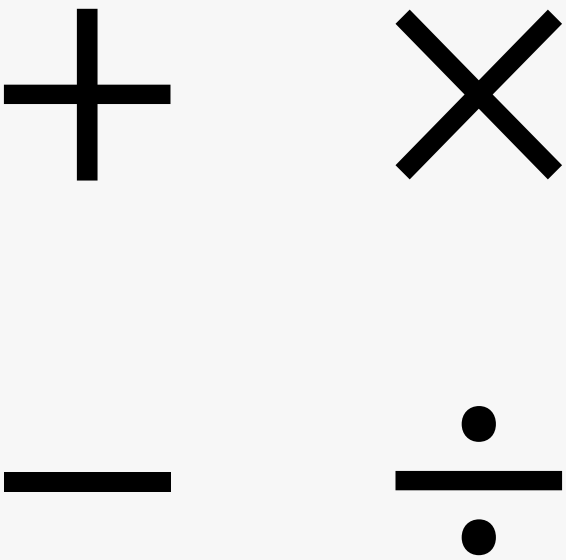
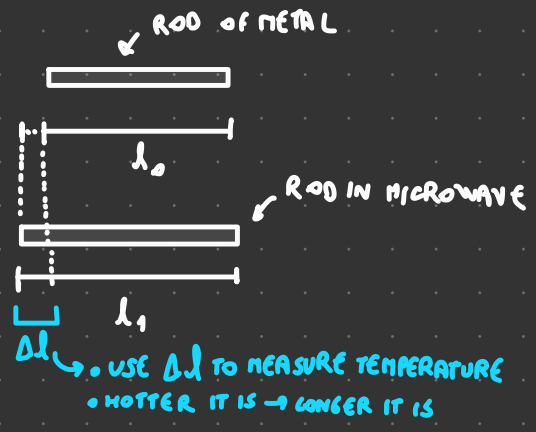


- FLUCTUATIONS ← TEMPERATURE
  - MEASURE HOW THE SYSTEM FLUCTUATES
  - HOW FAR FROM THE AVERAGE VALUE IT GETS
- DISORDER ← ENTROPY
  - MEASURE OF THE DISORDER OF THE SYSTEM
  - ORGANIZE SYSTEM ⇒ LOW ENTROPY

HOW TO MEASURE TEMPERATURE EFFECTIVELY AND IN A MEASURABLE WAY



- USE Δl TO MEASURE TEMPERATURE
- HOTTER IT IS → LONGER IT IS

SUGAR CUBE IN HOT BEVERAGE

t_{MELT} → TIME TO MELT COMPLITELY

I KNOW THIS FROM EXPERIENCE

HIGHER MELTING TIME → LOWER THE TEMPERATURE

DIFFERENT WAYS TO CLASSIFY THE TEMPERATURE

TENTATIVE TO DEFINE TEMPERATURE

- $\tilde{T} = 1/t_{MELT}$
- $\tilde{T} = -t_{MELT}$
- ...

HUGE NUMBERS OF WAYS TO DEFINE IT

HOW TO CHOOSE THE RIGTH WAY TO DEFINE EXPERIMENTALLY THE TEMPERATURE

- STICK TO 1 DEFINITION → CHOOSE ONE (LIKE SUGAR CUBE ONE AND $\tilde{T} = -t_{MELT}$)
- CALIBRATION → CAN'T GET SAME RESULT (DEPENDS ON HIGH, HOUR OF THE DAY...) → CHOOSE A PHENOMENA THAT I SUSPECT IS CONSTANT WITH TEMPERATURE (LIP OF FAITH)
  - WATER BOILS AT 100 °C (DECIDED BY ME)
  - WATER FREEZES AT 0 °C

SOMETHING THAT HAPPENS ALWAYS AT THE SAME TEMPERATURE

TRUE TEMPERATURE $T = a\tilde{T} + b$ ← I INVENT THIS TEMPERATURE

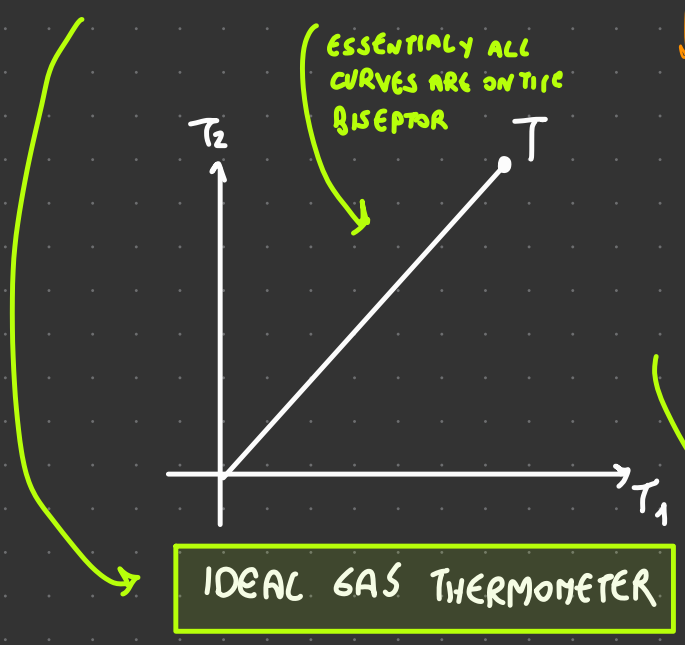
- CAN CHOOSE TWO CONSTANTS
- b FOR 0 (FREEZE - THE 0 OF THE TEMPERATURE)
- a 1 DEGREE HAVE FIXED LENGTH

