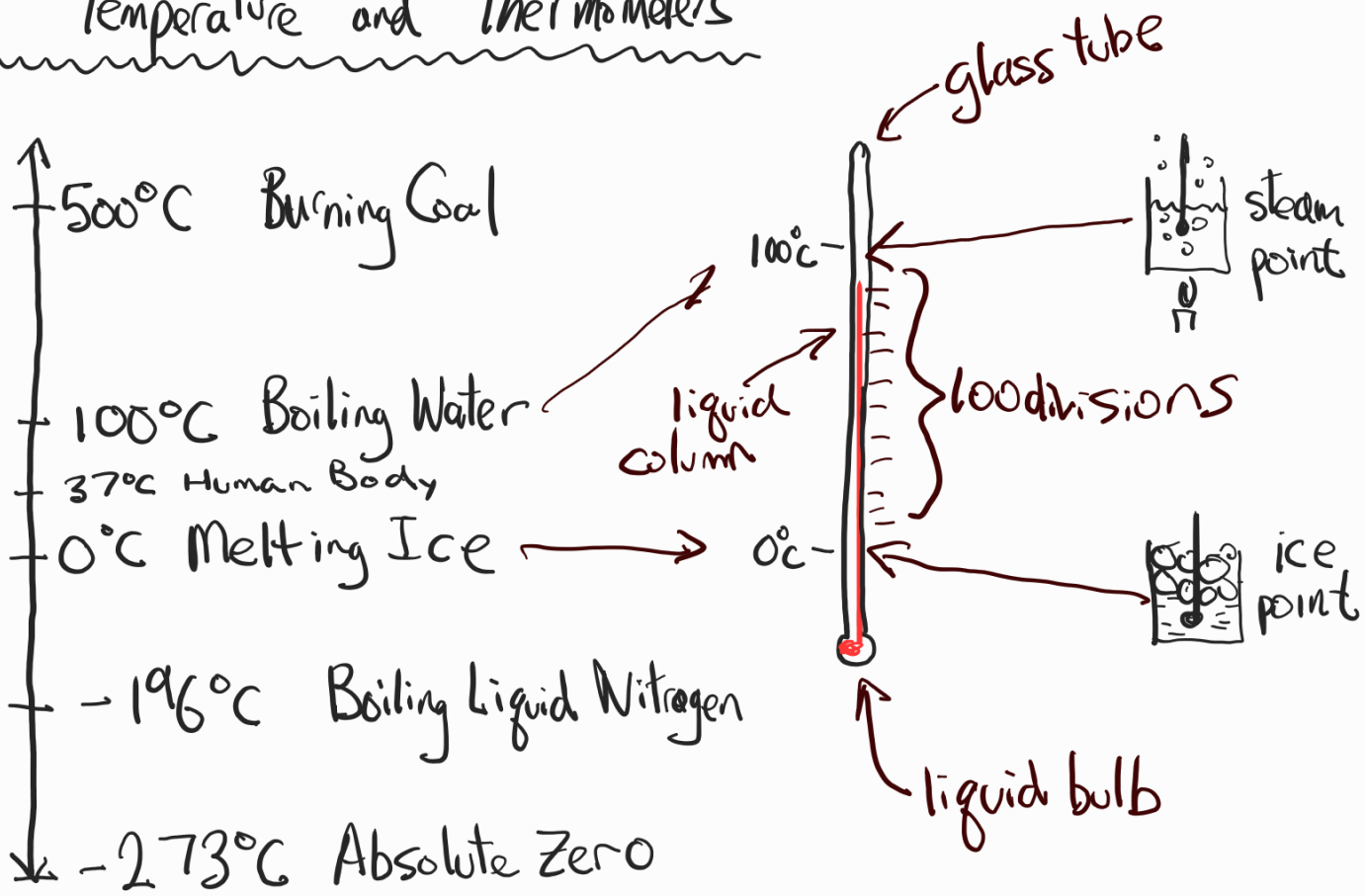
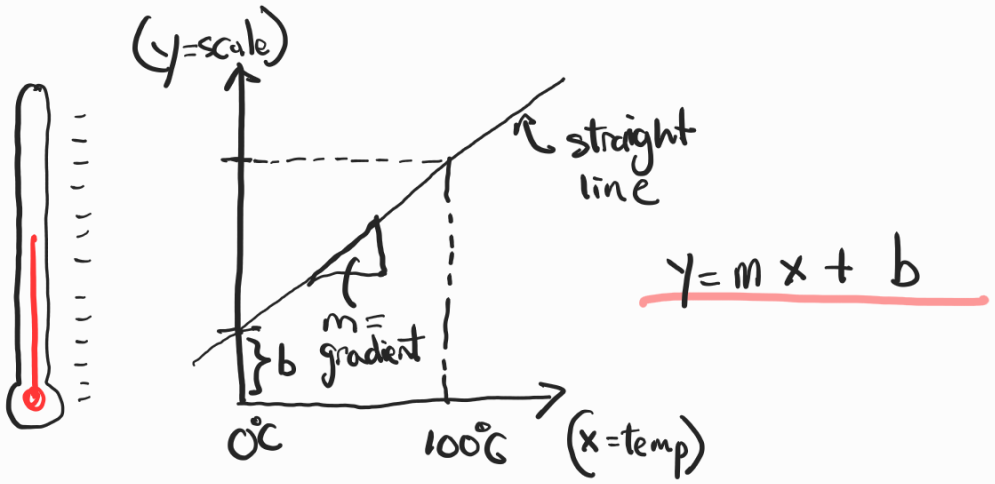
1.1 Temperature and Thermometers

