

Science 10 Physics: Lesson 4: Thermal Energy

Name:

Thermal ENERGY

Energy comes in two main categories:

1. Kinetic Energy: the energy of motion
Examples: moving car, falling ball
2. Potential Energy: The energy an object has because of its position rather than its motion
Examples: an elastic band, weight being held up.

Energy comes in many forms of either kinetic or potential energy. Here are some examples:

1. chemical energy: energy stored in the bonds of chemical compounds (atoms and molecules)
2. electrical energy: energy made available by the flow of electric charge (electrons) through a conductor
3. nuclear energy: the energy stored in the nucleus and released during nuclear fission or fusion
- * 4. thermal energy: energy due to the motion of particles *

We are going to study THERMAL ENERGY more today.

Is thermal energy: POTENTIAL ENERGY or KINETIC ENERGY? (circle one)

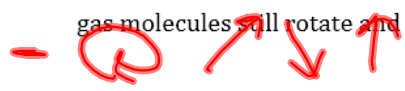
Kinetic Molecular Theory of Heat

States

Solids: particles/molecules vibrate. This is the only motion experienced by this state of matter.

Liquids: particles/molecules also vibrate but they rotate as well, giving them their familiar freedom to assume the shape of whatever container they are poured in.

Gases Gas molecules move from one point to another; they're said to translate. Of course gas molecules still rotate and vibrate.



most energy

Hot vs. Cold

Heat = the transfer of thermal energy from one object to another
Therefore cold is a lack of thermal energy and hot is the abundance of thermal energy

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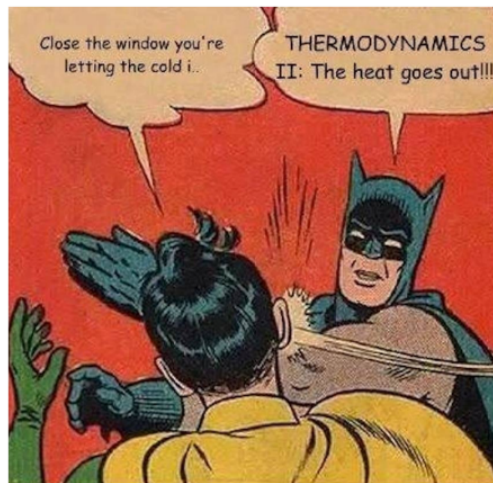
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The **Laws of Thermodynamics** will help explain how thermal energy is transformed or transferred

1. Energy cannot be destroyed or created, but can be transformed from one form to another or transferred from one object to another.

2. No process can be 100% efficient. ~~Some energy will always remain in the form of thermal energy.~~

Therefore, thermal energy always spontaneously flows from an object at a higher temp. to an object at a lower temperature.



Thermal energy moves from higher temp. (in the batcave) to lower temp (outside) if the window is open.

Cold is just less thermal energy present.

3 The knee has a higher concentration of thermal energy compared to the icepack

So, thermal energy from the knee transferred to the ice particles.

The ice particles moved faster because they gained energy and will become liquid.