$$\begin{cases} 0 = a\tilde{T}_F + b \\ 100 = a\tilde{T}_B + b \end{cases}$$

$\tilde{T}_F$ → FREEZING TEMP. INVENTED BY ME

↳ $\tilde{T}_B$ BOILING TEMP. INVENTED BY ME

ONE CLASS OF WAYS TO DEFINE TEMPERATURE THAT IS VERY POWERFUL



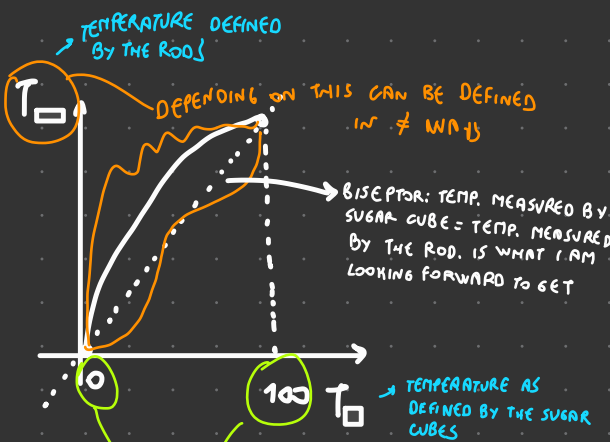
PRESSURE = FORCE / SURFACE AREA

$P = \frac{F}{A}$

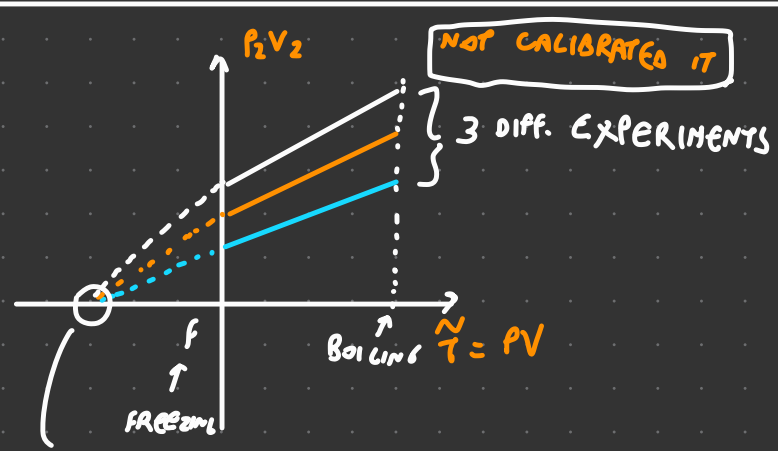
$\tilde{T} = PV$ —CALIB.→ T

RIPEREDERE 28.00

$[T] = [a][\tilde{T}]$ $\quad \tilde{T} = a\tilde{T} + b$

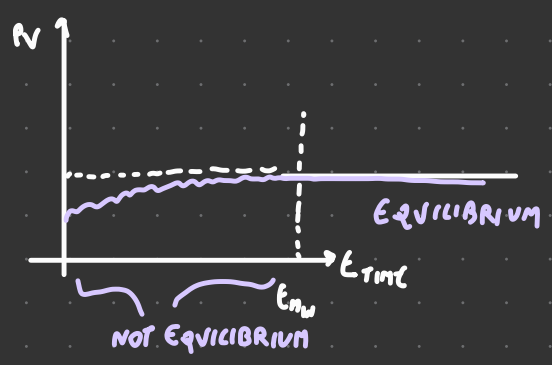


- NOBEL GAS
- LOW PRESSURE



UNIVERSAL 0 POINT (ABSOLUTE 0) $\quad T = 0K$ (KELVIN) $= -273.15\,K$

$\Delta T_{FB} = 100\,K$



A SYSTEM IS IN THERMAL EQUILIBRIUM WHEN ITS TEMPERATURE DOES NOT CHANGE WITH TIME

↳ CONSTANT → YOU CAN DEFINE TEMPERATURE

2 SYSTEM ARE IN THERMAL EQUILIBRIUM IF
- IT IS IN THERMAL EQUILIBRIUM WITH ITS CLF
- IF THEY HAVE SAME TEMPERATURE

ZEROTH LAW

IF A, B ARE IN EQUILIBRIUM
AND B, C ARE IN EQUILIBRIUM
⇒ A, C ARE IN EQUILIBRIUM

$$\Delta Q = nC\Delta t$$