- Valence electrons: e⁻ on farthest energy level of atom
  * gives atoms their chemical properties

  → draw some Bohr models to represent

- Octet Rule: atoms with 8 valence e⁻ are the most stable
  * noble gases don't react because of this
  * atoms will gain or lose ve⁻ so they can have full octet (8ve⁻)
  * they do this through bonding

  → talk a little about reactivity (lose 1 vs 3)
  → Na demo, youtube (after ionic)

Lewis Structures:
- Ionic Bonds: electrostatic attraction between a metal cation and a nonmetal anion due to (Bond b/w metal + non-metal)   transfer e⁻
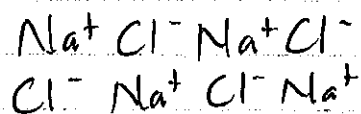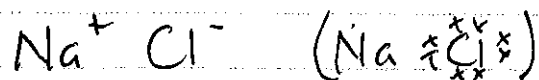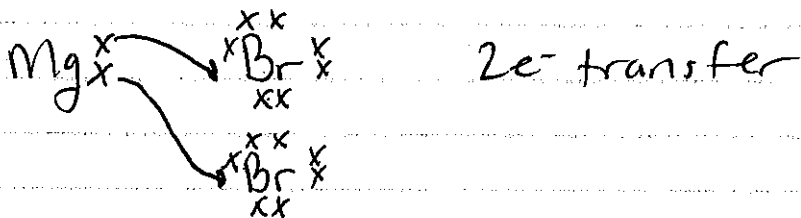
ex: NaCl

$$Na^x \longrightarrow \overset{x\,x}{\underset{x\,x}{{}^x_x Cl {}^x_x}}$$

metals lose e⁻   non-metals gain e⁻
because they have   b/c they have high
low ionization energy   electron affinity

ex: now both have charges and are
        attracted

$$Na^+ \; Cl^- \qquad (Na \; \overset{\times\times}{\underset{\times\times}{\times\,\ddot{C}l\,\times}})$$

        Na$^+$ Cl$^-$ Na$^+$ Cl$^-$
        Cl$^-$ Na$^+$ Cl$^-$ Na$^+$

ex: Magnesium bromide

        2e$^-$ transfer

    Why does Al form a +3 charge?
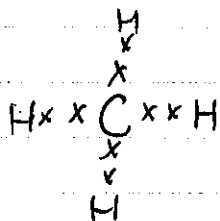
Demo

• Covalent Bond: 2 or more non-metals
     sharing e$^-$ due to electronegativity
                              ↑ define
                    – # to close to allow transfer

ex: CH_4, H_2O, ~~NH_3~~
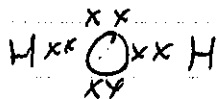
Lewis structures: 3-D structures that show
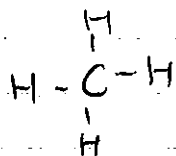 how each atom share's Valence e^-

steps:
 1. Covalent or Ionic
 2. If Covalent, determine the total # of ve⁻

$$C = 4 \qquad H_4 \rightarrow 1 + 1 + 1 + 1 = 8$$

 3. place unique atom in middle and bond
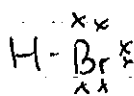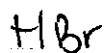   similar atoms around it
      * use — for bond (1 bond = 2e⁻)

$$
\begin{array}{c}
\text{H} \\
| \\
\text{H} - \text{C} - \text{H} \\
| \\
\text{H}
\end{array}
$$

 4. each atom has 8 ve⁻ (H = 2, B = 6)
 5. Check you've used all ve
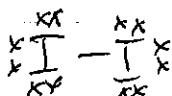   (# needs to equal # calculated)

    NH_3 (lone pairs)

→ double bonds / triple
→ resonance

Polar Covalent
* not sharing electrons evenly
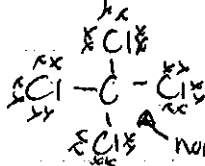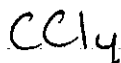* 2 different atoms (one atom that has more e^-)

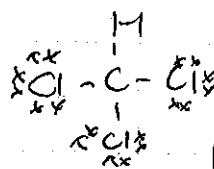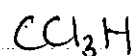HBr I_2 CCl_4 CCl_3H

H—Br   I—I   Cl—C—Cl   Cl—C—Cl

↑ polar   ↑ Covalent bond (non-polar)   non-polar   polar

* shares e^- evenly

Multiple Bonds
* single, double, triple
* when can't complete an octet w/ provided ve^-, make another bond

ex: SiO_2 , SO_2
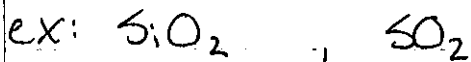
Resonance / Ions
* Ions: need bracket
    ex: OH^- , NH_4^+
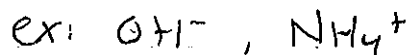
* Resonance: rotating double bond
    ex: NO_3^- , SO_2