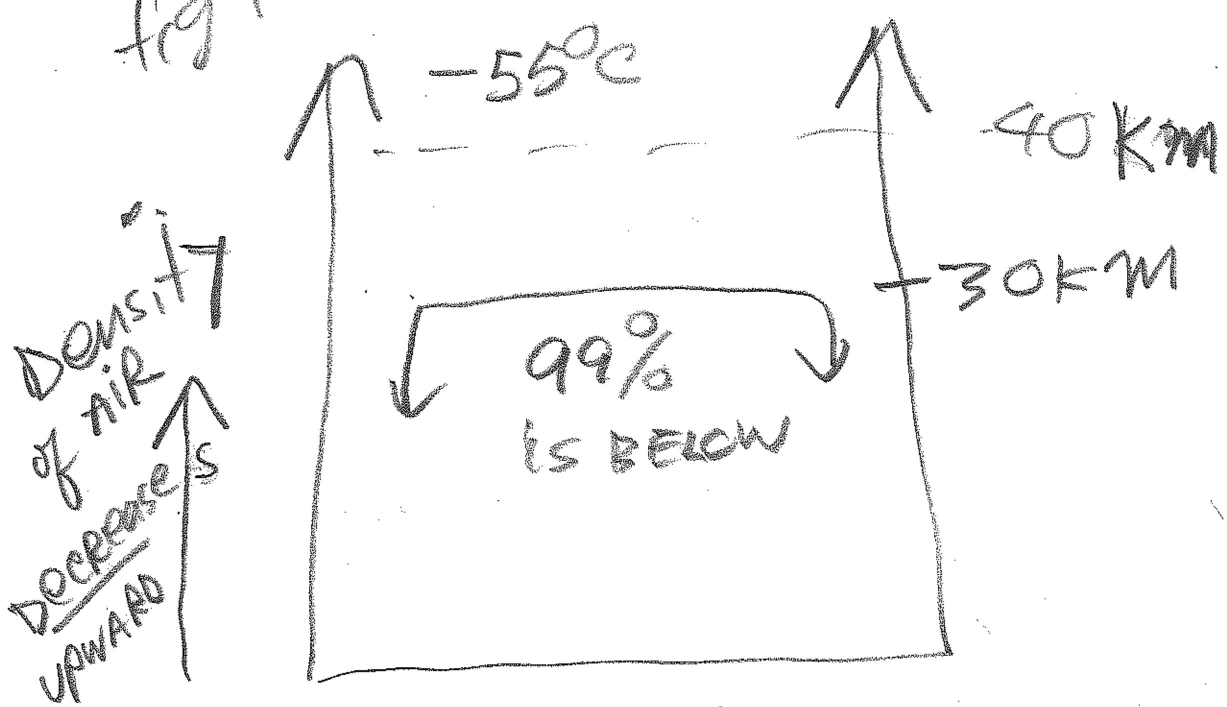
pn CH14 — 10-15-13

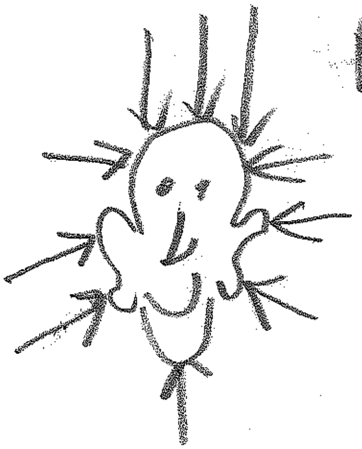
55 below freezing

fig 14.1



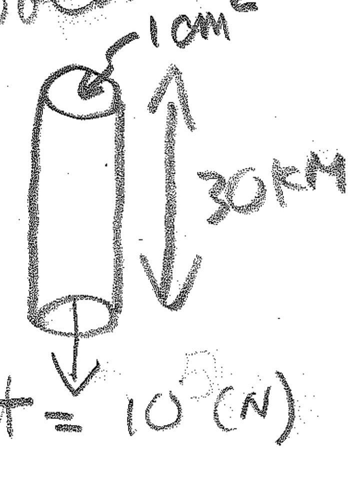
ATMOSPHERIC PRESSURE

P_{ATM} = weight of AIR ABOVE YOU.



