Homework Quiz

Define: 1. ionic bond
2. covalent bond
3. valence electron

Describe: 4. ionic Compound
5. electronegativity

Complete the following Lewis Structures:

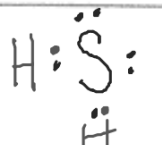
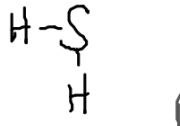
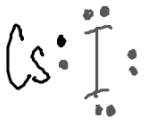
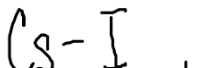
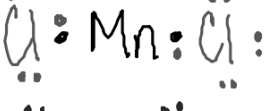
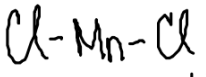
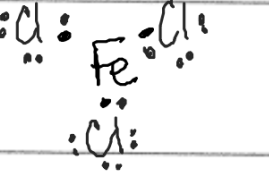
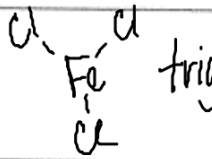
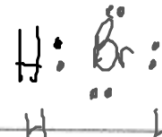
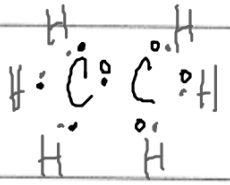
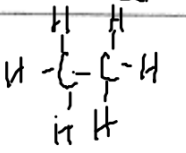
H_2Se
$BaCl_2$

Bonding Homework:

1. the process of removing the most loosely held e^-
2. transfer e^- (ionic) share e^- (covalent)
3. an atom's relative attraction to the e^- in a covalent bond
4. valence e^-
5. Oxidation (Leo says Ger)
6. decreases increases

7. A
8. A
9. A
10. B
11. C
12. B, C
13. A
14. B
15. C
22. B
23. D
24. C
25. D

Complete the following table. I = ionic PC = Polar Covalent NPC = non-polar covalent

Compound	Type of bond	Lewis Dot Diagram	Molecular Shape Formula
16. H_2S	S 2.5 -H 2.1 0.4 NPC		 Bent
17. CsI	I 2.5 Cs 0.7 1.8 PC		 Linear
18. $MnCl_2$	Cl 3.0 Mn 1.5 1.5 PC		 Linear
19. $FeCl_3$	Cl 3.0 Fe 1.8 1.2 PC		 trigonal planar
20. HBr	Br 2.8 H 2.1 0.7 PC		 Linear
21. C_2H_6 C -C NPC 0	C 2.5 H 2.1 0.4 NPC		

Metallic Bonding: Occurs in bonding of pure metals + is very strong. The e⁻ flow between nuclei in what is called a sea of e⁻.

Name: _____ Block: ___ Date: _____

Periodic Trends Worksheet

VSEPR

Atomic Radii Inc

Ionization Energy + Electronegativity Inc

Valence shell electron pair repulsion

Atomic Radii Inc

IE + EN inc

He 2 valence e⁻ → He:

	I A	II A	Group B	III A	IV A	V A	VI A	VII A	VIII A
# of Valence Electrons	1	2	2 ($2s, \emptyset_p$)	3	4	5	6	7	8
Charge	1+	2+	Varies	3+	2+ 4+	3−	2−	1−	⊘
Bonding Capacity	1	2		3	4	3	2	1	Ø
Shape (central atom)	/	linear		trigonal planar	tetra-hedral	pyramidal	bent	/	/
Resulting Bond Angle	/	180°		120°	109.5°	107°	105°	/	/

IIA — linear

IIIA — trigonal planar

IVA — tetrahedral

VA — pyramidal

VIA — bent

Memorize this chart!

Lewis Dot Structures are used to help illustrate Molecular Structures

Elements are drawn w/ dots representing the val. e⁻. Think of them as rotational - they can be turned to aide in connecting elements to make a compound.

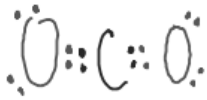
Know This!

Steps to Making Lewis Structures

1. Determine total # of valence e⁻
2. Determine the # of e⁻ needed to satisfy atoms
   Grp 1 need 2, Grp 2 need 4, Grp 3 need 6, Grp 4-8 need 8
3. Determine the # of bonds required
   Step 1 − Step 2 = ☐ ÷ 2 = # of bonds required
4. Chose a Central Atom — ~~e⁻~~ generally needs the most bonds or has lowest EN value
5. Draw Structure — if a pair of e⁻ is shared draw a line.

CO_2

$O=C=O$



N_2

$N\equiv N$

:N⋮⋮N:

Illustrating Compounds

1. Lewis Dot Diagrams $CaCl_2$

$\cdot Ca\cdot \quad \cdot\ddot{Cl}: \quad \cdot\ddot{Cl}: \quad : \ddot{Cl}:Ca:\ddot{Cl}:$

↑ ↑ bonds

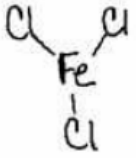
$Ca-Cl$ 2 of these bonds

Cl	3.0
− Ca	1.0
	2.0 ionic bond

2. Molecular Shape: uses dashes to indicate bonds

Iron (III) chloride → $FeCl_3$

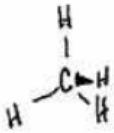
$Fe^{3+}\ Cl^{1-}$



Cl	3.0
Fe	1.8
	1.2

polar covalent bonds

3. Ball + Stick "3-D" model



CH_4 methane

C	2.5
H	2.1
	0.4

non polar covalent

PRACTICE (To Complete in Class)

Name/Formula	Lewis Dot	Type of Bond	Molecular Structure	Name of Shape
Ammonia NH_3				
Carbon dioxide CO_2				
Calcium fluoride CaF_2				
Oxygen O_2				

Determining Molecular Polarity

Step 1 Determine the Type of Bond (Math)

- Non-Polar Covalent (EN diff ≤ 0.49) ✓ Non Polar Molecule
- Polar Covalent (EN diff 0.5 to 1.9) or Ionic (EN diff ≥ 2.0)

Step 2 Draw an arrow at each bond pointing toward the element w ↑EN

- Equal & Opposite (Tug-o-war) → Non-Polar Molecules
- Single Direction → Polar Molecules