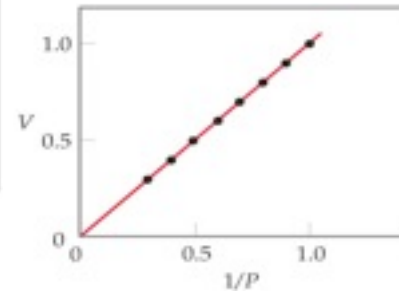
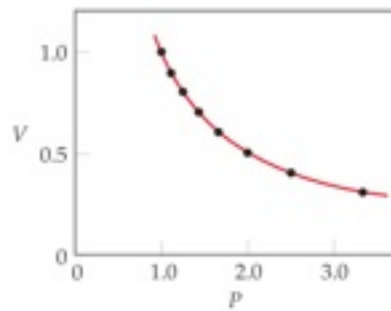
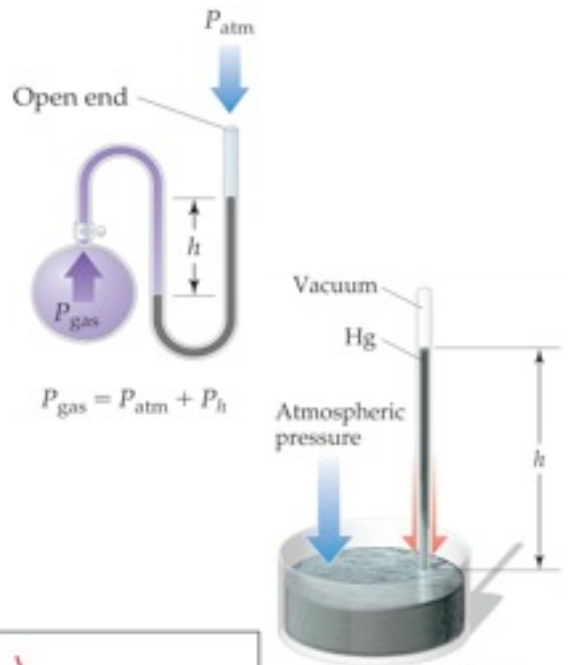


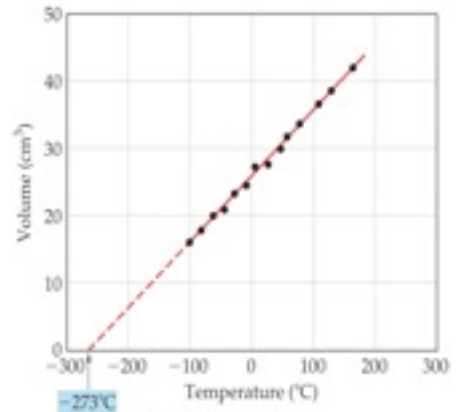
Some Background

- 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 _____.

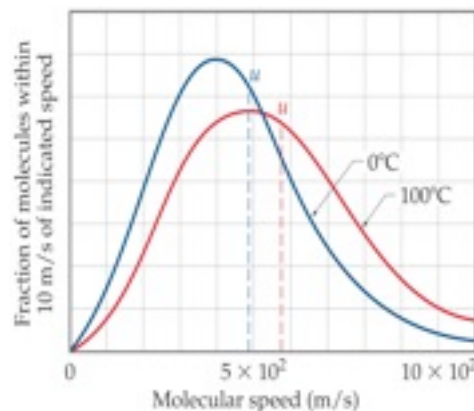
C. Thus, _____ !

D. An equation is used to describe this:

$$u = \frac{3RT}{2M}$$

E. Thus, _____.

II. Effusion – _____.



Chapter 5: Gases

- 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 ₂ O	5.46	0.0305
CH ₄	2.25	0.0428
CO ₂	3.59	0.0427
CCl ₄	20.4	0.1383