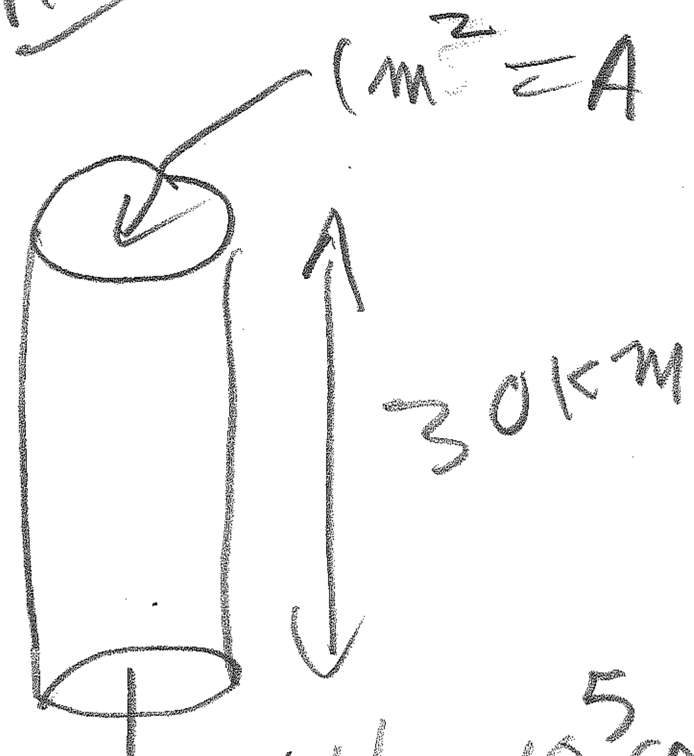
HOMEWORK PROBLEM: PAGE 249.

pole →



2.2 lbs ≈ weight = 10 (N)

CH 14



Wider Bamboo pole

weight $= 10^5 (N) \approx$

≈ 23000 lbs

$= 22000$ lbs

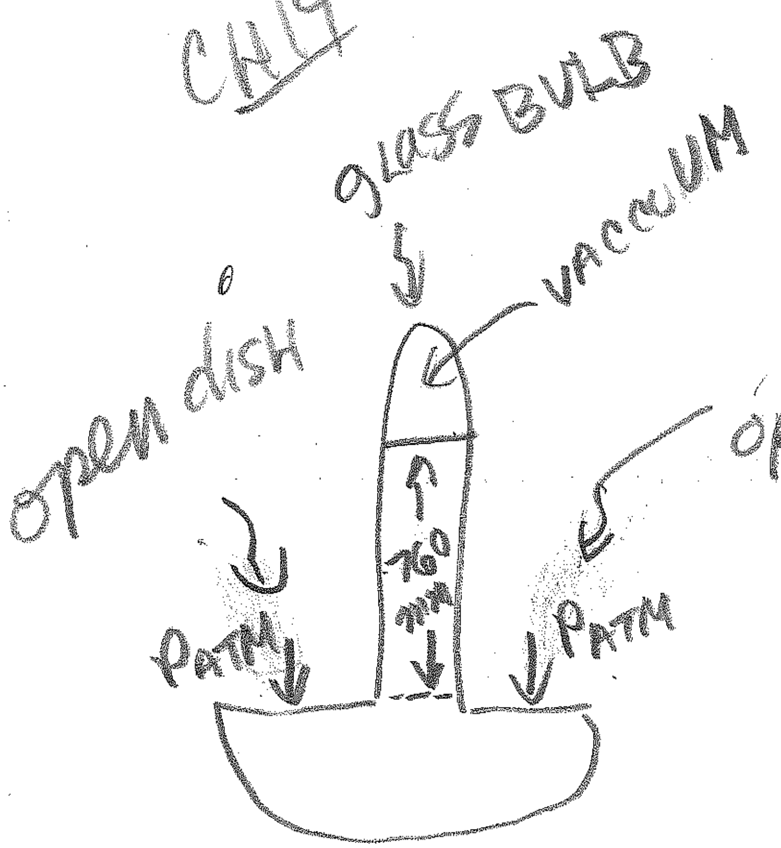
Pressure $\dfrac{10^5 N}{\text{area}} = \dfrac{10^5 N}{1 m^2}$

$= 10^5 \dfrac{N}{m^2}$

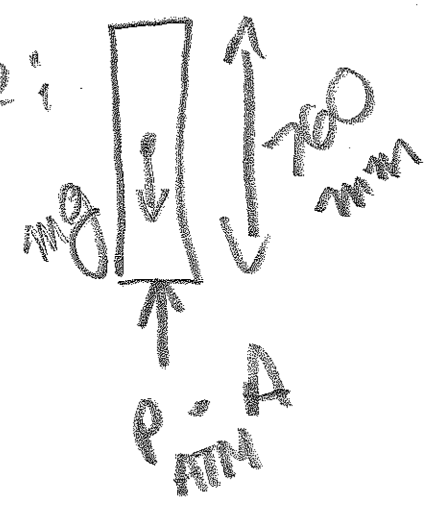
$= P_{ATM}$

CH14

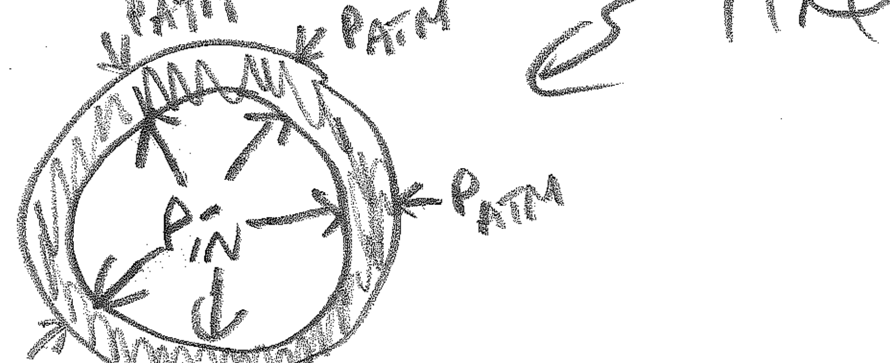
Barometer



NOTE:



