Honors Chemistry
Ms. Ye

Name _____
Date _____Block_____

**Review: Mixed Ionic/Covalent Compound Naming and Formula Writing**

For each of the following compounds, determine whether the compound is ionic or covalent and name it appropriately.

1) $Na_2CO_3$

2) $P_2O_5$

3) $NH_3$

4) $FeSO_4$

5) $SiO_2$

6) $GaCl_3$

7) $CoBr_2$

8) $B_2H_4$

9) $CO$

10) $P_4O_{10}$

For each of the following compounds, determine whether the compound is ionic or covalent and write the appropriate chemical formula for it.

1) Dinitrogen trioxide

2) Ammonium nitrate

3) Carbon tetrahydride

4) Lithium acetate

5) Phosphorous trifluoride

6) Vanadium (V) oxide

7) Aluminum hydroxide

8) Zinc sulfide

9) Silicon tetrafluoride

10) Silver phosphate

**Covalent Compounds Lewis Structures Activity**
**Chemistry**

Background/Review:

## Forming Bonds

- **Bond**= a region that forms when _____ from _____ interact with each other
  - The attraction between 2 or more atoms allows for the formation of a compound.
  - Only _____ electrons participate in bonding
- **Octet Rule**
  - Atoms bond in order to get a full valence shell, or _____
  - Exceptions: **Hydrogen** will bond and be happy with _____ valence electrons
  - **Boron** will bond and be happy with _____ valence electrons

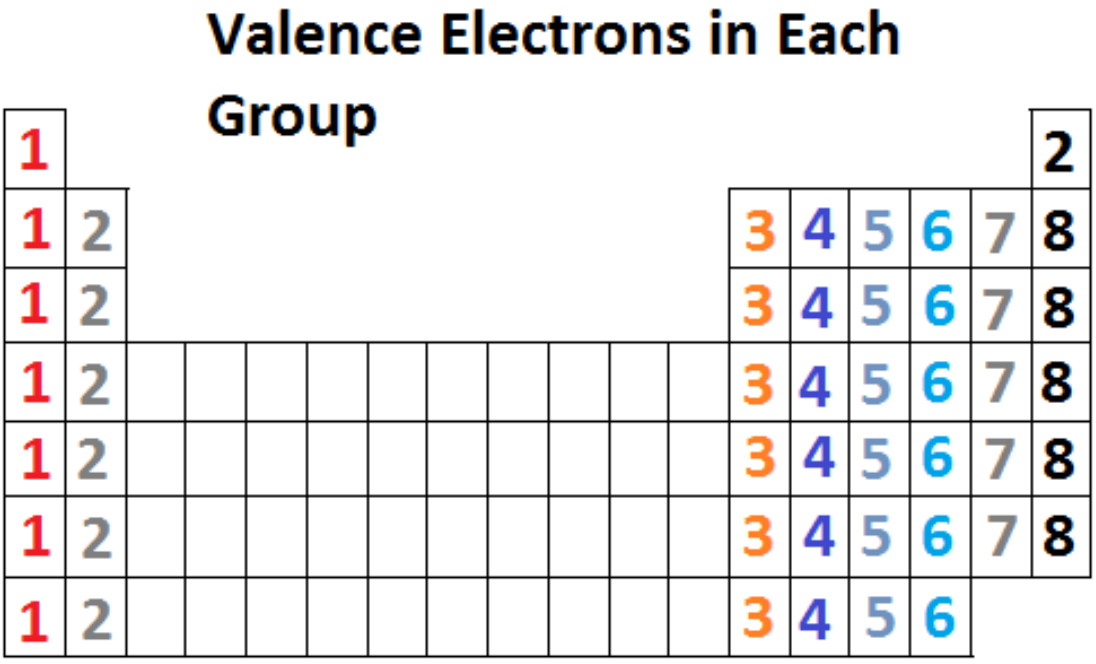
## Covalent Bonds

- A covalent compound is one that is made up of _____
- A covalent bond involves the _____ of electrons

