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Kinetic Energy Formula *Moving*

$$\frac{1}{2} MV^2$$

Potential Energy - *stored energy*

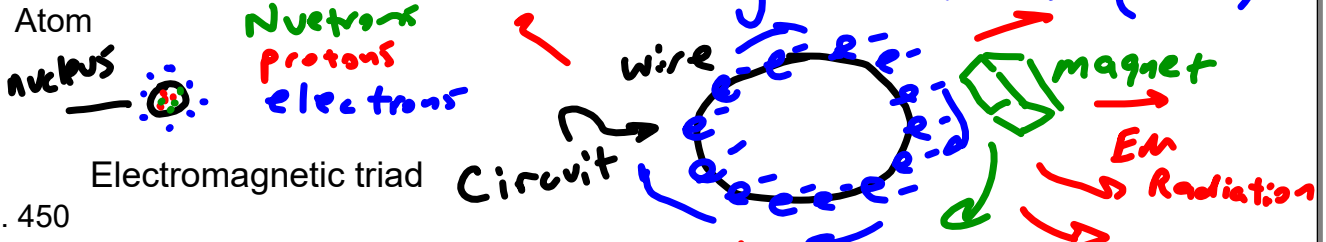
Gravitational Potential Energy -

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$$GPE = \text{Weight} \times \text{height}$$

Thermal Energy - *total energy of All particles in object*

Electrical Energy - *Moving electrons (e⁻)*



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Chemical Energy - *energy stored in chemical bonds*

Nuclear Energy - *energy that holds the nucleus together*

Fusion - *fusing light elements H+H=He*

Fission - *splitting heavy elements* \boxed{W} , \boxed{P}

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Electromagnetic Spectrum

Electromagnetic Energy (radiation) -

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Law of Conservation of Matter & Energy

Energy and Matter cannot be created nor destroyed, but they can change from one to the other. $E=MC^2$

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States of Matter

1. **BEC** - almost NO energy

2. **Solid** particles don't move

$E \downarrow$

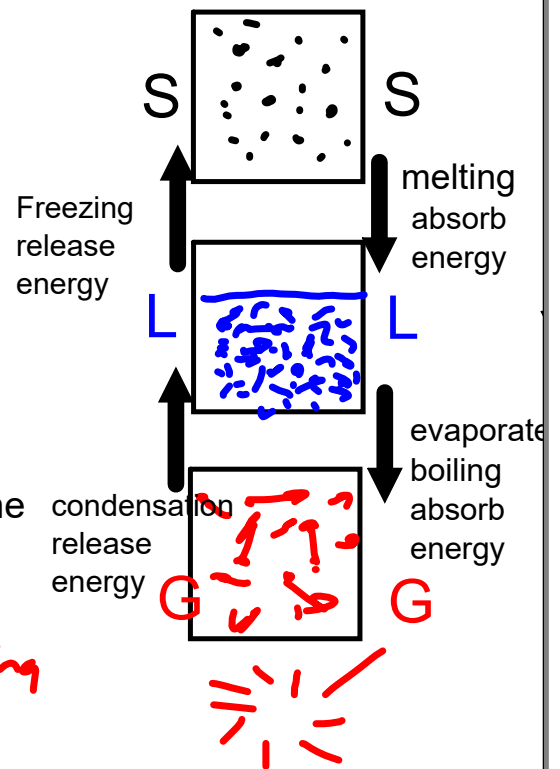
3. **Liquid** particles move & take the shape of the container