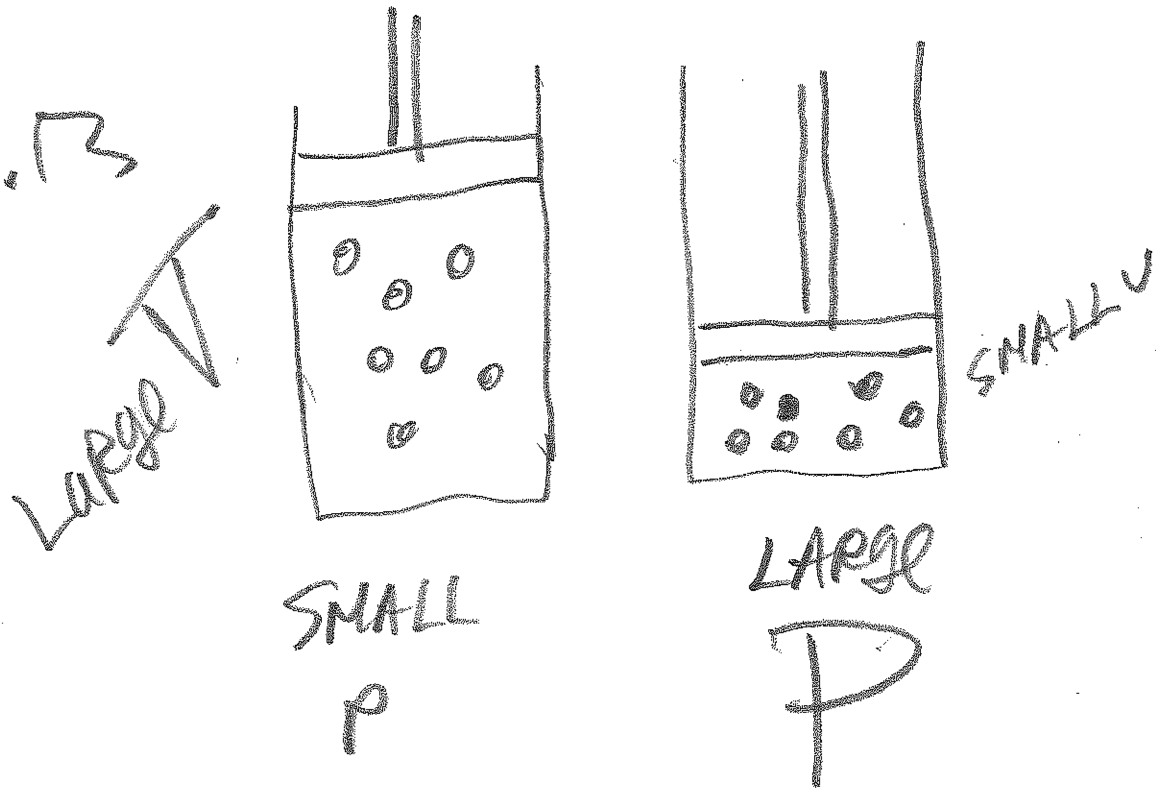
BOYLES LAW



NOTE: $P_{ATM} < P_{IN}$ because of TIRE. FORCE (POINTS INWARD)