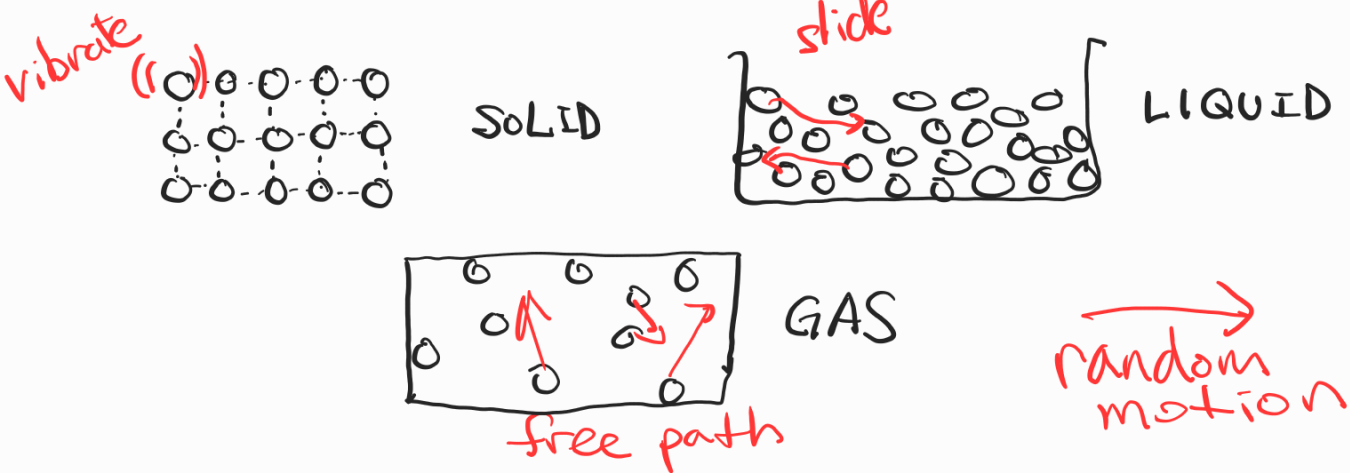




$y = mx + b$

1.2 Heat and Internal Energy

molecules structure



(KE) Kinetic Energy : random motion → temperature

(PE) Potential Energy : intermolecular attraction Further apart → ↑ energy

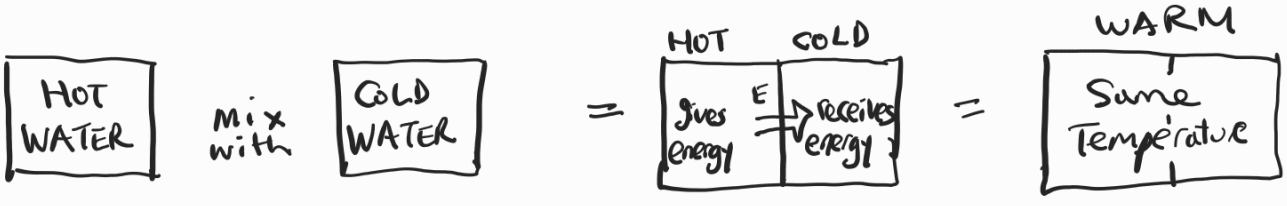
Therefore: Temperature is a measure of average KE per molecule

Total internal energy = total KE + total PE

Solid (low PE) ⇄ (add energy / gives out energy) Liquid (higher PE) ⇄ (add energy / gives out energy) GAS (highest PE)

HEAT FLOW : Hot → (energy transfer) → Cold

THERMAL EQUILIBRIUM (熱平衡)



