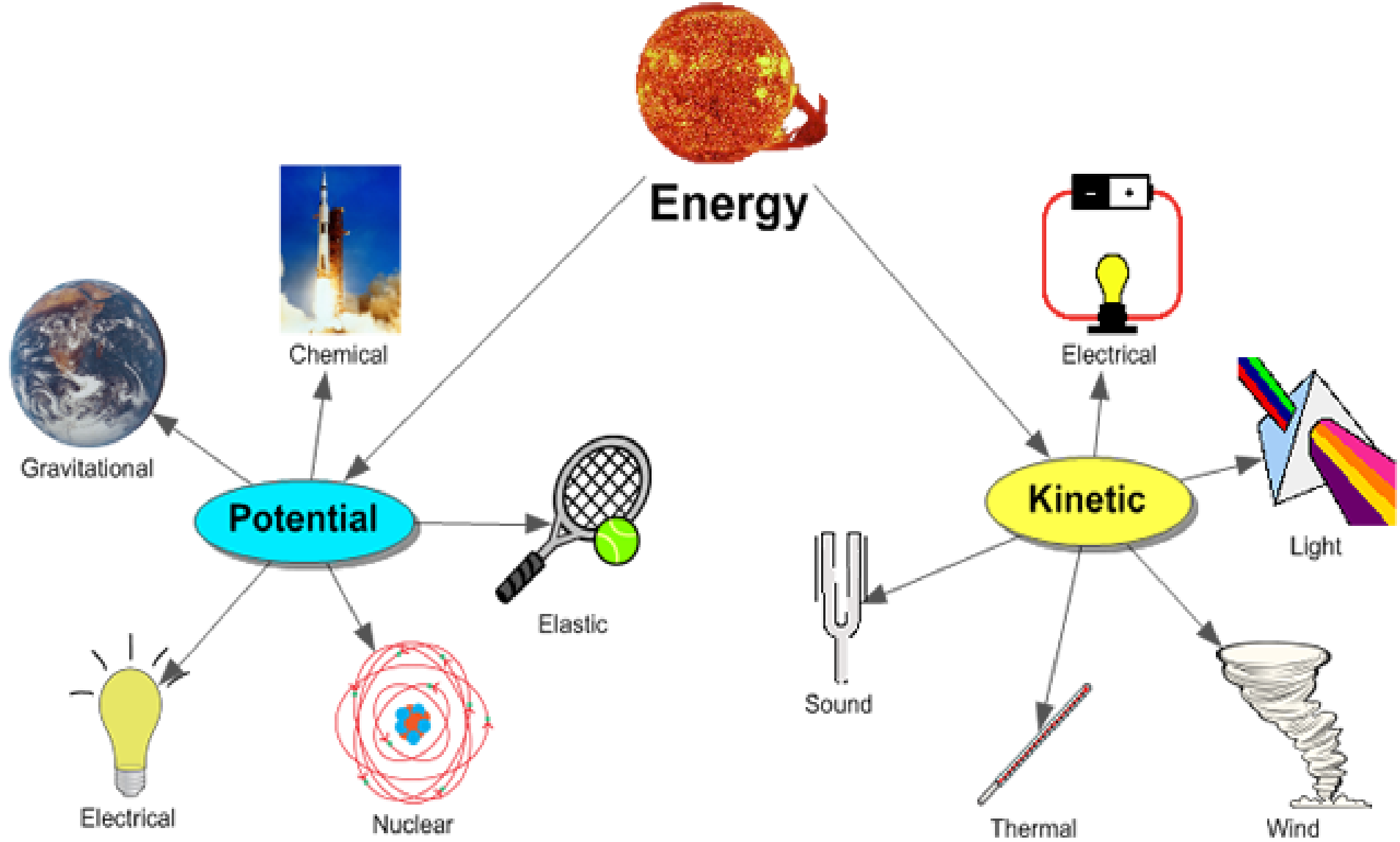
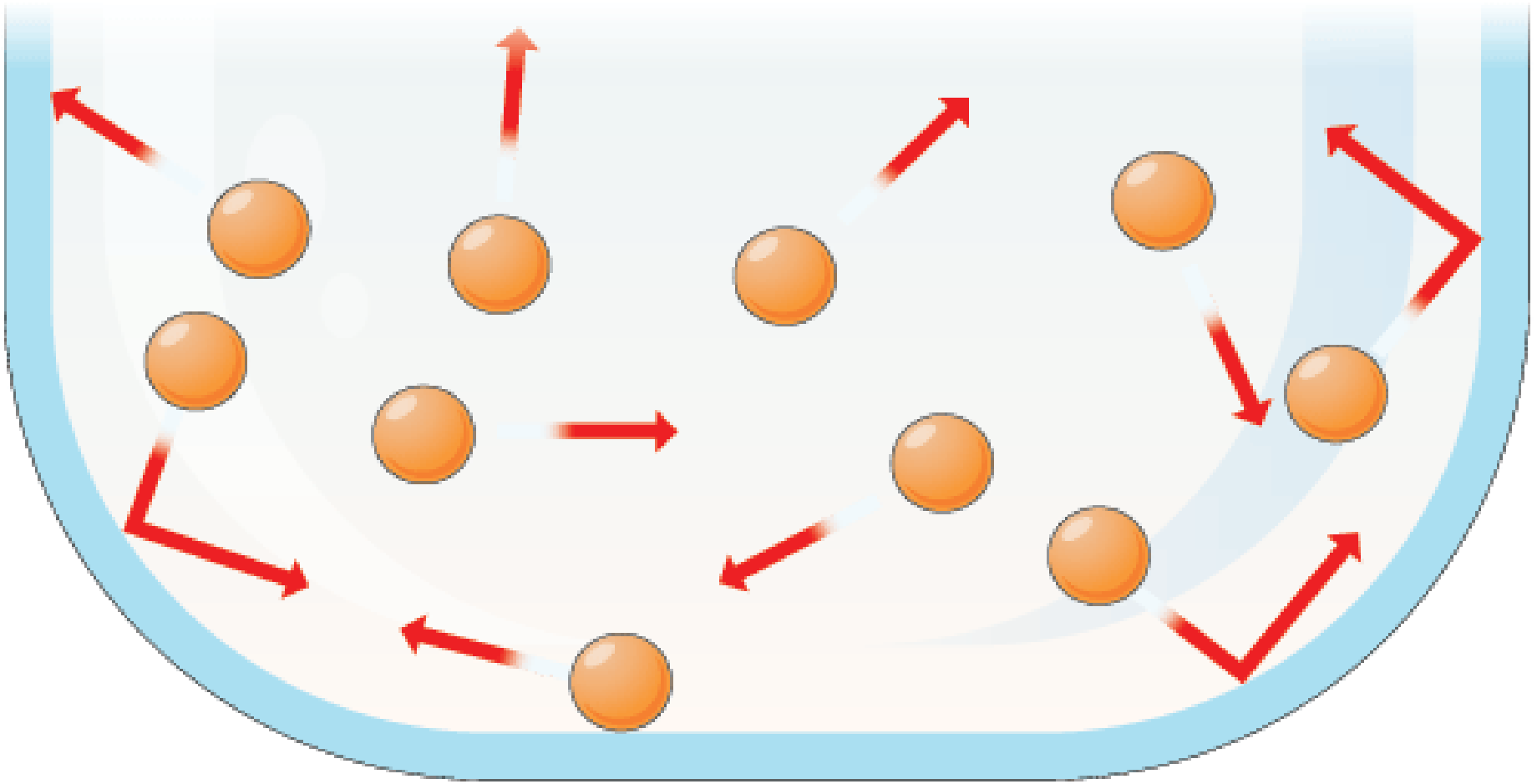
ENERGY

Energy comes in many forms.



- One form of energy can be transformed into another form of energy.

- A few of the forms of energy in our environment that we use without even thinking are thermal energy,