CH14

fig 14.13



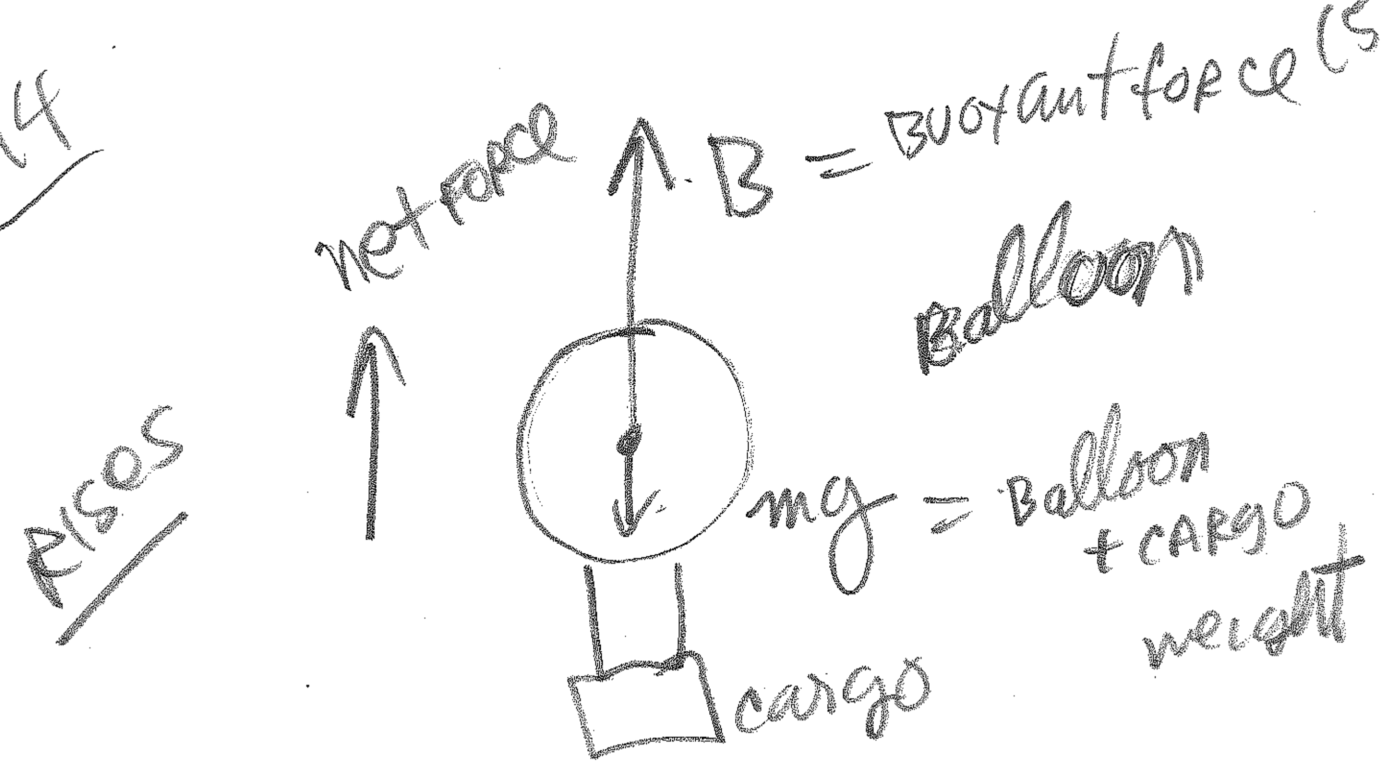
$$P = \frac{F}{\text{Large } A} \; ; \; P = \frac{F}{\text{small } a}$$