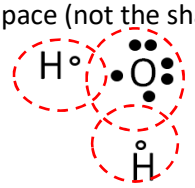
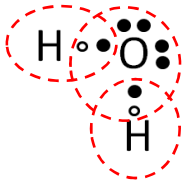
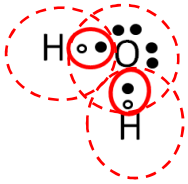
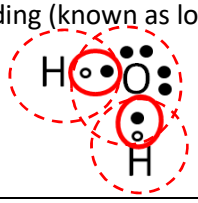
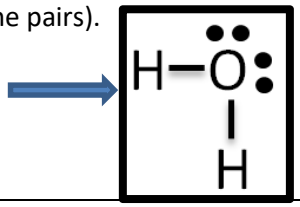
### Lewis Dot Structures

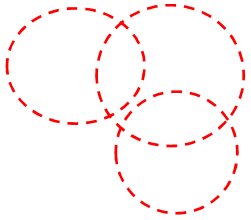
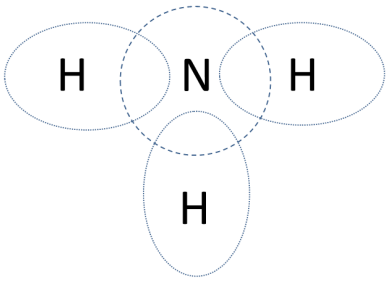
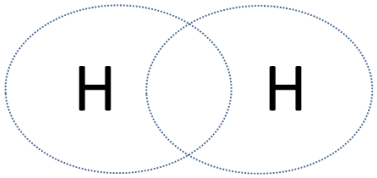
- Show just the _____ electrons of an atom

**Remember:** _____ the element is in gives you information about the _____ it has!



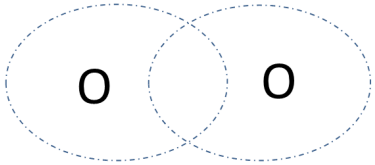
**Directions:** For each covalent compound:

| | | |
|---|---|---|
| 1. Start by placing all the valence electrons around each atom in their space (not the shared space)  | 2. Move one valence electron from each atom into each "shared space" it touches  | 3. Count how many electrons each atom has now. Remember, **shared electrons** count for **both atoms**.  **Each H has 2 electrons, O has 8 electrons** |
| 4. If all atoms are happy (have a full valence shell), move on to step 5<br><br>If all atoms are not happy (do not have a full valence shell), repeat steps 2 and 3 (place another valence electron from each atom into the shared space). | 5. Draw the Lewis structure using dashes (lines) for each **pair** of shared electrons and dots for the valence electrons that were not involved in bonding (known as lone pairs).   **There are 2 O-H bonds, There are 2 lone pairs on the oxygen** | |

| Covalent Compound | Electron Count | Diagram showing sharing of electrons | Lewis Structure for Covalent Compound |
|---|---|---|---|
| Example: $H_2O$ | **# valence electrons** / **H** / **O**<br>Start<br>After bonding (sharing ) once |  | |
| $NH_3$ | **# valence electrons** / **N** / **H**<br>Start<br>After bonding (sharing ) once<br>If necessary: after bonding (sharing ) 2 times<br>If necessary: after bonding (sharing ) 3 times |  | |
| $H_2$ | **# valence electrons** / **H** / **H**<br>Start<br>After bonding (sharing ) once<br>If necessary: after bonding (sharing ) 2 times<br>If necessary: after bonding (sharing ) 3 times |  | |

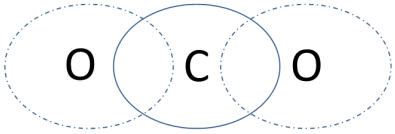
$O_2$

| # valence electrons | O | O |
|---|---|---|
| Start | | |
| After bonding (sharing ) once | | |
| If necessary: after bonding (sharing ) 2 times | | |
| If necessary: after bonding (sharing ) 3 times | | |



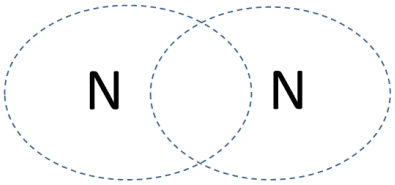

$CO_2$

| # valence electrons | C | O |
|---|---|---|
| Start | | |
| After bonding (sharing ) once | | |
| If necessary: after bonding (sharing ) 2 times | | |
| If necessary: after bonding (sharing ) 3 times | | |



