Announcements

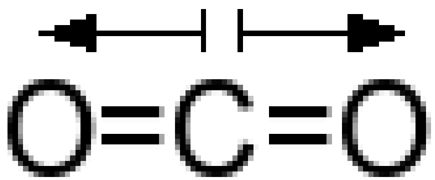
To join clicker to class today (Clickers with LCD display join automatically):

- Turn on the Clicker (the red LED comes on).
- Push "Join" button followed by "20" followed by the "Send" button (switches to flashing green LED if successful).

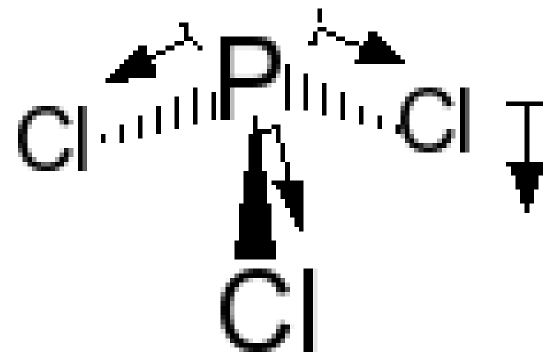
- No shorts, sandals or skirts allowed in Lab!!
- Volunteer to help with Earth Day Science Fun

Hybridization vs. VSEPR
Chang Table 10.4

Overall vs. Bond Dipoles



Overall 0 dipole
(nonpolar)



Overall dipole sum of
the three bond dipoles
is downward
(polar)

Also responsible for quantitative bond dipole calculations
for diatomics.

Chapter 8 – Gases

- Pressure
- Ideal Gas Law ($PV = nRT$, solutions for P, V, n, T, density and molar mass)
- Dalton's Law of Partial Pressures
- Henry's Law of gas solubility
- Kinetic Molecular Theory of Gases (molecular speeds, diffusion and effusion)
- Real Gases/Non-Ideal behavior (van der Waals equation)

Barometer
Fig 5.2

$PV=nRT$

- Called Ideal Gas Law
- P = pressure, we will use unit of atm, but can also be in
  - mmHg=Torr (1 atm = 760 Torr)
  - Pa = Nm^{-2} (1 atm = 101325 Pa)
  - bar = 10^5 Pa (1 atm = 1.01325 bar)
- V = the volume occupied by the gas
- n = the number of moles of gas in the volume
- R = the gas constant = 0.082058 L•atm•$mol^{-1}K^{-1}$
- T = temperature in Kelvin
- Model works well for gases near room temperature and 1 atm.

Solving for one variable

- If a gas that behaves ideally occupies a volume of 1.90 L (volume of fully expanded human lungs) at 1.0 atm and a temperature of 37 ˚C (body temperature), How many moles of gas do you have?

Answer: $n = (1.0\ \text{atm})(1.90\ \text{L})/[(0.08206\ \text{L•atm•mol}^{-1}\text{•K}^{-1})(310.\ \text{K})] = 0.0747$, 0.075 mol w/SF.

One or more variables constant

- Example 1: An expandable but closed container (balloon, piston) is maintained at constant T. It is found that $V_2 = (0.5)V_1$. How is the final P related to the initial P? $(P_2 = nRT/V_2 = nRT/\{0.5V_1\} = 2nRT/V_1 = 2P_1)$
- Example 2: An ideal gas inside a piston is initially at STP (0˚C=273. K, 1.00 atm) and occupies a volume of 10.0 L. What volume does it occupy at 25 ˚C = 298. K and 3.00 atm?

$V_f = nRT_f/P_f$ & $n = P_iV_i/(RT_i)$ => $V_f = P_iV_iT_f/[P_fT_i] = (1.00\ atm)(10.0\ L)(298\ K)/[(3.00\ atm)(273\ K)] = 3.64\ L$