BOYLE'S LAW

$$P V = P \cdot V$$

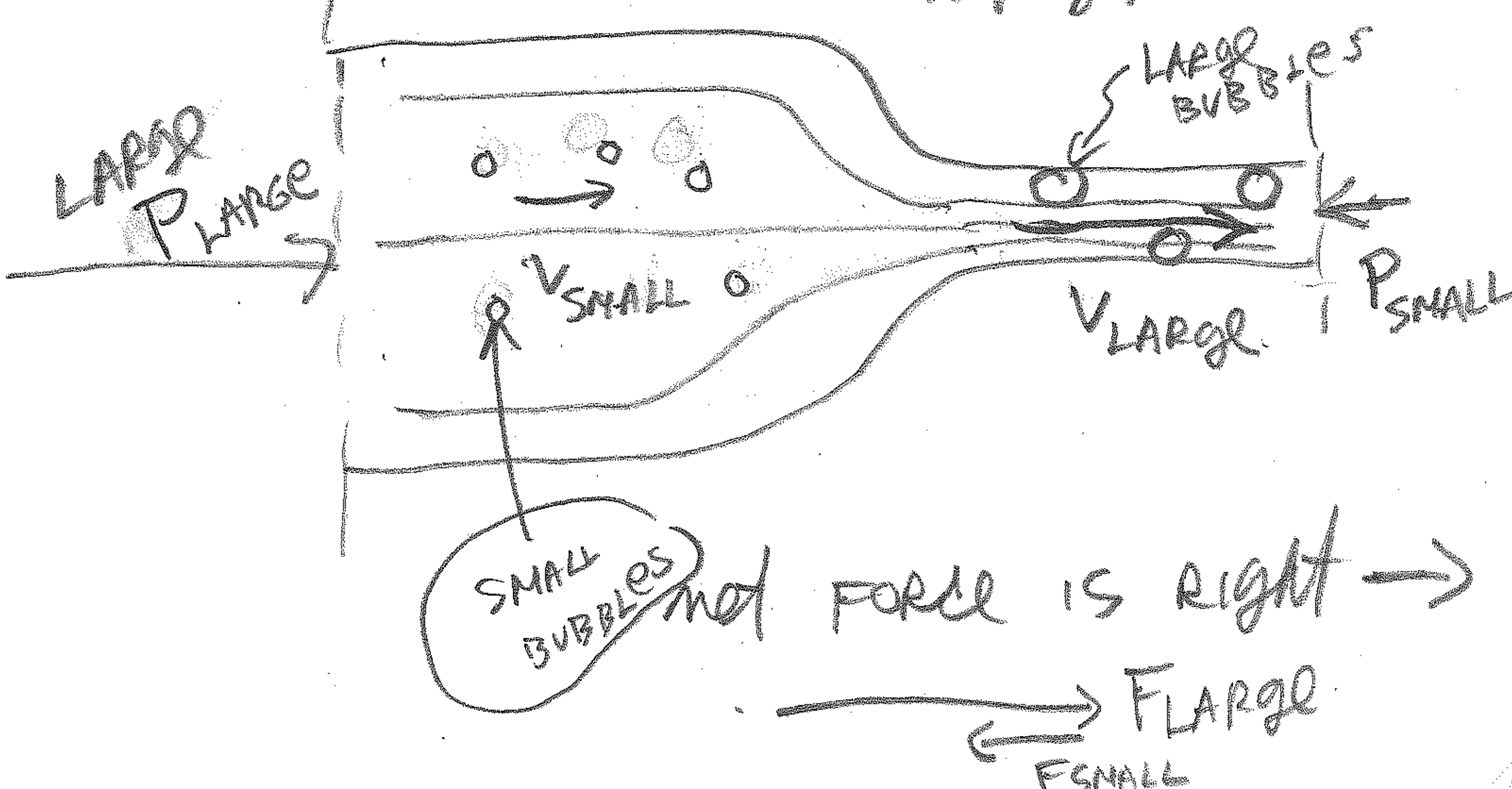
$$P_1 \cdot V_1 = P_2 \cdot V_2$$

ch14



BERNOULLI'S LAW

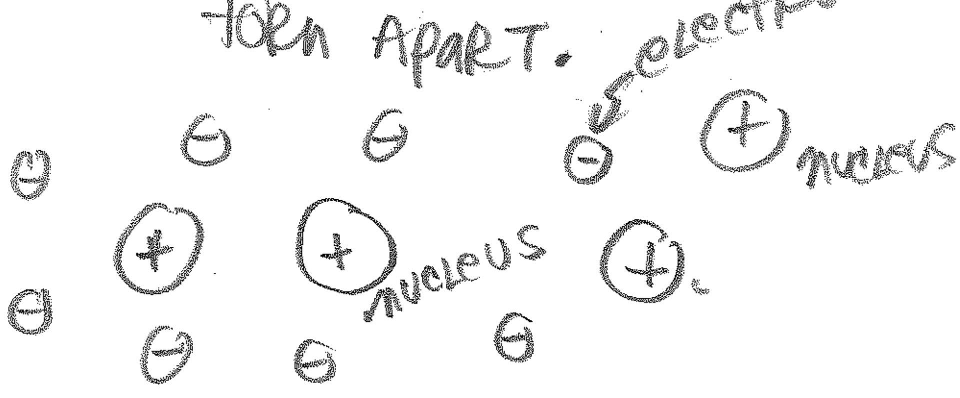
FLUID MOTION IS RIGHTWARD



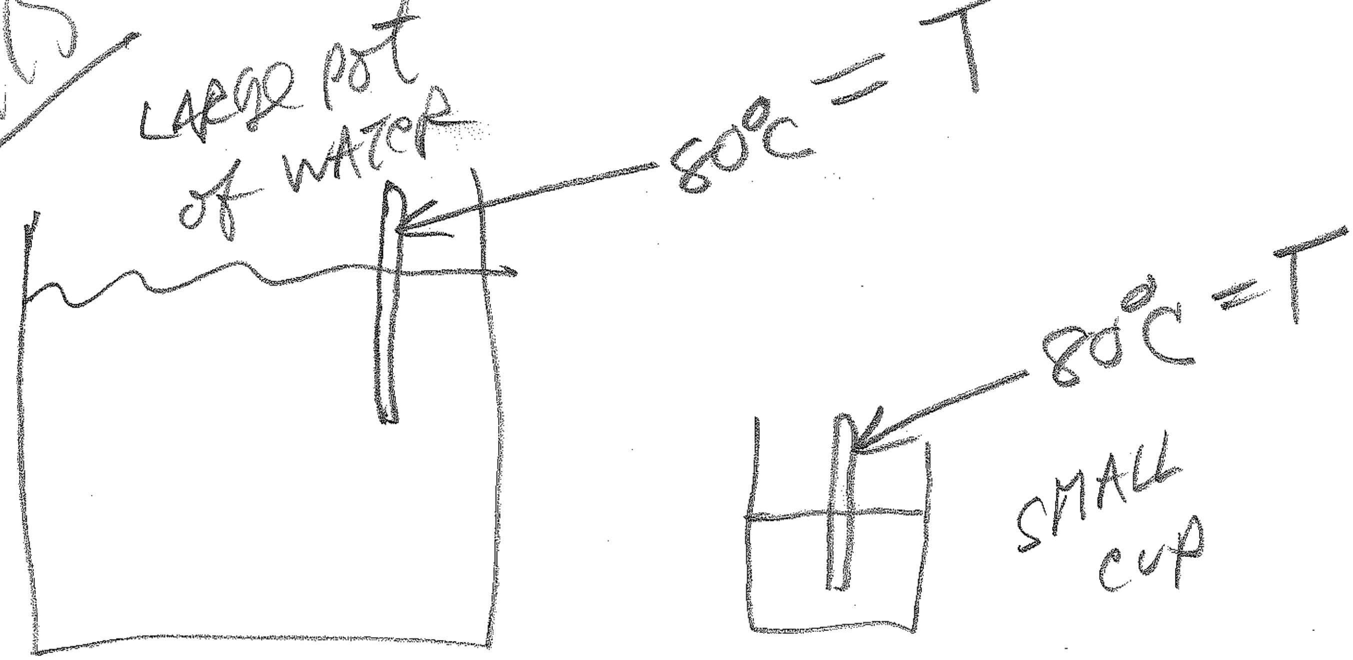
LINES of FLOW ARE CLOSE together, FLUID speed is high.

