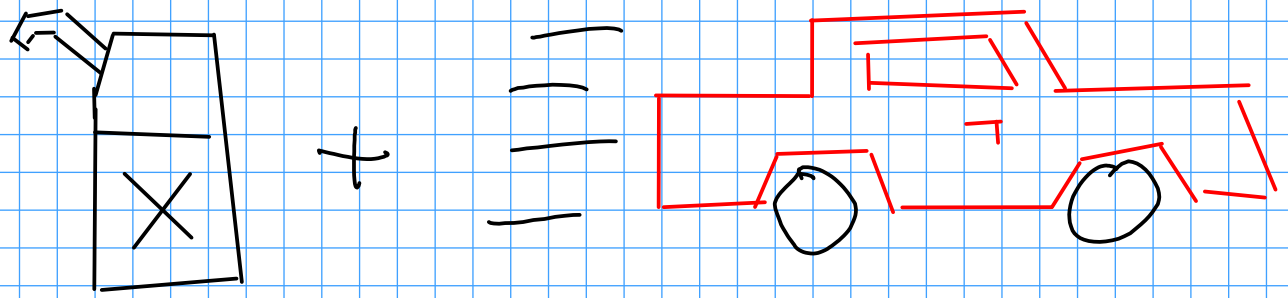
A ball on a table has POTENTIAL ENERGY because it is being acted on by GRAVITY



When the ball falls, the POTENTIAL ENERGY is converted to KINETIC ENERGY

CHEMICAL ENERGY is energy stored in matter. Think of chemical energy as the sum of the kinetic and potential energy of the atoms in a chemical

CHEMICAL ENERGY may be converted to other forms of energy during chemical reactions



Gasoline

Car's internal combustion engine

The chemical energy of the gasoline is CONVERTED to thermal and kinetic energy when the gas is burned in the engine of the car.

Conservation of energy

- Like mass, energy is conserved in physical and chemical changes.

- During a chemcal or physical process, the overall amount of energy remains constant, even if there is a change in the type of energy.

"Law of conservation of energy"

sometimes called

"First Law of Thermodynamics"

study of energy transfer

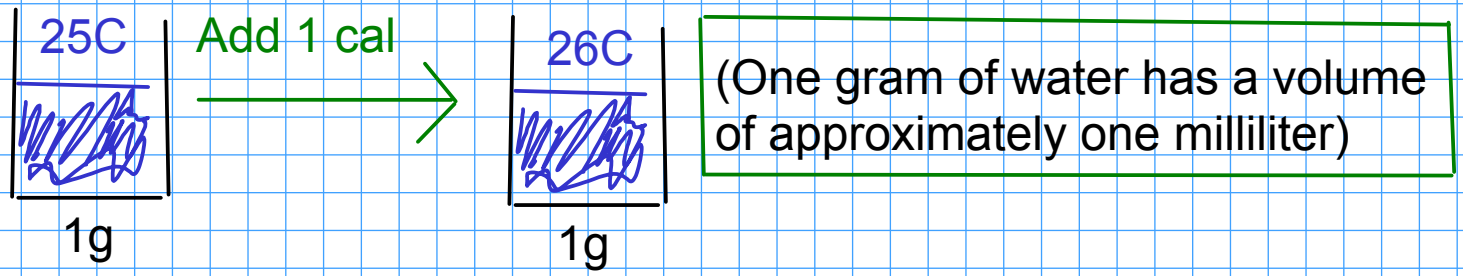
Energy units

- two common units. Both are based on the metric system

CALORIE

- the amount of energy required to change the temperature of one gram of water by 1 degree Celsius.

- abbreviation: cal



- the Calorie reported on the side of most food labels is actually a KILOCALORIE (kcal). 1 kcal = 1000 cal

JOULE

- the standard metric unit of energy is the JOULE.

- abbreviation: J

- the Joule is defined based on KINETIC ENERGY, but is smaller than the calorie.

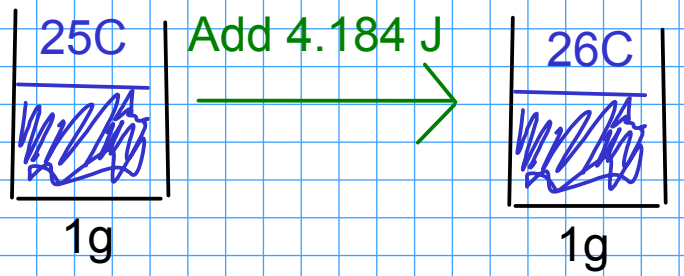
4.184 J = 1 cal

The joule is a DERIVED UNIT:

$1\ J = 1\ \frac{kg\ m^2}{s^2}$, from

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

kinetic energy — mass — velocity



(One gram of water has a volume of approximately one milliliter)