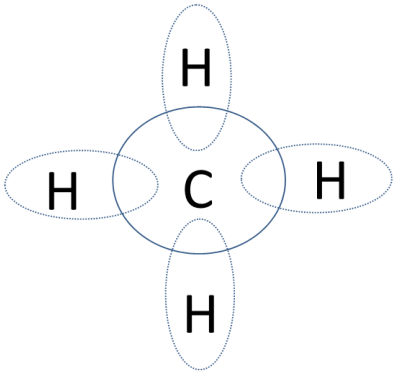

$N_2$

| # valence electrons | N | N |
|---|---|---|
| Start | | |
| After bonding (sharing ) once | | |
| If necessary: after bonding (sharing ) 2 times | | |
| If necessary: after bonding (sharing ) 3 times | | |




$CH_4$

| # valence electrons | C | H |
|---|---|---|
| Start | | |
| After bonding (sharing ) once | | |
| If necessary: after bonding (sharing ) 2 times | | |
| If necessary: after bonding (sharing ) 3 times | | |



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<tr><td>Start</td><td></td><td></td></tr>
<tr><td>After bonding (sharing ) once</td><td></td><td></td></tr>
<tr><td>If necessary: after bonding (sharing ) 2 times</td><td></td><td></td></tr>
<tr><td>If necessary: after bonding (sharing ) 3 times</td><td></td><td></td></tr>
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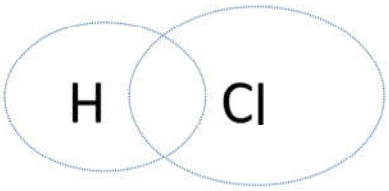
<td> 
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<td>$CF_4$</td>
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<tr><th># valence electrons</th><th>C</th><th>F</th></tr>
<tr><td>Start</td><td></td><td></td></tr>
<tr><td>After bonding (sharing ) once</td><td></td><td></td></tr>
<tr><td>If necessary: after bonding (sharing ) 2 times</td><td></td><td></td></tr>
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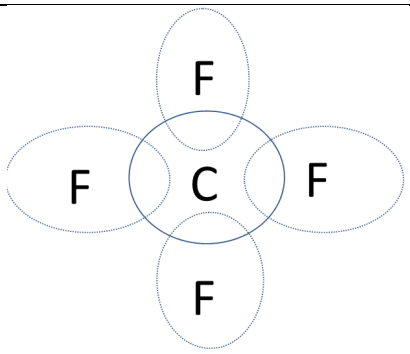
<td> 
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**<u>HONC Rule:</u> Use the Lewis Structures you drew to answer the following questions**

- How many bonds does 1 **Hydrogen** atom need to form in order to achieve a full valence shell? ___
- How many bonds does 1 **Oxygen** atom need to form in order to achieve a full valence shell? _____
- How many bonds does 1 **Nitrogen** atom need to form in order to achieve a full valence shell? ____
- How many bonds does 1 **Carbon** atom need to form in order to achieve a full valence shell? ____
- How many bonds does 1 **halogen** atom need to form in order to achieve a full valence shell?_____

**<u>Fill in the following blanks with the terms “single”, “double” or “triple” bond</u>**

When only **1 pair** of electrons is shared between atoms (one dash), it is known as a _____

When **2 pairs** of electrons are shared between atoms, it is known as a _____

When **3 pairs** of electrons are shared between atoms, it is known as a _____

**Putting it all together…**

****In general, when drawing the Lewis Structure, satisfy the <u>HONC Rule</u> first, then the <u>Octet Rule</u>**

| Chemical Formula | Lewis Structure: | Essential Information: |
|---|---|---|
| **HCN** | | Total valence electrons:<br>Bonded electrons:<br>Electrons in lone pairs: |
| **$PF_3$** | | Total valence electrons:<br>Bonded electrons:<br>Electrons in lone pairs: |
| **$H_2CO$** | | Total valence electrons:<br>Bonded electrons:<br>Electrons in lone pairs: |
| **$CHCl_3$** | | Total valence electrons:<br>Bonded electrons:<br>Electrons in lone pairs: |
| **$C_2H_2$** | | Total valence electrons:<br>Bonded electrons:<br>Electrons in lone pairs: |
| **$CH_3OH$** | | Total valence electrons:<br>Bonded electrons:<br>Electrons in lone pairs: |