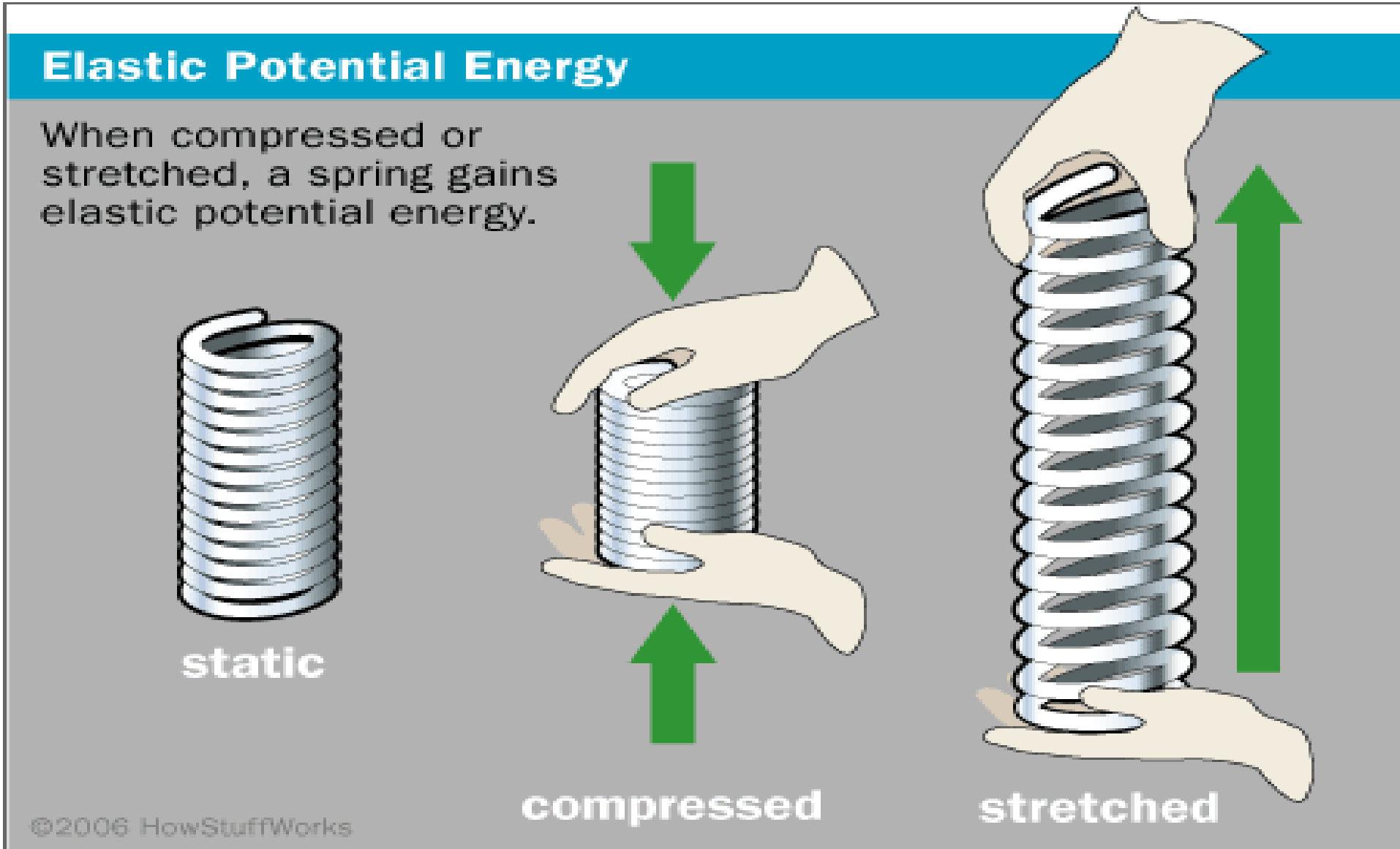
sound energy

- and chemical energy.

Other forms of energy include wind energy,

- solar energy,

elastic energy,

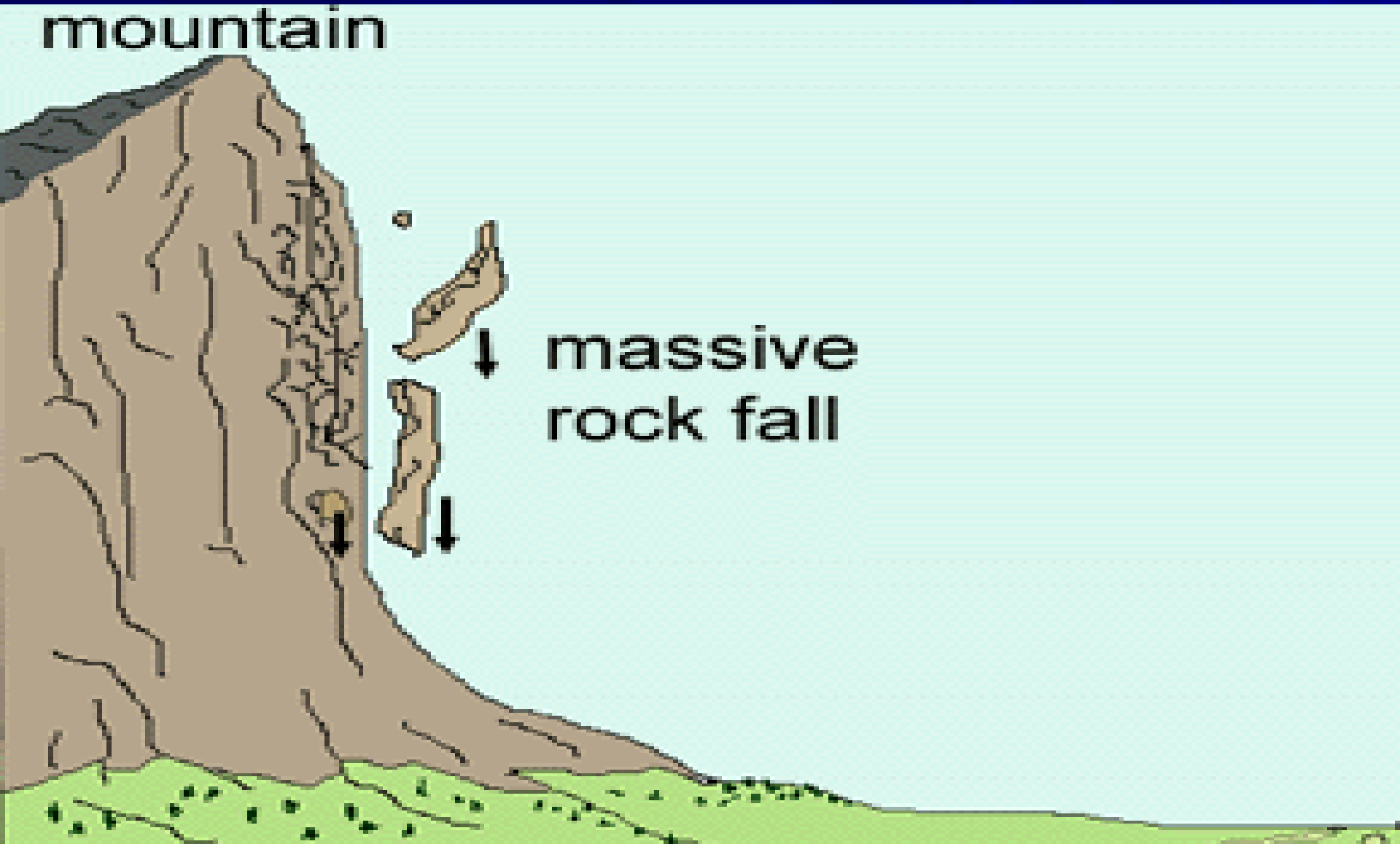


- electrical energy,

- hydraulic energy,

- radiant energy,

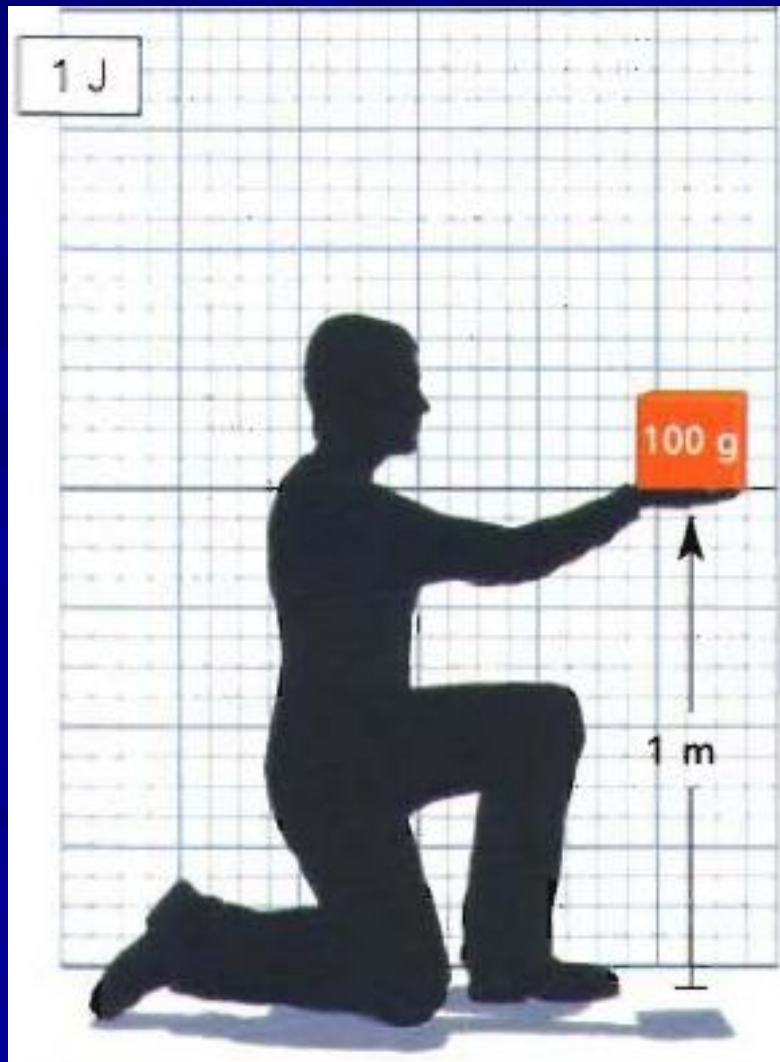
- potential energy,



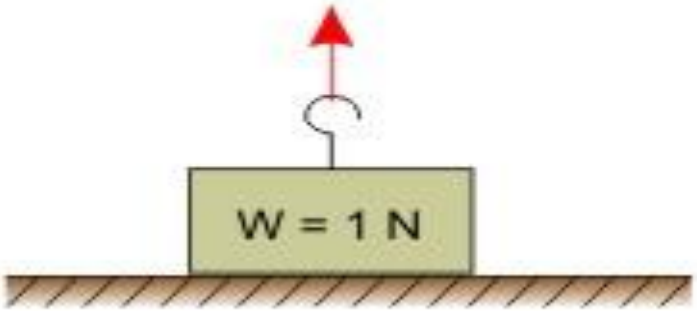
- or kinetic energy.

