

Name _____ Pd _____ Date _____

Chemistry: Chemical Bonds & Lewis Dot Structures Worksheet - Review

Intro to Chemical Bonding

1. Why do elements combine to form chemical compounds?
2. Compare and contrast ionic and covalent bonding.
3. Rank single, double and triple bonds in order of shortest to longest bond length?

Lewis Dot Structures

4. Determine the total number of valence electrons in each of the following:
 - a. SBr_2
 - b. NBr_3
 - c. CH_3OH
 - d. NH_3
5. Draw the Lewis dot structures for each of the following covalent molecules or polyatomic ions:
 - a. H_2O
 - b. H_3O^+
 - c. CCl_4
 - d. SiF_4
 - e. CF_2Cl_2
 - f. C_2H_6

6. After you create single bonds between the atoms, what do you need to do if there aren't enough remaining electrons to complete all of the octets?

7. When does a covalent compound have resonance structures?

8. Draw the Lewis dot structure for each of the following molecules or polyatomic ions:

a. HCCH

f. F₂

b. CO

g. SO₄²⁻

c. H₂CO (C is the central atom)

h. NH₃

d. NO⁻

~~i. PCl₅ omit~~

~~e. N₂O (N N O) omit~~

~~j. SF₆ omit~~

9. Draw the Lewis dot structure for each of the following ionic compounds:

a. MgO

d. Li₂O

b. BaF₂

e. Al₂O₃

c. AlCl₃

f. K₃N

(Remember: drawing arrows to show the electron movement is important. Be specific where the electrons are going.)

Worksheet #3: Drawing Ionic Bonds

Remember: Ionic bonds form between POSITIVE IONS and NEGATIVE IONS. Ionic bonding is when one of the atoms is donating an electron(s) (the cation) and one of atoms is accepting an electron(s) (the anion). The electrons are not shared, the anion gains an electron(s) to achieve a full valence and the cation loses an electron(s) to achieve a full valence.

Diagram the ionic bonding process from neutral atoms to ions showing the valence electrons and indicating with arrows the direction in which the electrons are going. Write your final answer in the box.

Ex: sodium nitride (Na_3N)



Remember

Ionic bonds
= Metal
+
NonMetal

1. sodium chloride (NaCl)



5. potassium fluoride (KF)



2. barium oxide (BaO)



6. sodium oxide (Na_2O)



3. magnesium chloride (MgCl_2)



7. aluminum chloride (AlCl_3)



4. calcium chloride (CaCl_2)



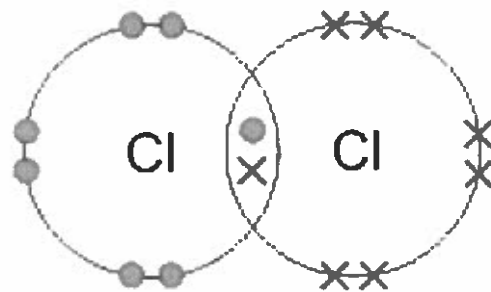
8. rubidium oxide (Rb_2O)





Covalent bonding

A non-metal and another non-metal can bond together by **sharing** electrons so that both electrons can achieve a **full outer shell**. This is called covalent bonding. To represent the atoms involved in the bonding we draw crosses for the electrons on one of the atoms and dots for the electrons on the other atoms as shown here.



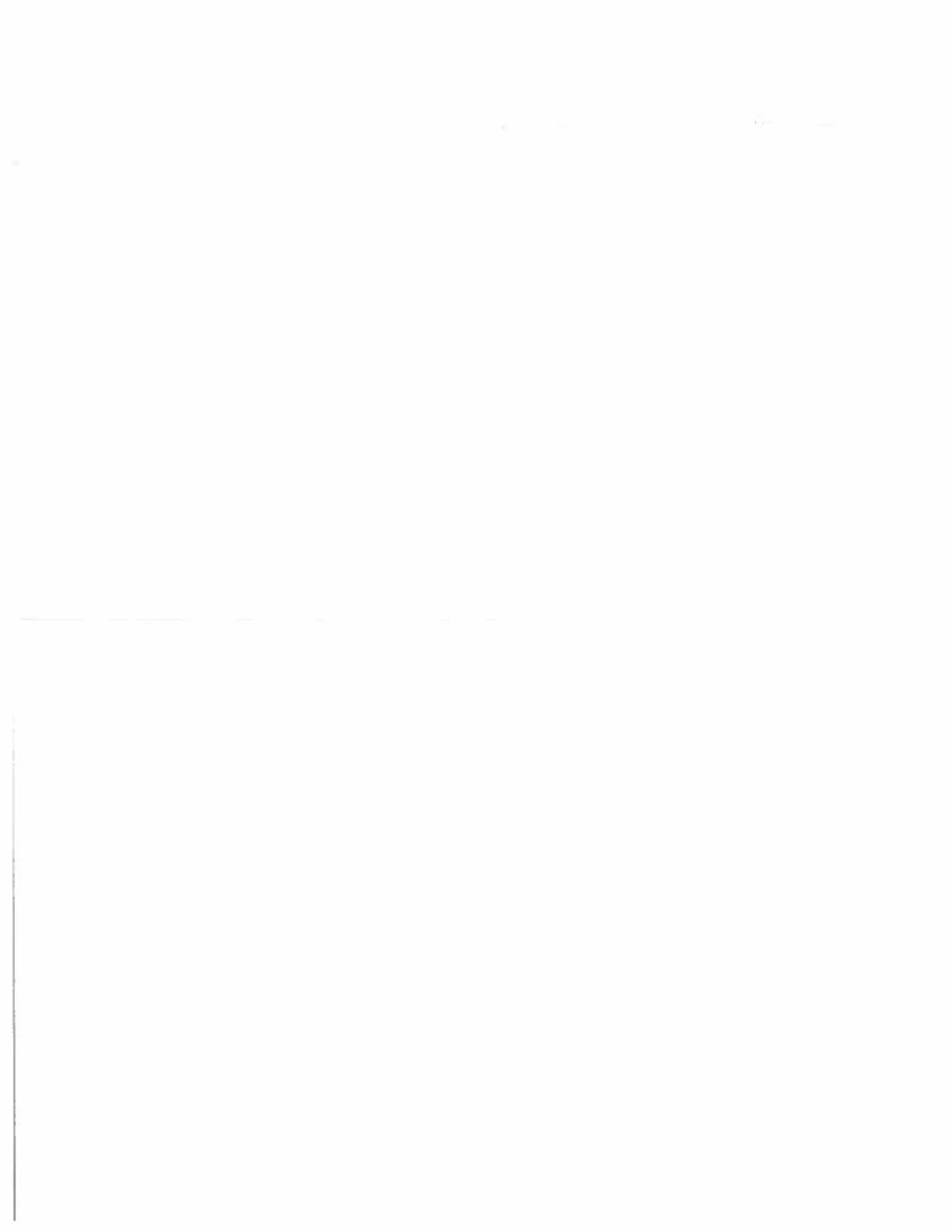
Instructions

NB: It may be easiest to draw each atom out individually first to work out how many electrons will be shared

1. Follow the steps to draw a covalent bond:
 - a. Add up the total number of valence electrons for the structure
 - b. Draw the skeleton
 - c. Add valence electrons to outer atoms so that they are full
 - d. Add any leftover electrons (if applicable) to central atom
 - e. Verify the central atom has 8, if not add electrons until it does

TASK: Draw the following covalent compounds in the space provided.

F_2		CH_4	
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HCl		CO ₂	
H ₂ S		H ₂ O	
HF		NH ₃	

