Announcements

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

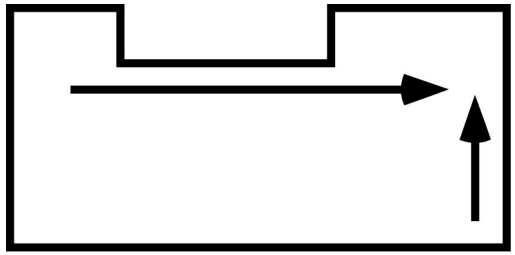
- Turn on the Clicker (the red LED comes on).
- Push "Join" button followed by "20" followed by the "Send" button (switches to flashing green LED if successful).

- Exam on Stoichiometry, Limiting Reagents, Solutions and Bonding/Lewis Structures one week from today.

- There will be a quiz in discussion this week on material through drawing simple Lewis Structures (did before break and will review at beginning of class today).
- No shorts, sandals or skirts allowed in Lab!!

Review

- Precipitation RXNs
- Valence Electrons
- Review of Ionic Bonding
- Covalent Bonding
  - octet rule, –Simple Lewis Structures
  - electronegativity



  - bond polarity (example: ∂+ :C≡O: ∂-)

Rough Guide to Bond Type

difference in electronegativity	Bond Type
> 2.0	ionic bond
< 2.0	polar covalent bond
~0	non-polar covalent bond

Will see better way of dividing up bond types based on electronegativity in discussion

Systematic Lewis Structures

1. Octet rule: all main group (s and p block) elements except B (6) and H (2) will share electrons to get 8 valence electrons.
2. Count the total number of valence electrons on all atoms. Add or subtract from this to account for the overall charge on the species.
3. Next draw single bonds from each of the outer atoms to the central atom. Subtract two electrons from the total number of electrons for each bond you have made = # electrons you have left to use elsewhere.
4. Put electrons on the outer atoms to give each atom a total of eight (an octet). (H) hydrogen only needs 2 electrons. (B) boron usually only 6 electrons. Keep track of how many electrons you are using. If you run out of electrons before filling the outer atoms' octets, stop.
5. Any electrons that were not used up in step 3 should be put on the central atom. You should now have no unused valence electrons.
6. If any atoms do not have octets, make multiple bonds (double and triple) by sharing electron pairs from atoms that do have octets.
7. Look for resonance structures. If you have made multiple bonds or have odd electron species where all the atoms cannot have octets, there may be more than one way to arrange the multiple bonds or place the odd electron. If so, the molecule is better modelled as an average of all the possible structures.
8. Use “Formal Charge” to pick best resonance structures.

Ozone, O_3

- Allotrope of oxygen (allotropes are differently bound forms of the same element)
- O_3 is one of the irritants in smog.
- O_3 in the stratosphere (ozone layer) is good.
  - It protects us from UV radiation by absorbing radiation between 242 nm and 320 nm.
  - O_2 only absorbs radiation with $\lambda \leq 242$ nm (higher energy)

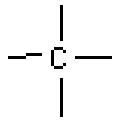
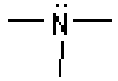
Catalytic destruction of O_3 by Cl

1) $CCl_3F + h\nu \longrightarrow CCl_2F + Cl$
2) $Cl + O_3 \rightarrow ClO + O_2$
3) $ClO + O \rightarrow Cl + O_2$

- Last two RXNs constitute a catalytic cycle
  - Cl used in RXN 2, but produced in equal amounts in RXN 3.
  - Sum of RXNs 2 &3: $Cl + O_3 + O \rightarrow Cl + 2O_2$

Quick rules for simple Lewis Structures

- Works well for some period two atoms (H, C, N, O, F) and the halogens (group 17) most of the time.

Atom	Number of Bonds	Lewis Cartoon
H	1	H-
C	4	
N	3	
O	2	
F (same for other halogens)	1