- ***Energy is the ability to do work or effect change.***

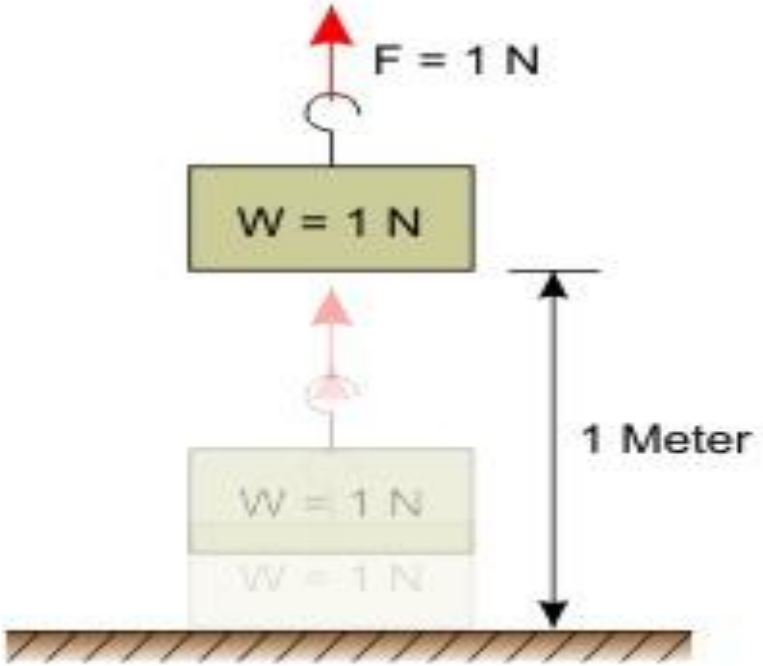
- The unit of measurement for energy is the ***joule***, represented by the symbol ***J.***



- A joule is equal to the energy required to move an object with the force of one Newton over a distance of one metre.



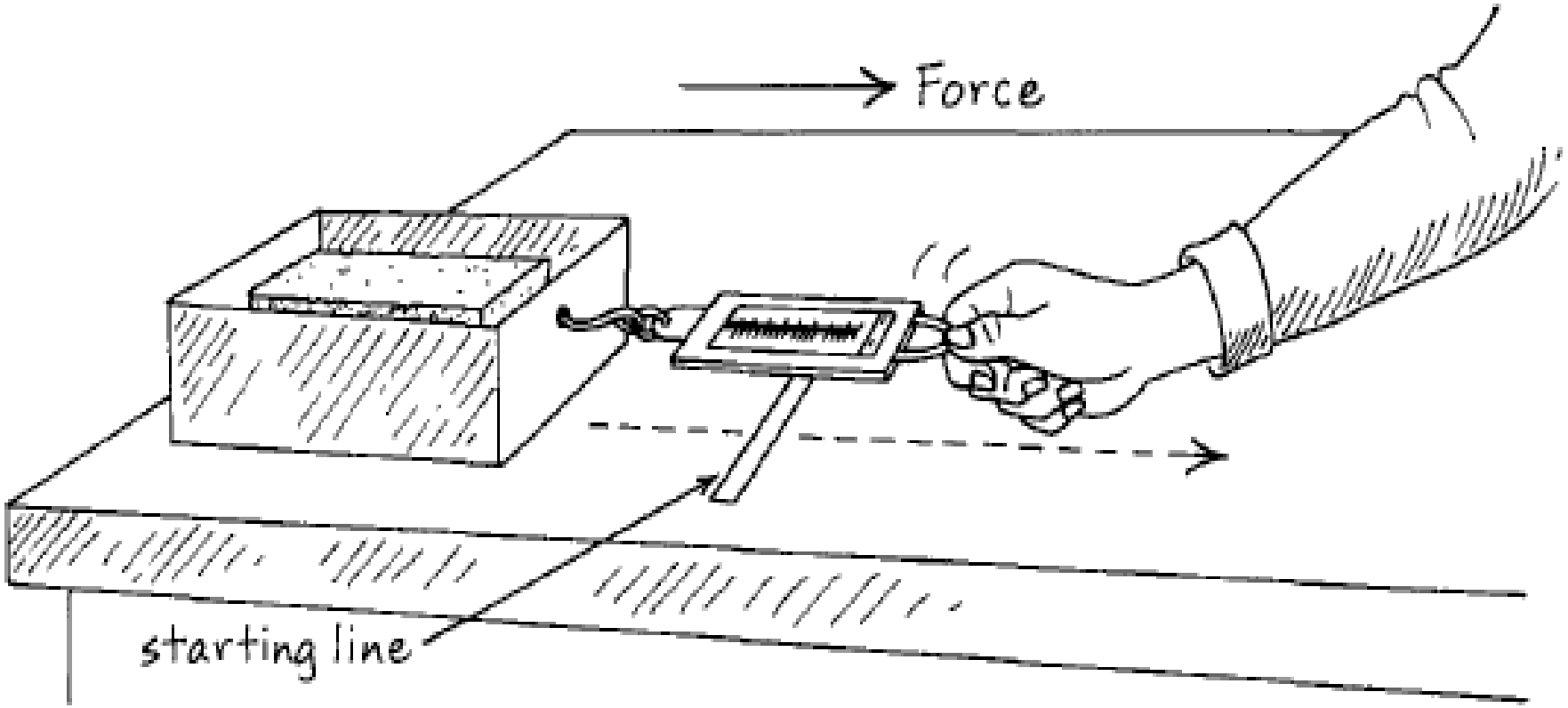
Weight of 1 newton on floor



Weight of 1 newton lifted 1 meter by a force of 1 newton. Energy used = 1 joule

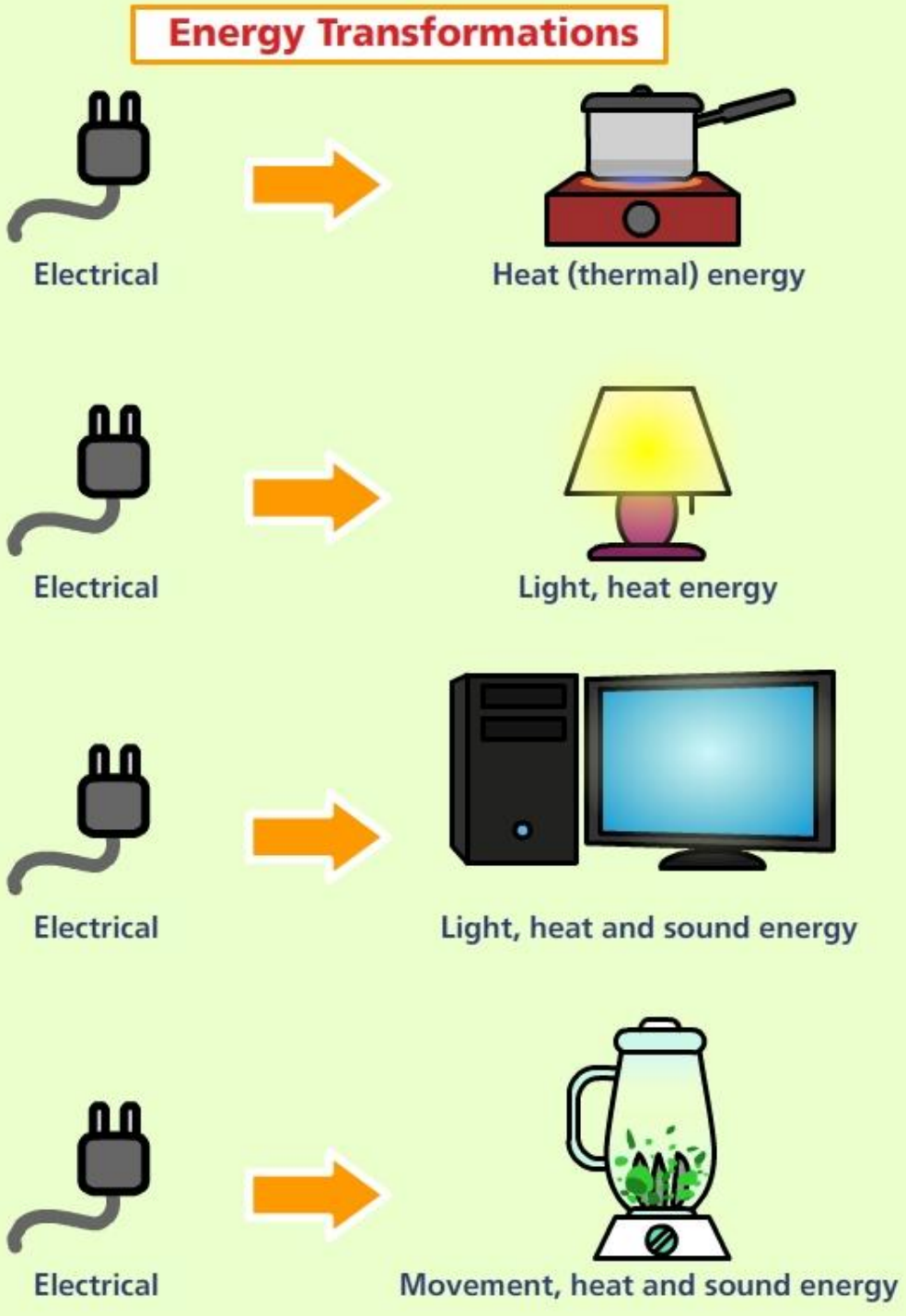
- This relationship can be expressed by the following equation:

$1\ J = 1\ N \times 1\ m$

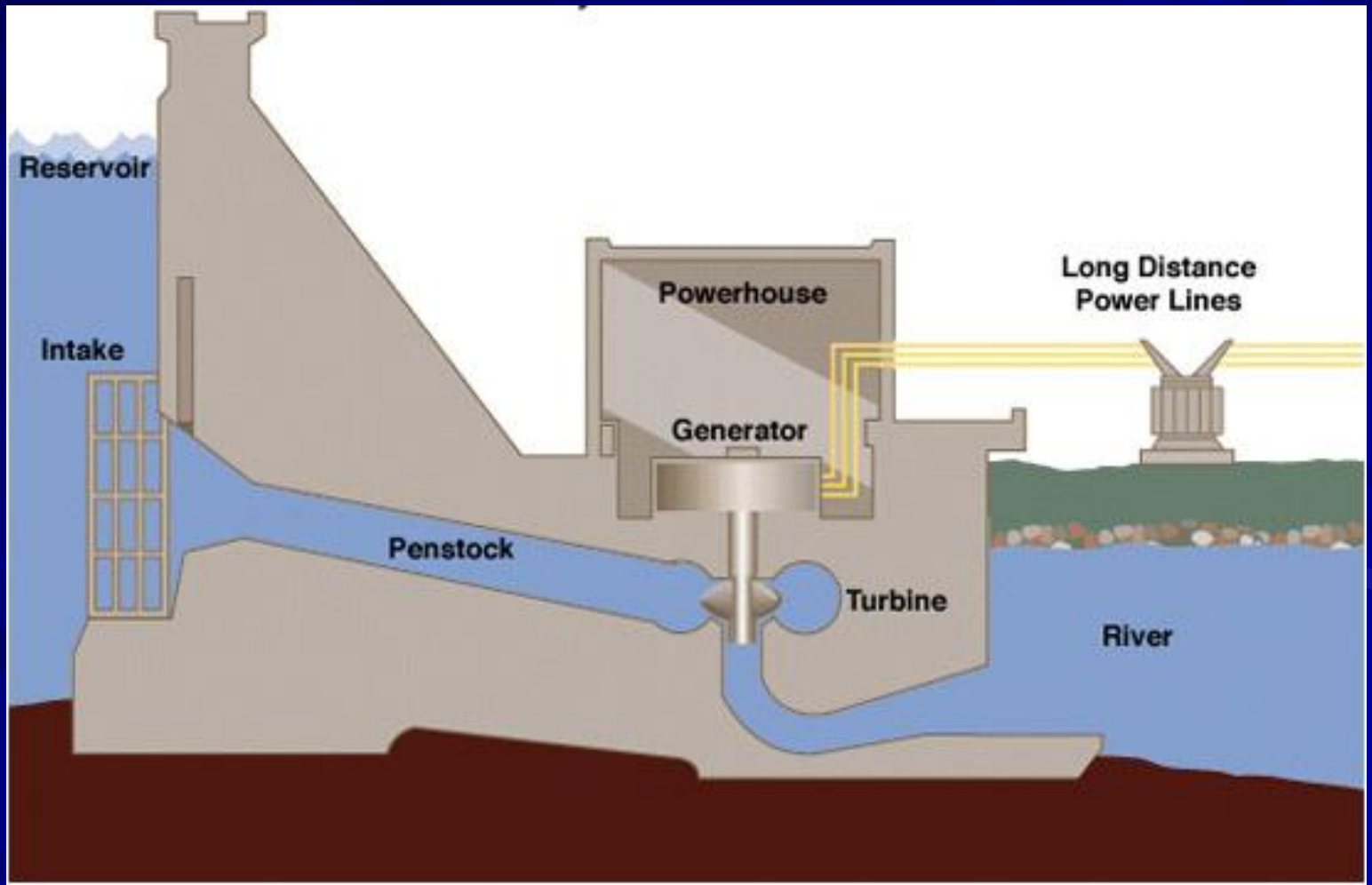


- Energy transfer is the movement of energy from one place to another.

- Energy transformation is the changing of energy from one form to another.

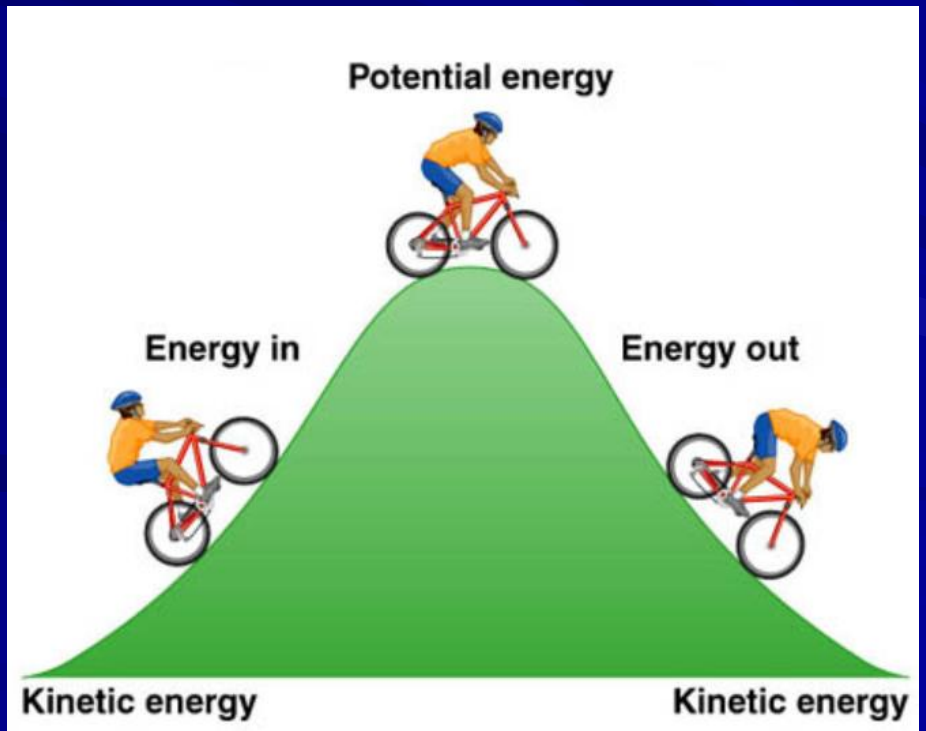


- For example, the hydraulic energy of water can be transformed into mechanical energy to spin a turbine.

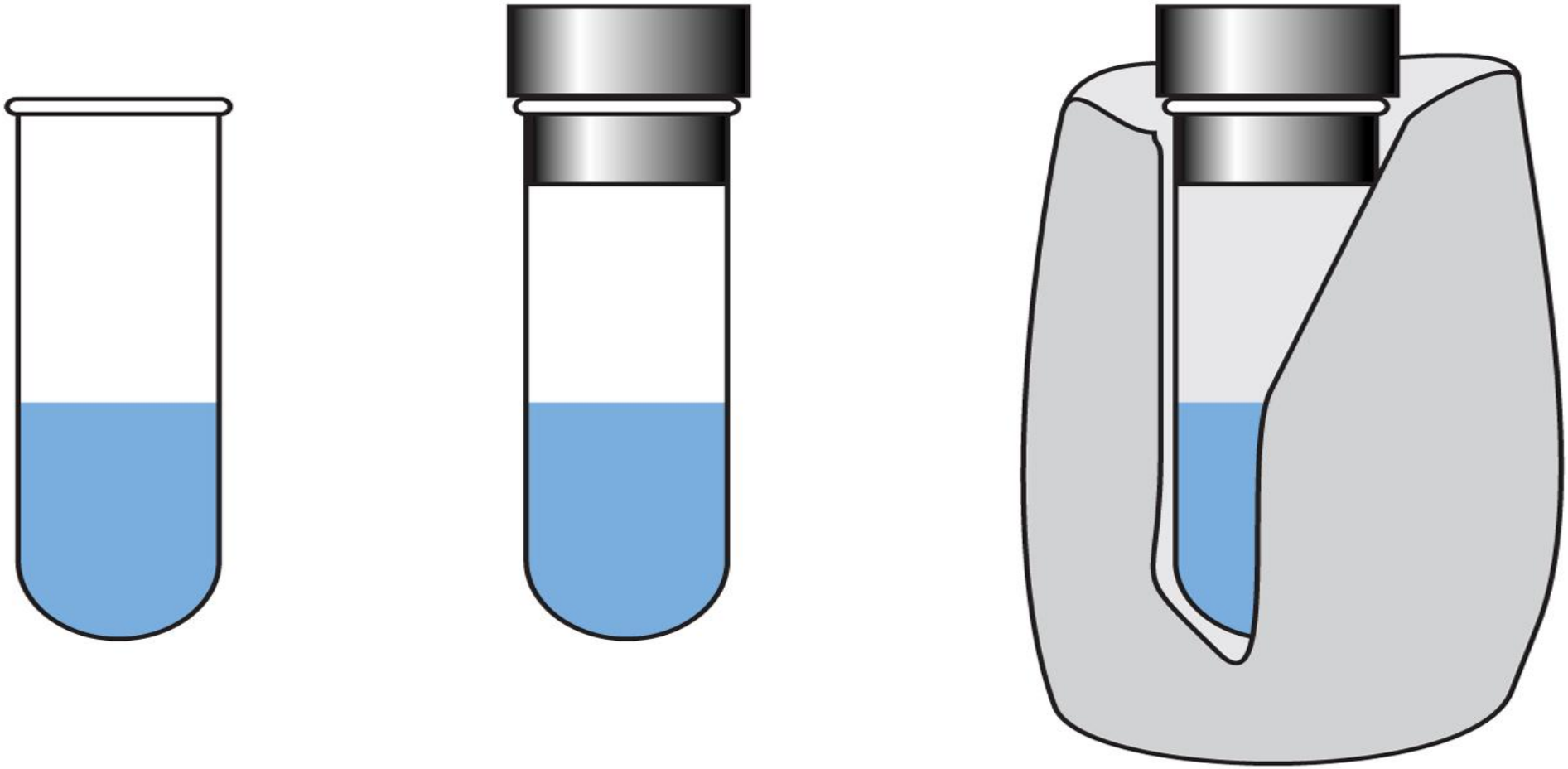


THE LAW OF CONSERVATION OF ENERGY:

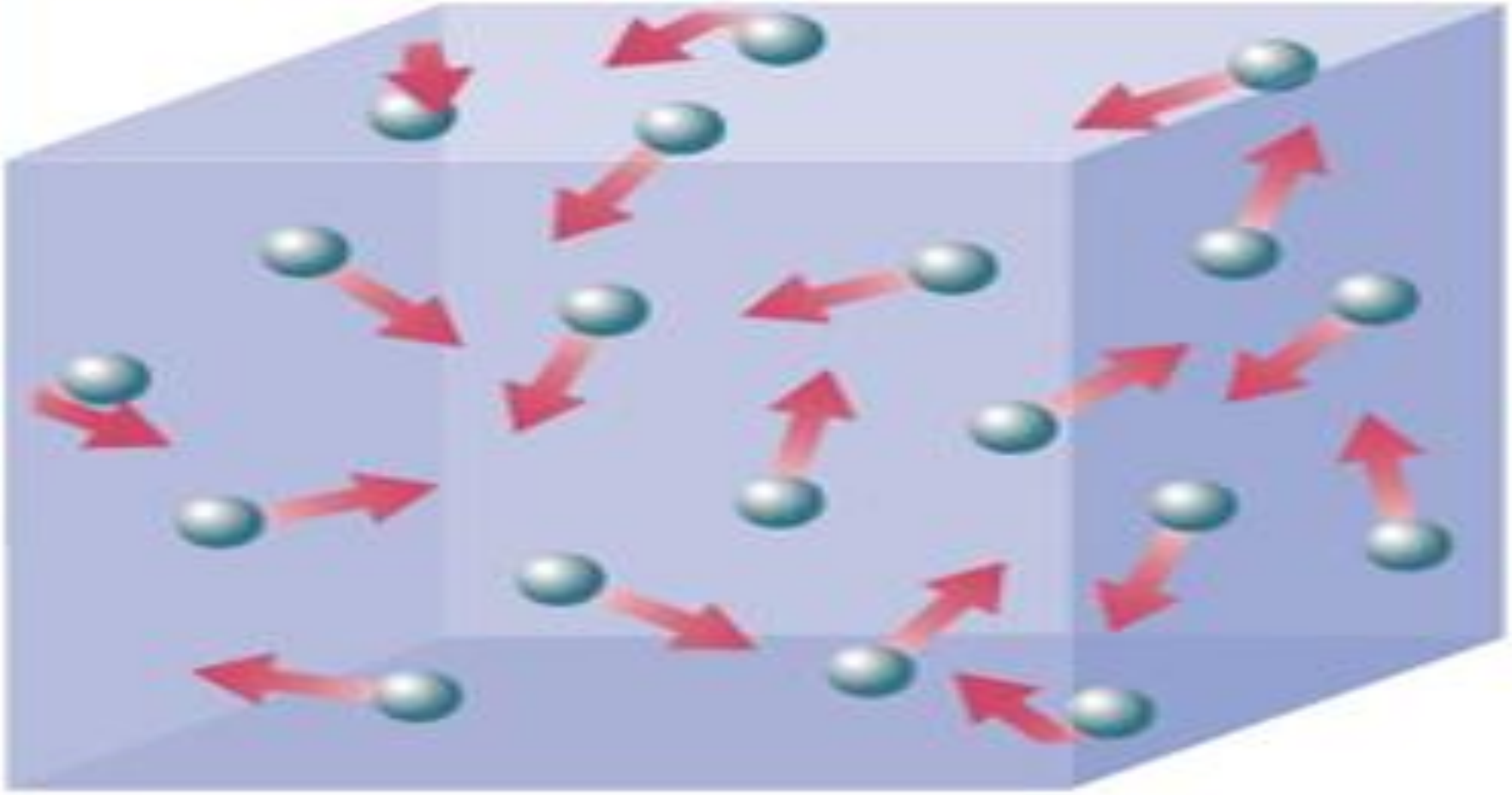
1) Energy can be neither created nor destroyed; it can only be transferred or transformed.



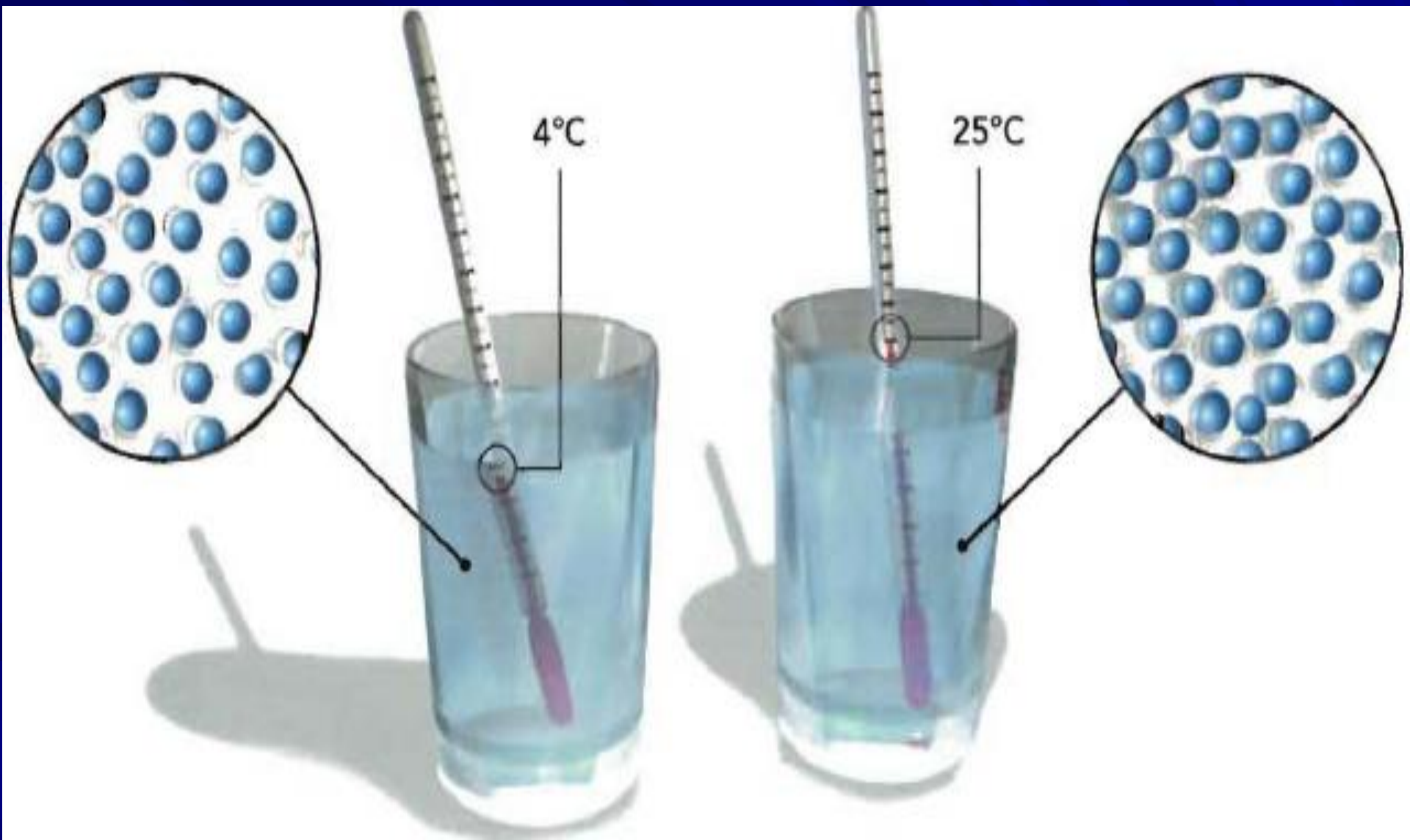
2) In an isolated system, the total amount of energy remains constant.



- ***Thermal energy*** results from the degree of ***agitation*** of the particles of a substance or from their ***random*** movement.

