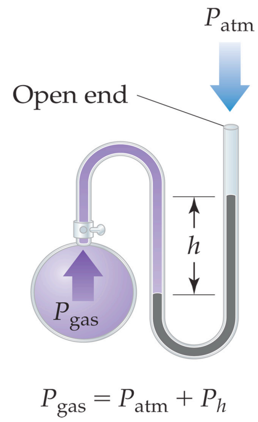
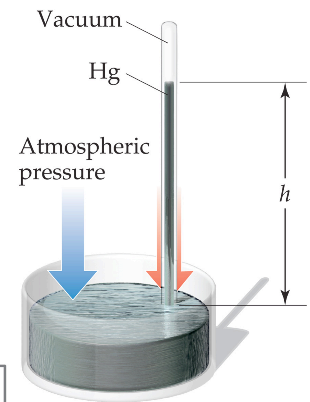
Some Background

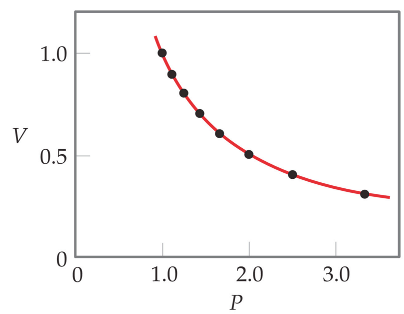
I. Gases:
  A. ______________________________ to fill containers
  B. Highly ________________
  C. Low ______________________!
II. Pressure:
  A. ______________________________
  B. Most common unit: ______________________________
  C. Other units: ______________________________

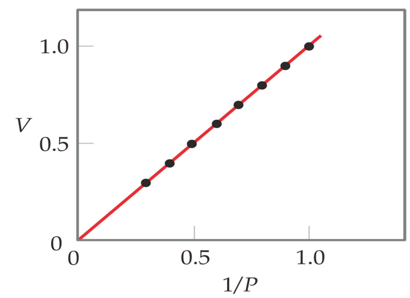




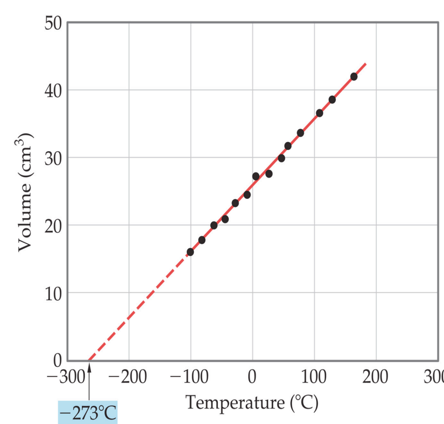
III. STP:
  A. ____________________
  B. This “standard” applies ________________________.
IV. Temperature:
  A. Measures ________________________
  B. Always use __________ for gas problems!
  C. ______________________________.

Basic Gas Laws





I. ____________ Law:
  A. Relates __________ and __________.
  B. _____ and _____ are ___________________________
  C. _________________________
II. ____________ Law:
  A. Relates __________ and __________.
  B. _____ and _____ are ___________________________.
  C.



III. ____________ Law:
  A. Relates __________ and __________.
  B. _____ and _____ are ___________________________.
  C.

IV. ______________________________ Law:
  A. Relates __________ and __________.
  B. ____.
  C. _____ and _____ are ___________________________.
  D.

  E. Thus, at STP, ________________ = ____________________. (more on this later...)

Ideal Gas Law

I. Combo of all the gas laws
  A. ______________________.
  B. VERY commonly used in AP for gas problems!
  C. R=_____________________ or _____________________.
  D. Derived from the ___________________ law:

II. Extensions of the ideal gas law:
  A. Can find density (derivation)

  B. Can find molecular mass (derivation)

Gas Mixtures: ___________________________________

I. Previous slides dealt with pure gases.
  A. For mixtures of gases: ____________________ = __________________________________.
  B. _______________________________
  C. When water is present, water vapor ______________________________________. (Thus, don't forget to account for it!)

II. Partial pressures can relate to moles...
  A. For mixtures of gases: gases behave ___________________.
  B. Therefore, we can relate _____________ to ________________
  C. ____________________ = _____ = ______________________________________.
    1. Equation =

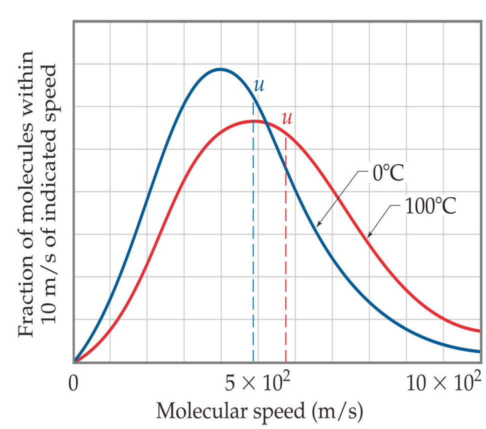
  D. ______________ relates to ____________________________.
    1. Equation:

Kinetic Molecular Theory

I. This theory is essential for the gas laws to work
II. It states:
  A. Gases have __________________________
  B. Gases move __________________________
  C. Gas molecules have ____
  D. ________________ between gas molecules are _____________ (no __________________)
  E. Average kinetic energy of molecules is __________________________

Graham's Law of Diffusion/Effusion

I. Introducing a unit: __________________________
  A. Since there are so many gas molecules in a given volume, __________________________ __________________________
  B. Related to kinetic energy. __________________________
    1. higher the ______________, higher the __________________.
  C. Thus, ___________________________, __________________________!
  D. An equation is used to describe this:



u=___________ R=_____________ T=______________
M = ______________
  E. Thus, _________________________.
II. Effusion – __________________________.

A. Graham's law relates _____________ to _______________.
B. ____.
C. Equation:

D. Diffusion: ____

Real Gases - Van der Waals Equation

I. Not all gases are ___________
II. The closer the gas is to ________________, the ________________
(____________________________________).
III. Ideal gas law makes two assumptions that ____________________:
1. ___________________________
2. ___________________________
IV. van der Waals equation accounts for this.

1. a = ___________________________(units: ___________________)
2. b = ___________________________ (units: ____________)

Substance	*a* (L^2-atm/mol^2)	*b* (L/mol)
He	0.0341	0.02370
Ne	0.211	0.0171
Ar	1.34	0.0322
Kr	2.32	0.0398
Xe	4.19	0.0510
H_2	0.244	0.0266
N_2	1.39	0.0391
O_2	1.36	0.0318
Cl_2	6.49	0.0562
H_2O	5.46	0.0305
CH_4	2.25	0.0428
CO_2	3.59	0.0427
CCl_4	20.4	0.1383

V. Thus...
A. The more __________________ a molecule is, the _______________________ it is.
1. The ____ affects its ____________________.
2. Polarizable: ____
B. The ____
1. ____, causing _______________________________ to come into play.
2. ____, _______________________ for the molecules to be ____.