BERNOULLI'S Explains airplane LIFT curve balls

PLASMA: VERY HOT SO that ATOMS ARE TORN APART.



CH 15

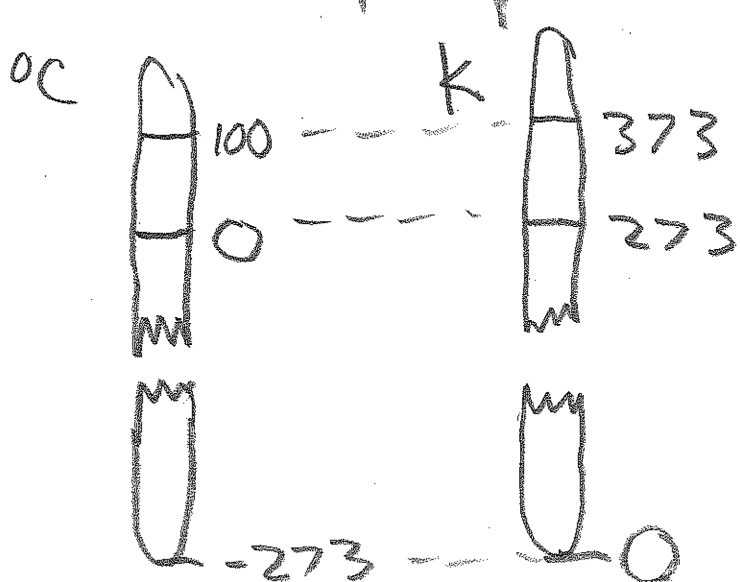


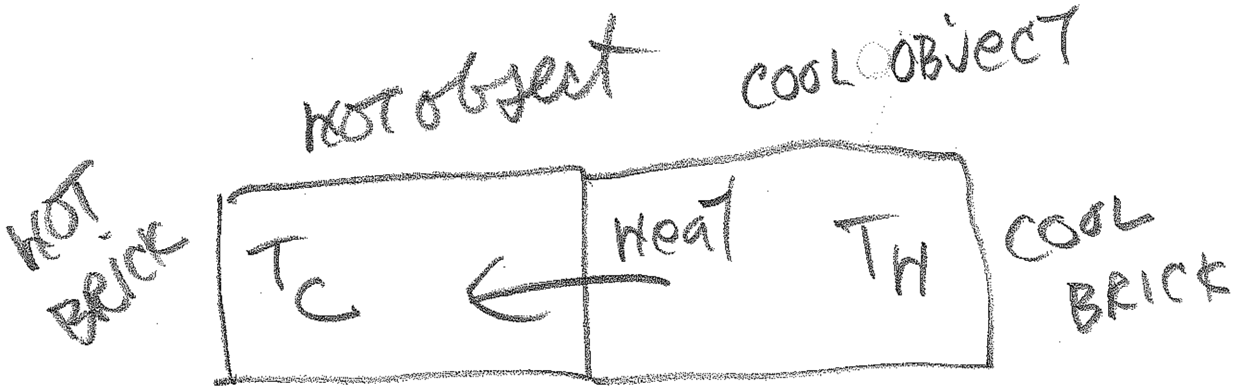
T = temperature

Temperature does not depend on volume.