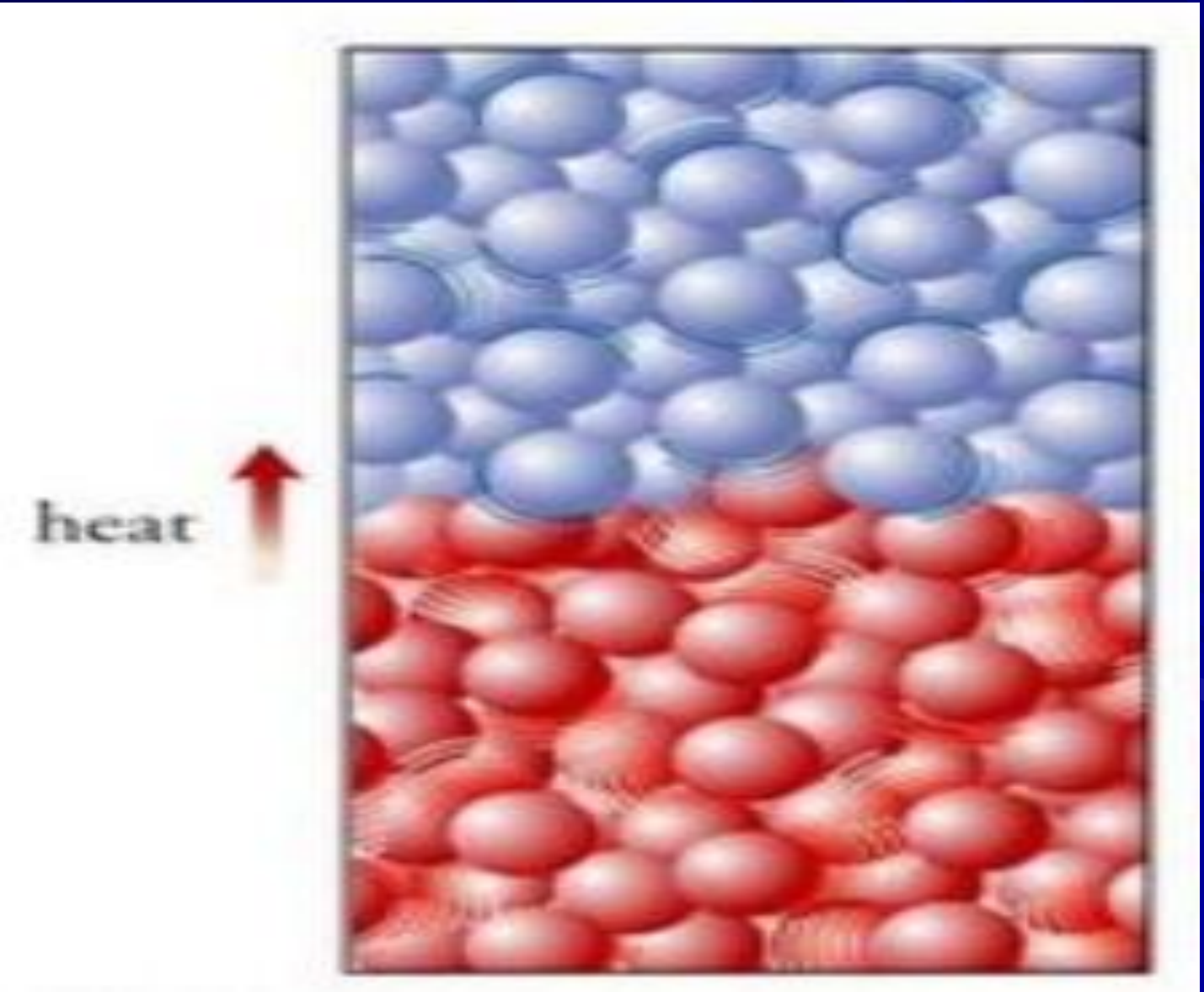


- It depends on two factors: the ***temperature*** of the substance and

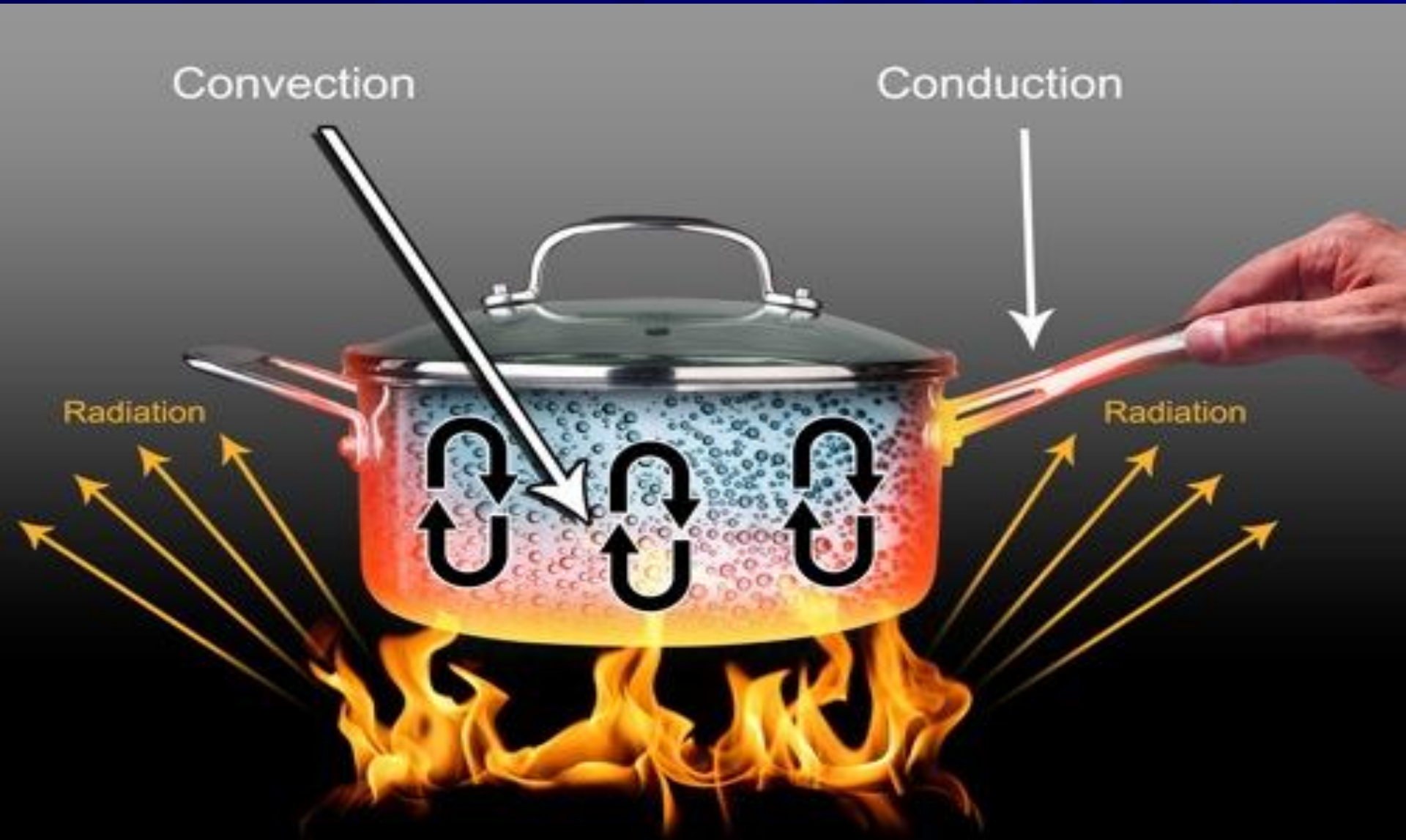


- the ***number of particles*** of the substance.