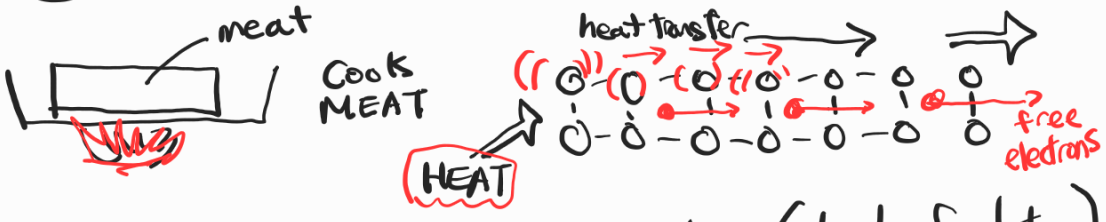
1.3 Ways of Heat Transfer

Method 1 : Convection, by flow of fluid (liquid → gas)

example

Method 2 : Conduction, due to molecular collisions (mostly → solid)

example

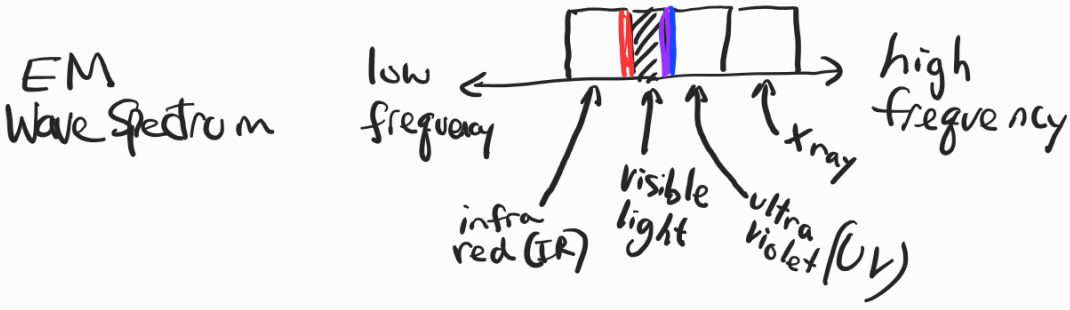


conductors of heat : metal (also has free electrons)

insulators of heat : wood

Method 3 : Radiation, emission of electromagnetic waves (EM waves)

example



Dark (Black), Dull (Rough) surface : Good Absorber + Emitter of radiation

Light (Silver), Polished (Smooth) surface : Bad Absorber / Emitter of radiation

Examples of Devices Controlling Heat Flow