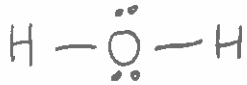
Chemical Bonding Worksheet # 3 (Molecular/Covalent Dot Structures)

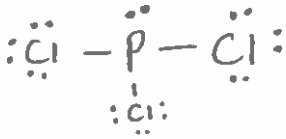
ANSWERS

1. The following molecules have only single covalent bonds. Draw a Lewis structure for each.

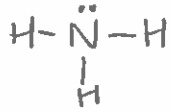
a. H_2O



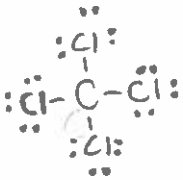
b. PCl_3



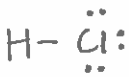
c. NH_3



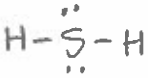
d. CCl_4



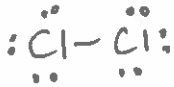
e. HCl



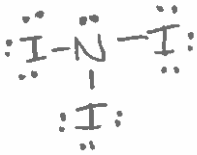
f. H_2S



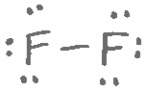
g. Cl_2



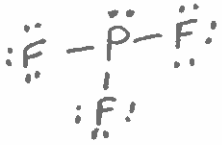
h. NI_3



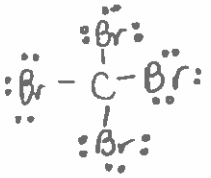
i. F_2



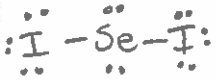
j. PF_3



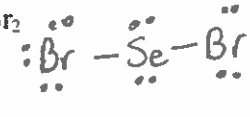
k. CBr_4



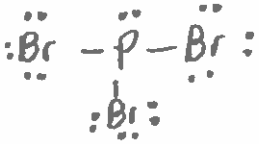
l. SeI_2



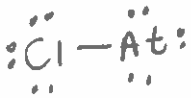
m. $SeBr_2$



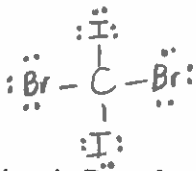
n. PBr_3



o. ClAt

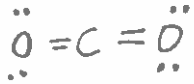


p. CI_2Br_2



2. The following structures may have a double, triple, or coordinate covalent bond. Draw Lewis structures for each.

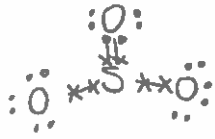
a. CO_2



b. HCN

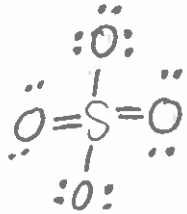
c. N_2

d. SO_3



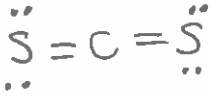
} too tough for us ☹

e. SO_4



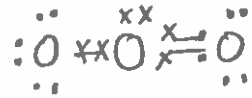
} too tough for us ☹

f. CS_2

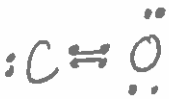


g. As_2

h. O_3



i. CO



Chemical Bonding Test Review

1. Define ionic bonding: metals lose e^- and non-metals gain e^-, forming ions in order to have full outer shells.
2. Define covalent bonding:
   non-metals share valence e^- to get stable octet.
3. Determine if the following bonds are covalent or ionic (determine which ones are metals and which ones are nonmetals and then use that info to determine bond type):

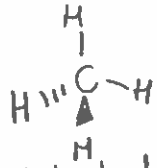
a. C-H	b. F-F	c. Li-Br	d. O-Si	e. K-I
nm nm	nm nm	m nm	nm nm	m nm
covalent	covalent	ionic	covalent	ionic

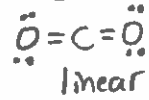
4. Determine if the following atoms will lose or gain electrons when forming ionic bonds

Na	Mg	F	S
lose 1	lose 2	gain 1	gain 2

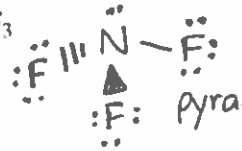
5. Draw the dot structure for the following covalent compounds. State the molecular shape or structure (linear, bent, pyramidal, or tetrahedral).

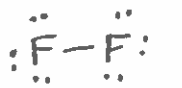
H_2O
bent

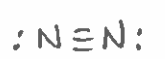
CH_4 
tetrahedral

CO_2 
linear

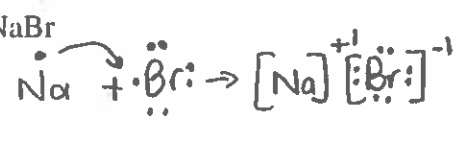
PCl_3
pyramidal

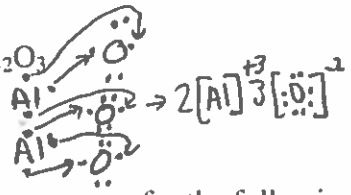
NF_3 
pyramidal

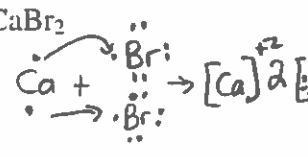
F_2 
linear

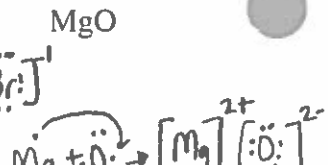
N_2 
linear

6. Show how the following ionic compounds form with movement of e^- to make ions:

NaBr 

Al_2O_3 

$CaBr_2$ 

MgO 

7. Draw the Lewis valance electron dot structures for the following atoms:

a. nitrogen atom	b. sodium atom	c. sulfur atom	d. bromine atom
·N·	Na·	·S·	·Br:

8. How many valance electrons are needed in order for an atom or ion to be stale? (What are the "magic" numbers?)
   2, 8, 8

9. Which type of atom will always lose valance electrons to become an ion?
   metals

10. Which type of atom will always gain valance electrons to become an ion?
    non-metals

11. When the following become IONS what will the charge be?

a. nitrogen	b. sodium	c. sulfur	d. bromine	e. magnesium	f. aluminum
$[:\ddot{N}:]^{-3}$	$[Na]^{+1}$	$[:\ddot{S}:]^{2-}$	$[:\ddot{Br}:]^{-1}$	$[Mg]^{+2}$	$[Al]^{+3}$