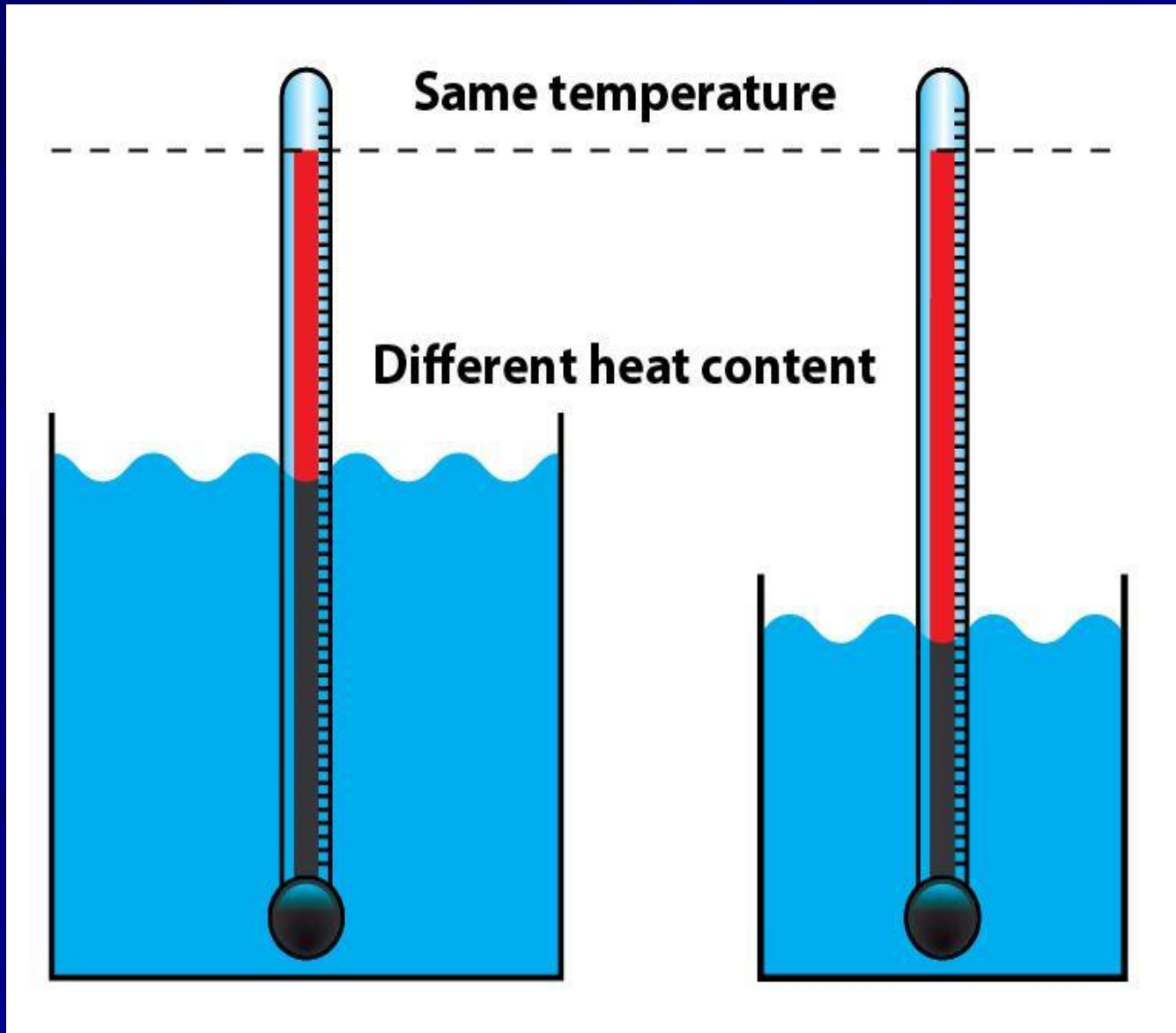
- The transfer of thermal energy between two environments is called ***heat***.



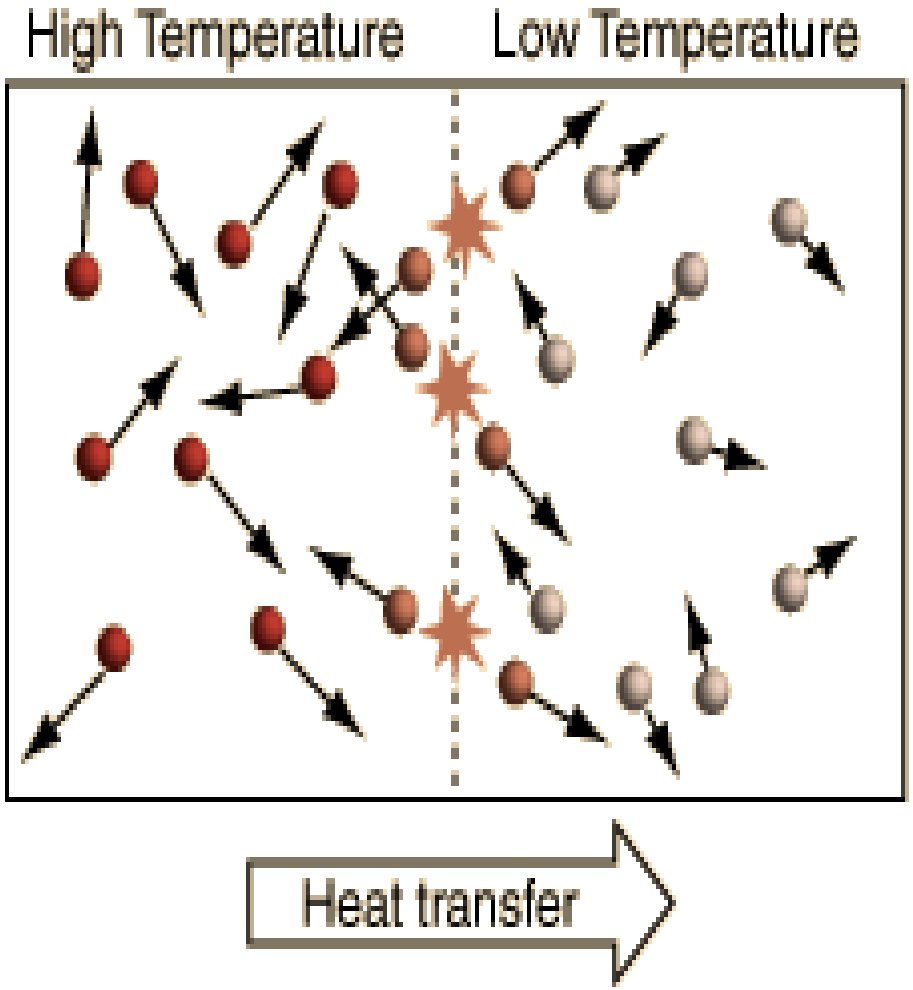
- Heat always passes from the ***warmer*** environment to the ***cooler*** environment.

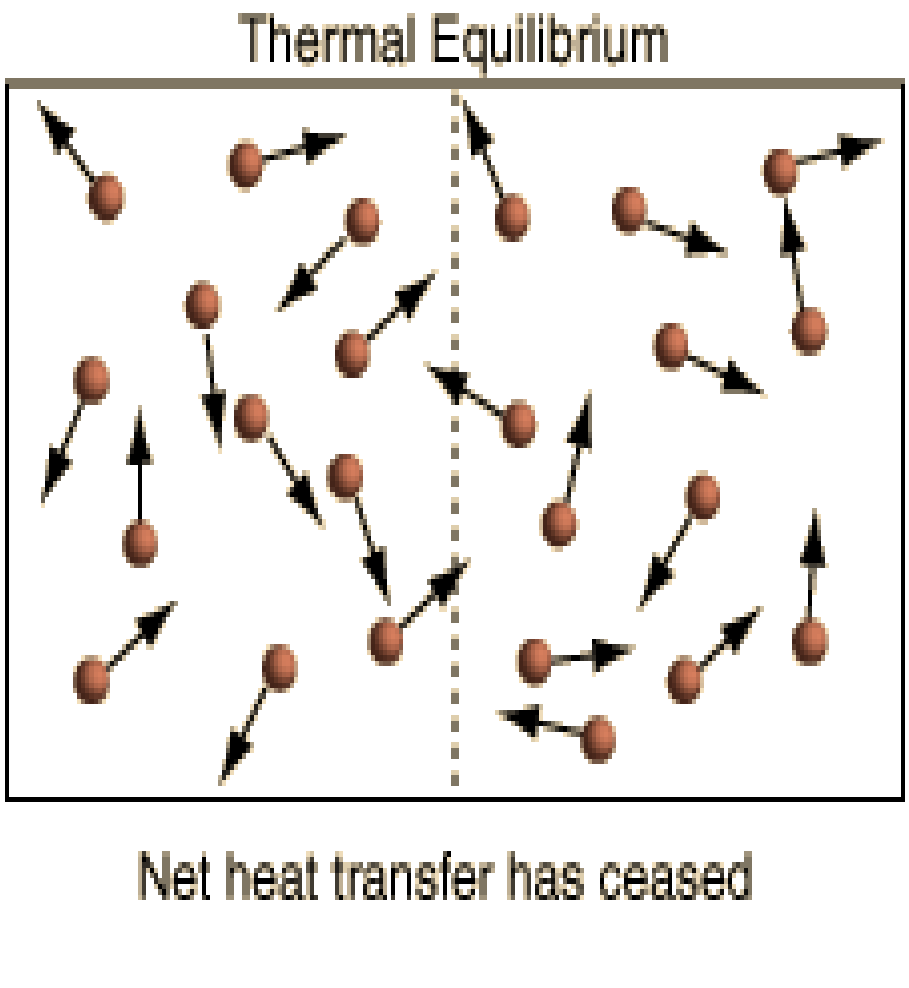


- It is important to distinguish between heat and temperature.
- Play video.