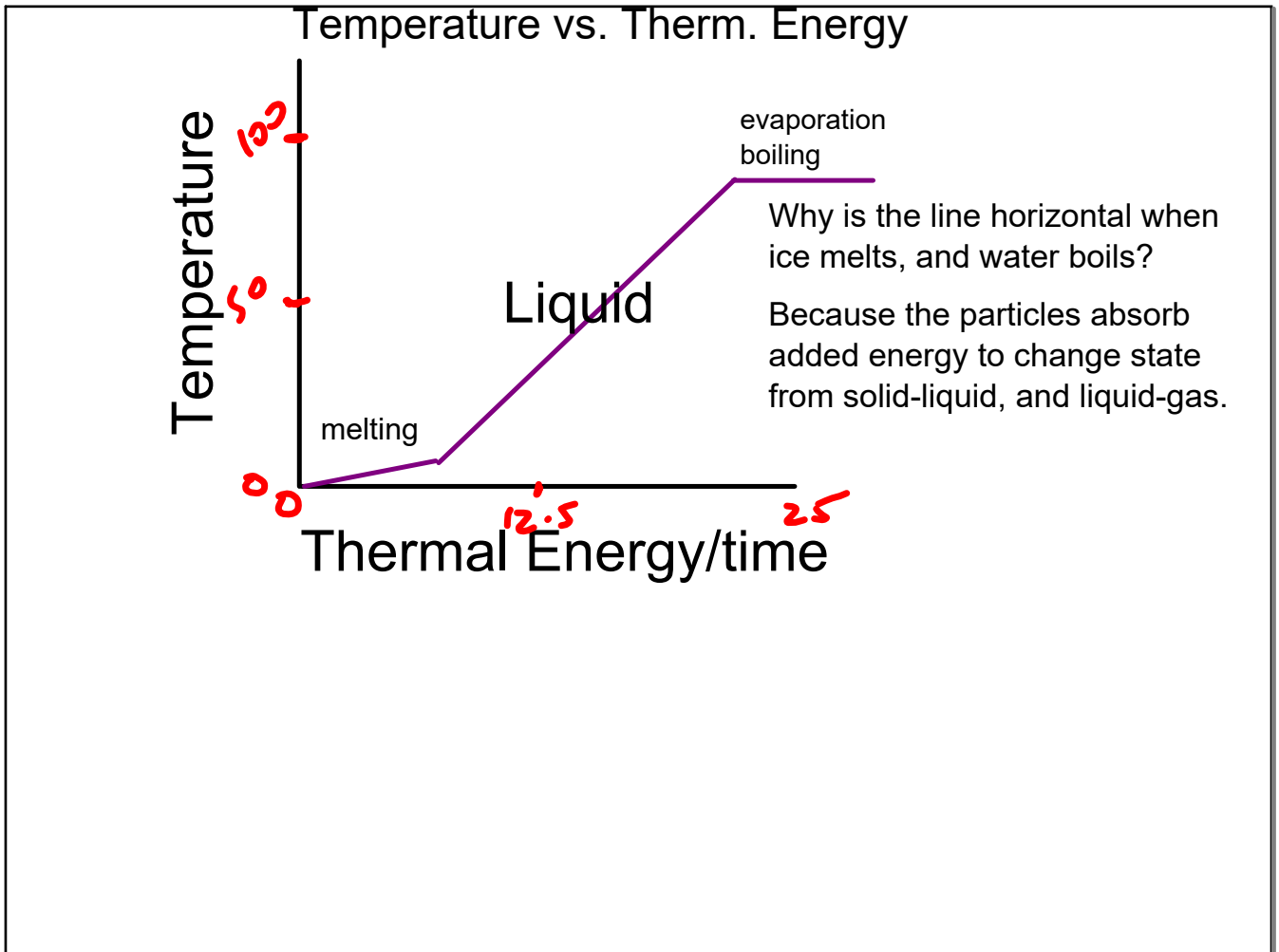
$E \leftrightarrow$

4. **Gas** particles move super fast & fill the container!

$E \uparrow$

5. **Plasma** - atoms all sharing electrons





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Temperature - Average Kinetic Energy of Particles

Thermal Energy - Total Energy of ALL particles

Heat - Thermal Energy moving from **HOT** to **COLD**

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	Fahrenheit	Celcius	Kelvin
FP water	32 ⁰	0 ⁰	273 ⁰
BP water	212 ⁰	100 ⁰	373 ⁰
Scale	Fahrenheit	Centigrade	Centigrade



0°C
 $\downarrow 1^{\circ}\text{C}$
 $\downarrow \frac{273}{273} = 1$

Size
 $\downarrow \frac{1}{273}\text{rd.}$

NO Size
 NO Energy!
 Absolute Zero!
 $0\text{ K} = -273\text{ C}$

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Specific Heat - Energy required to change the temperature of 1Kg of substance 1°K Units (J/KgK)

Change in Energy = (mass)(S.H.)(Change $^{\circ}\text{K}$)

$$\begin{array}{l} \text{Water } 5 \text{ kg} \\ \Delta \text{ temp } 10^{\circ}\text{K} \end{array} \quad (5)(4,180)(10) \\ 209,000 \text{ J}$$

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Energy & Changing State - When states change - thermal Energy is absorbed or released

melting - Solid to Liquid (absorb energy)

freezing - Liquid to Solid (release energy)

evaporating/boiling - Liquid to Gas (absorb energy)

condensation - Gas to Liquid (release energy)

excitation - Gas to Plasma (absorb energy)

sublimation - Solid to Gas (skip liquid absorb energy)

deposition - Gas to Solid (skip liquid release energy)