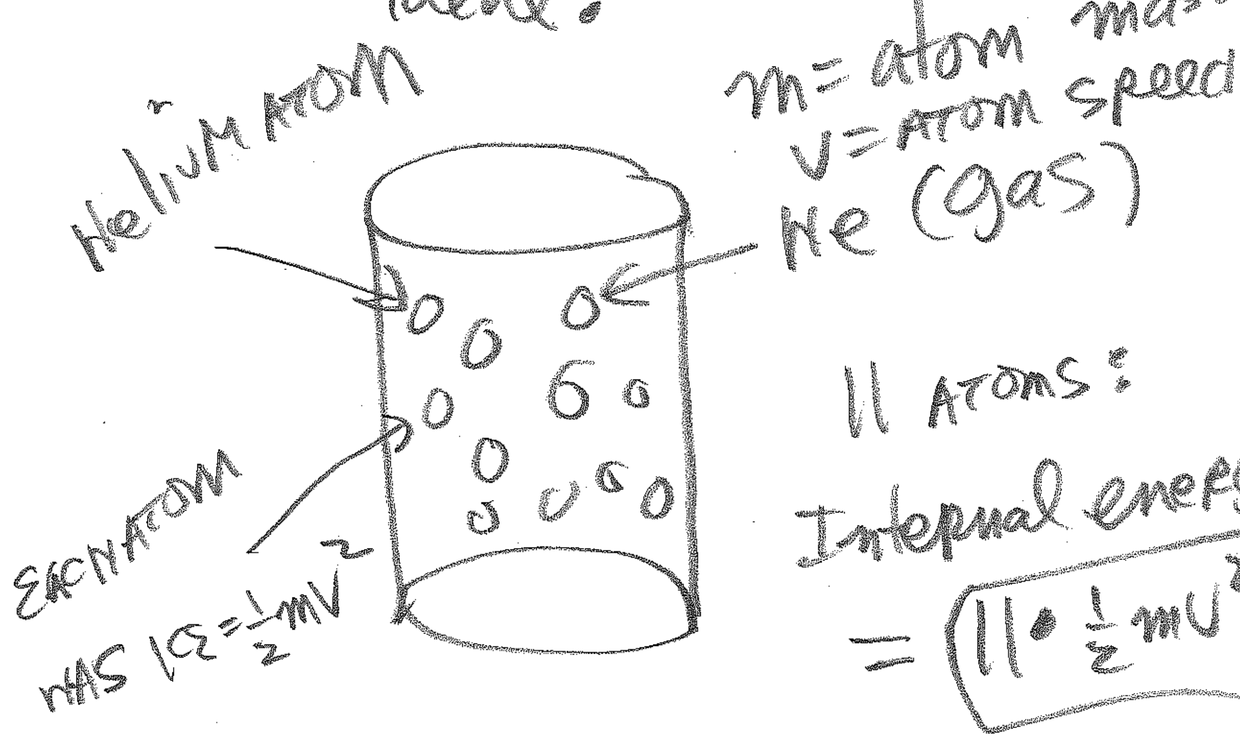
T ∝ AVERAGE KINETIC ENERGY of molecules

T-scales





Internal Energy of a gas = TOTAL Kinetic Energy if molecules are monoatomic and gas is ideal.

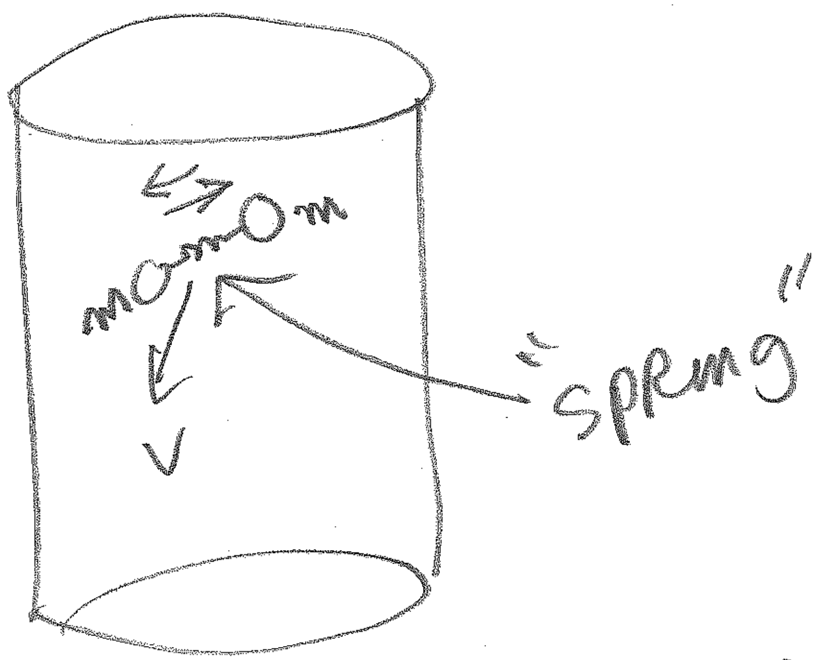


11 ATOMS:

Internal energy

$$= \boxed{11 \cdot \frac{1}{2} m v^2}$$

IF gas is diatomic (O_2)



$$\text{Molecule Energy} = \frac{1}{2}(2m)v^2 + \text{spring energy}$$

internal energy includes spring energy

Heat capacity

Rank from highest to lowest in heat capacity

List 1	List 2
Filling (apple)	water
crust	sand
	copper
Filling cools down and heats up slower	water cools and heats up slower