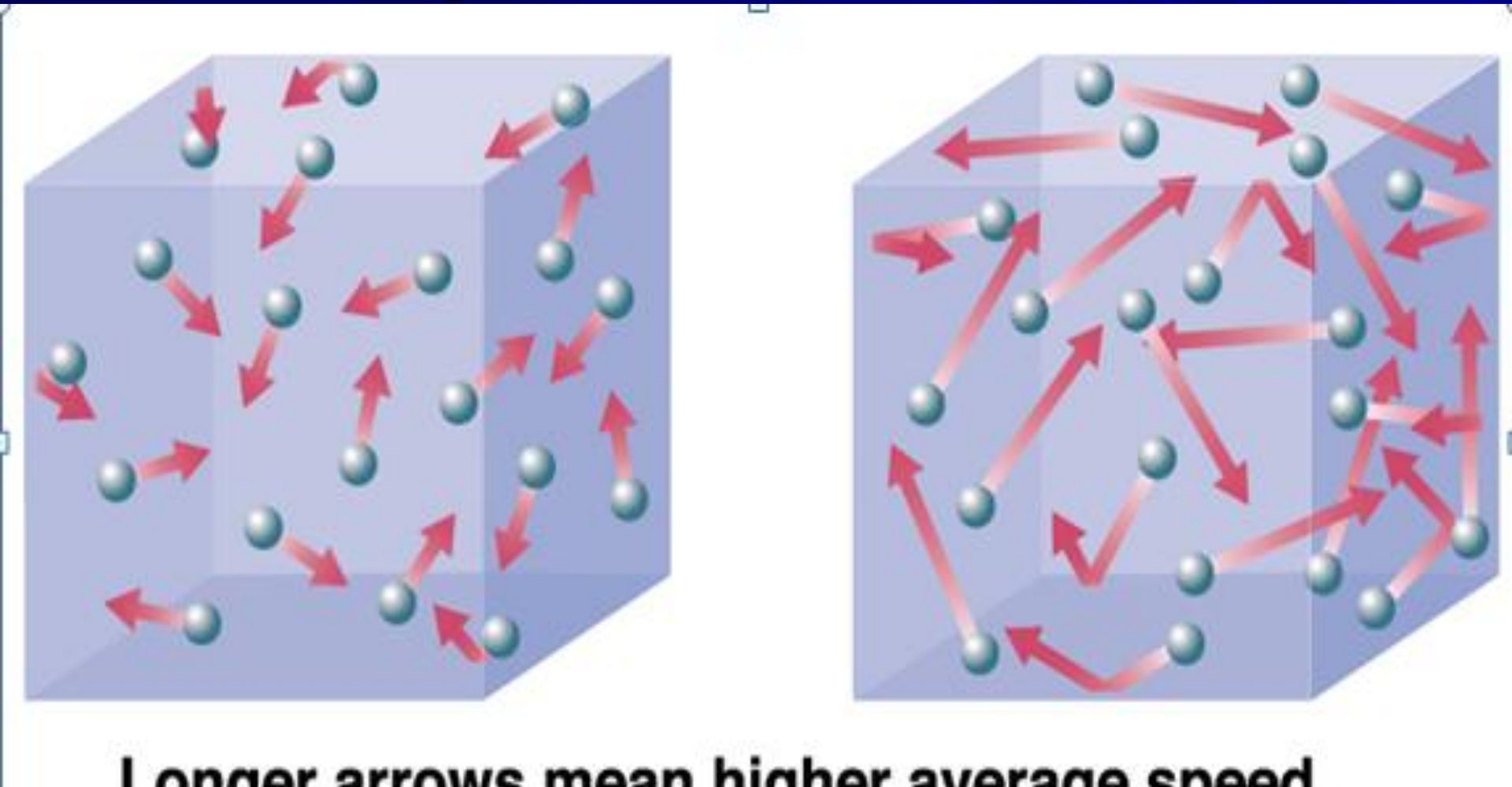


- ***Temperature*** takes into account only the ***particles speed*** of a substance or their degree of agitation.



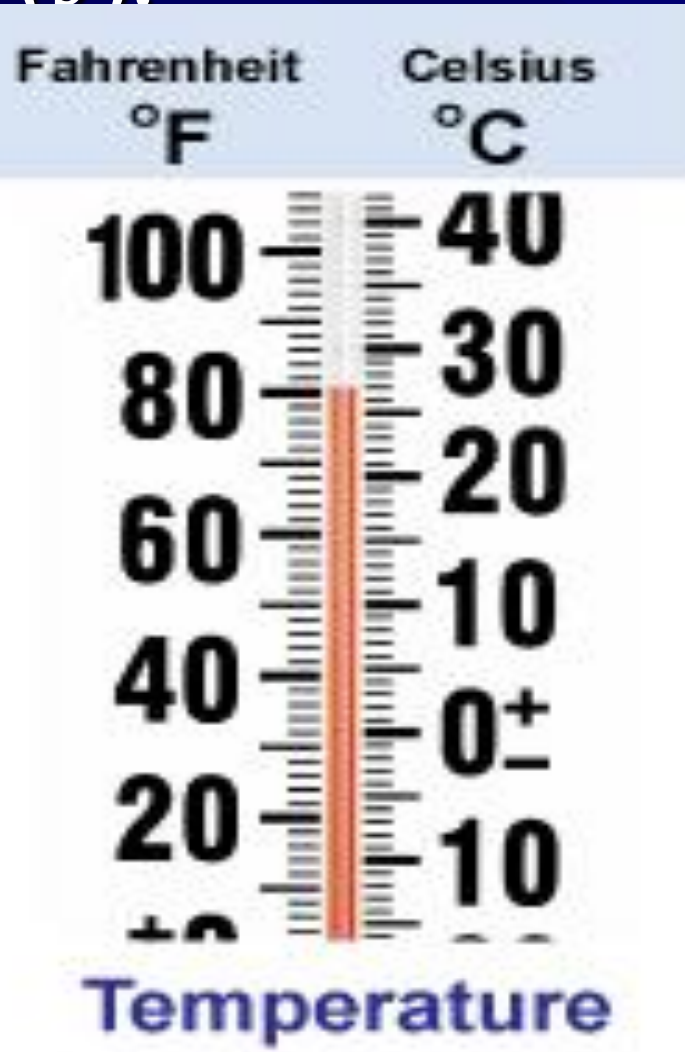


- ***Heat*** depends on the ***speed*** of the particles and on their ***mass***, which is the number of particles.



Longer arrows mean higher average speed.

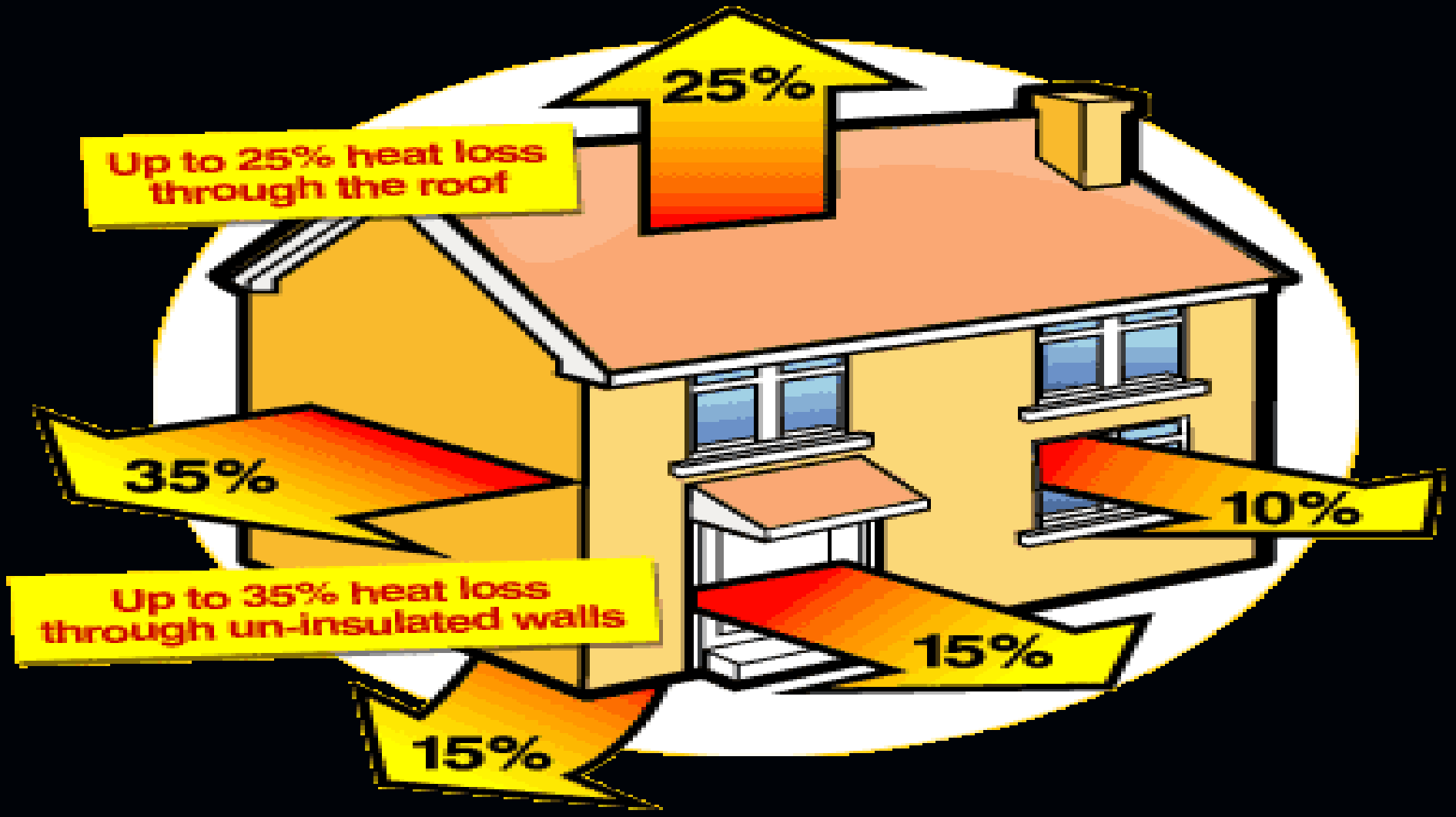
- Temperature is usually expressed in ***degrees Celsius***(°C), and heat, in ***joules*** (J).



Units

Joules, calories, btus

- In a non-isolated system, energy is dispersed in the environment.



- The energy efficiency of a machine or a system is the ***percentage of energy*** consumed that was transformed into useful energy.

- Energy efficiency is calculated using the equation below, and the result is expressed as a ***percentage***.

$$EnergyEfficiency = \frac{AmountOfUsefulEnergy}{AmountOfEnergyConsumed} \times 100\,\%$$