

Kinetic Molecular Theory

Gases are made of particles that move in straight lines until they hit something.

Collisions involving gas particles are elastic (no loss of KE)

The particles of a gas have no volume.

Law v. Theory

Law: a provable, mathematically stated relationship between variables.

Theory: an explanation of a law or laws. unprovable. can only be proven wrong, or not proven wrong

What's wrong/right about KMT

gas particles have no volume...**wrong**

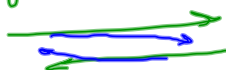
the truth: $V_{part.} \lll V_{container}$

the lie fails ... high density

gas particles move in straight lines and collide elastically...

wrong, because... they attract

the truth:



→ sticky

ignore b/c South Street

can't ignore ... low T

Gas Laws - the assumptions

Compare 2 variables

other 2 must be constant

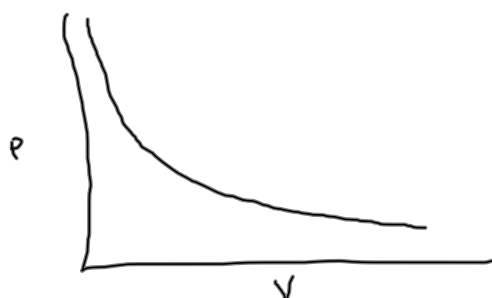
Boyle's Law

$$V \uparrow P \downarrow$$

$$V \propto \frac{1}{P}$$

$$V = \frac{1}{P} k$$

$$PV = k$$



$V \uparrow \rightarrow$ hit less often
(takes longer to go wall to wall)

\rightarrow surf. area \uparrow (more wall)

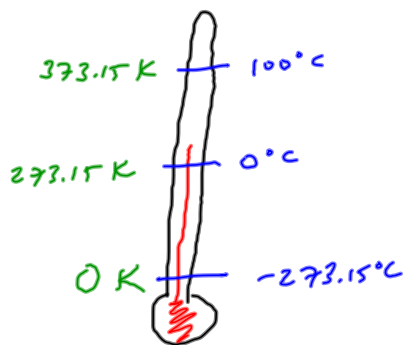
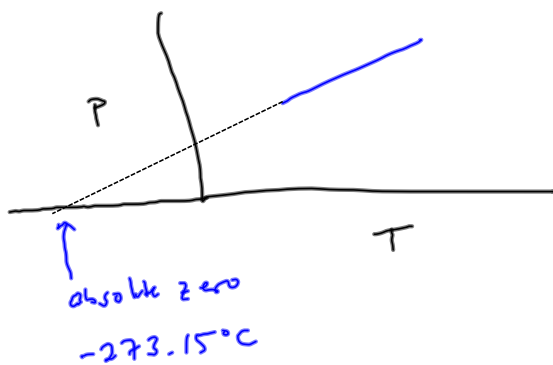
$$P = \frac{F}{A} \quad \begin{array}{l} \leftarrow \text{down} \\ \therefore P \downarrow \\ \leftarrow \text{up} \end{array}$$

Gay Lussac's Law

$T \uparrow P \uparrow$
 $T \propto P$
 $T = Pk$

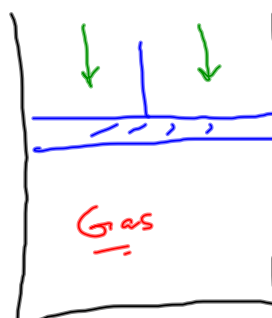
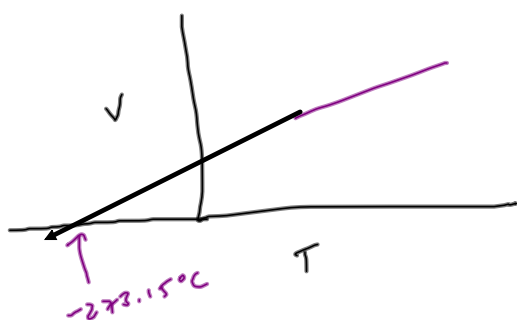
$TT \dots$ faster

\rightarrow hit more often
 \rightarrow hit harder



Charles' Law

$T \uparrow V \uparrow$
 $T \propto V$
 $T = Vk$



$T \uparrow \dots P \uparrow$ (G.L.)

$P_{in} > P_{atm}$

\dots push piston out

as $V \uparrow$ $P_{in} \downarrow$ (Boyle's)

until $P_{in} = P_{atm}$

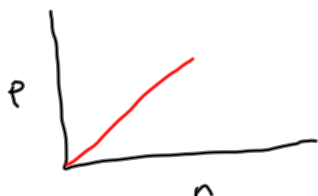
Boos' Law

$$n \uparrow \Rightarrow P \uparrow$$

$$n \propto P$$

$$n = Pk$$

$n \uparrow$... more things
hit wall $\therefore P \uparrow$

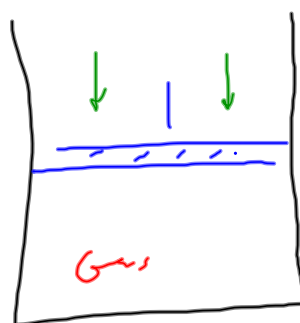
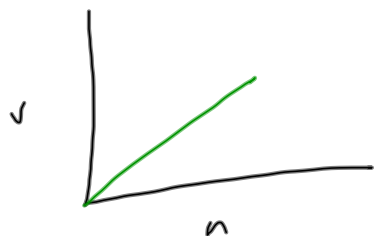


Avogadro's Law

$$n \uparrow \Rightarrow V \uparrow$$

$$n \propto V$$

$$n = Vk$$



$n \uparrow \dots P \uparrow$ (Boos)

$$P_{in} \rightarrow P_{atm}$$

push piston out
until $P_{in} = P_{atm}$
(Boyle)