~~Specific~~ Heat capacity of water is $C = \frac{1\ cal}{g \cdot °C}$

cal = calorie = 4.184 Joules

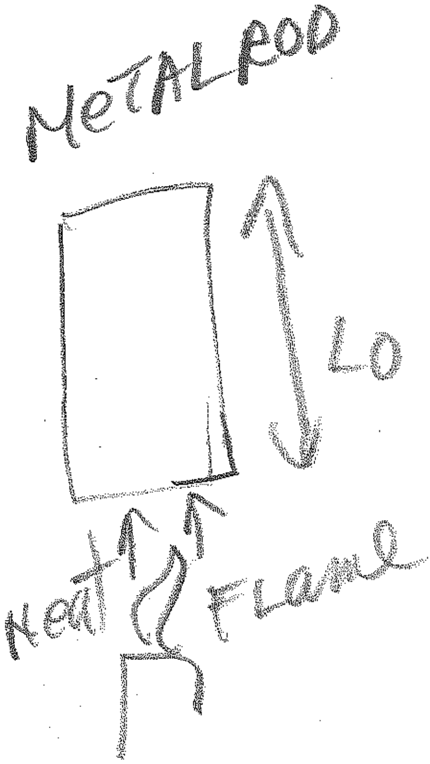
$Heat = m \cdot C \cdot \Delta T$

1g of water.

How much heat raises temperature by 6°C?

$Heat = (1g) \cdot \left(\frac{1\ cal}{g°C}\right) \cdot (6°C)$

$= 6\ cal$

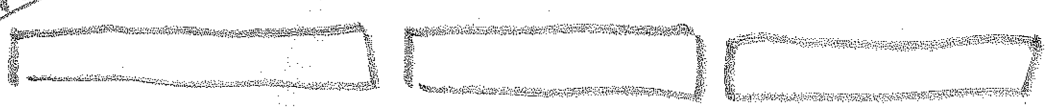


$L = L_0 + \Delta L$

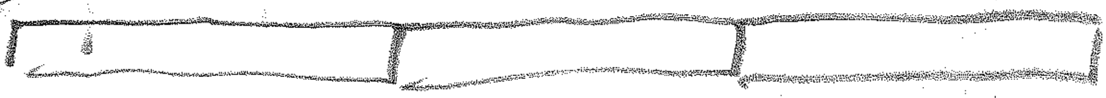
ROD Expands (LARGE THERMAL vibrations of molecules)

Fig. 15.14 3, 39 FT. segments.

Winter



SUMMER (Expansion)



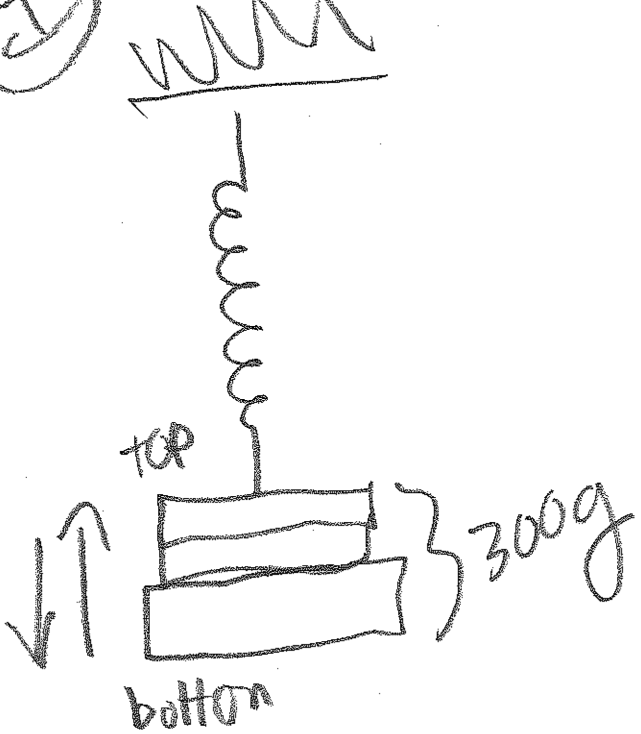
TOO MUCH EXPANSION CAUSES BUCKLING.

Lab on springs:

measure K, m, period = T_{ex}

Lab: 2 parts:

(I)



measure period = time = T_{ex} to go from bottom to top and back to bottom.

(II) measure K and compute:

$$T_{TH} = 2\pi\sqrt{\frac{m}{K}}$$

$$m = \left(0.300 + \frac{m_s}{3}\right) kg$$

where m_s = spring mass