

# Thou Shalt Not Forget

Credit: Dan Reid

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## Unit 6 – Bonding

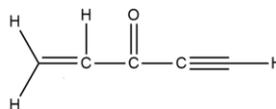
1. Covalent bonds are formed between two nonmetals sharing electrons.
2. Ionic bonds are formed when a metal transfers electron to a nonmetal and the opposite charges attract.
3. The greater the electronegativity difference between 2 atoms, the more polar the bond becomes.
4. Combustion reactions make  $\text{CO}_2$  and  $\text{H}_2\text{O}$ .
5.  $\text{H}_2$   $\text{O}_2$   $\text{N}_2$   $\text{Cl}_2$   $\text{Br}_2$   $\text{I}_2$   $\text{F}_2$  -- the diatomic elements. When they are in a compound, their # of atoms can vary.
6. Carbon makes a total of 4 bonds in a compound.
7. Bond angles: 4 domains =  $109.5^\circ$       3 domains =  $120^\circ$       2 domains =  $180^\circ$
8. Hybrid orbitals: 4 domains =  $\text{sp}^3$       3 domains =  $\text{sp}^2$       2 domains =  $\text{sp}$
9. Asymmetrical molecules = dipoles DO NOT cancel = polar molecule;  
symmetrical = dipoles cancel = nonpolar molecule
10. Single bond = sigma    double bond = sigma + pi bond    triple bond = sigma + 2 pi bonds
11. Lattice energy is the energy to break an ionic bond in a compound. Lattice energy increase as the ion's charge increases. Lattice energy decreases as the radii of the ions increase. (This can be deduced from Coulomb's Law.)
12. Formal charge involves comparing the # of valence electrons an atom has to the # of electrons around it in the Lewis structure. (Remember to "split" the bonded electrons evenly between the atoms.)
13. Obey the octet rule first when drawing the Lewis Dot Structure then use formal charge if necessary. Extra electrons can go on the larger central atom, and if you have too few electrons, start making some double or triple bonds.

# Thou Shalt Not Forget Questions

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## Unit 6 – Bonding

1. What type of bond forms between hydrogen and chlorine:  
polar covalent, nonpolar covalent, ionic, metallic or h-bond?
2. a) Ionic bonds are formed between what types of elements?  
b) When forming an ionic bond, which element gains electrons, and which element loses electrons?
3. As the electronegativity difference between 2 atoms increases, what happens to the polarity of the bond?
4. Combustion reactions produce what two substances?
5. Name the 7 diatomic elements.
6. What is the total # of covalent bonds carbon has to make when drawing a Lewis (e- dot) structure?
7. What is the bond angle in  $\text{BF}_3$  /  $\text{H}_2\text{O}$  /  $\text{NH}_3$  /  $\text{CO}_2$  ?
8. What is the hybrid orbital used in  $\text{BF}_3$  /  $\text{H}_2\text{O}$  /  $\text{NH}_3$  /  $\text{CO}_2$  ?
9. a) Are asymmetrical molecules polar or nonpolar? What about symmetrical molecules?  
b) Explain your answers to the question above – why are they polar or nonpolar?
10. a) How many sigma and pi bonds are there in a triple bond?  
b) Count the # of sigma and pi bonds in this molecule:
11. a) What term do we use for the energy to break the ionic bond in a compound?  
b) What 2 properties affect the lattice energy?  
c) Which ionic compound would have the most lattice energy? Circle the combo that would be the most.



<u>Ion Charges</u>	<u>Ion Radii</u>
<i>large</i>	<i>large</i>
<i>small</i>	<i>small</i>

12. Calculate the formal charges in these compounds:  $\text{H}-\text{C}\equiv\text{N}-\ddot{\text{O}}:$        $\text{H}-\ddot{\text{C}}=\text{N}=\ddot{\text{O}}:$
13. When drawing a Lewis (electron dot) Structure, after connecting the atoms with single bonds, if you notice that you have too few remaining electrons to give every atom an octet, that's an indication that you are going to have to do what?