

LAB: MOLECULAR GEOMETRY

Name: _____ Date: _____ Pd: _____

Station #1:

1. Draw the Lewis structure for the water molecule.
2. Build the water molecule with the molecular kit **AND** draw the 3-D representation of water.
3. What do the sticks in the model represent? → _____
4. How many electrons are shared between the oxygen atom and EACH hydrogen atom? → _____
5. How many unshared electron pairs (lone pairs) are present in the molecule? → _____
6. Draw the Lewis structure for the carbon dioxide molecule.
7. Build the carbon dioxide molecule with the molecular kit **AND** draw the 3-D representation of carbon dioxide.
8. What is the molecular geometry (MG) of a carbon dioxide molecule? → _____

Station #2:

1. What does VSEPR stand for? → _____
2. What is the VSEPR theory based on? → _____
3. Build the CH_2O molecule with the molecular kit **AND** draw the 3-D representation of CH_2O .
4. What is the molecular geometry (MG) of a CH_2O molecule? → _____

Station #3:

1. Draw the Lewis structure for the CH₄ (methane) molecule.
2. Build the CH₄ molecule with the molecular kit **AND** draw the 3-D representation of CH₄.
3. What is the molecular geometry (MG) of a CH₄ molecule? → _____
4. Draw the Lewis structure for diatomic nitrogen, N₂.
5. How many shared pairs of electrons (bonds) are there? Name this bond. → _____ : _____
6. Build diatomic N₂ molecule with the molecular kit **AND** draw the 3-D representation of N₂. (**Hint: Use springs!**)

Station #4:

1. Draw three (3) structural isomers of C₅H₁₀O₅. *Be sure to follow the HONC rule!*
2. First identify each of the following as either ionic, molecular, or an acid **AND** then write the name or formula of each.
 - a. Li₂S → _____
 - b. Copper (II) Nitrate → _____
 - c. H₃PO₃ → _____
 - d. Silicon Tetraiodide → _____

Station #5:

1. Which has a longer bond length: single, double, or triple bonds? → _____
2. When drawing Lewis structures:
 - a. How many electrons are around every atom (except Hydrogen)? → _____
 - b. What is this called? → _____
3. Draw the Lewis structure for the NH_3 (ammonia) molecule.

4. Build the NH_3 molecule with the molecular kit **AND** draw the 3-D representation of NH_3 .

5. What is the molecular geometry (MG) of a NH_3 molecule? → _____

Station #6:

1. Draw the Lewis structure for the CH_3Br molecule.

2. Build the CH_3Br molecule with the molecular kit **AND** draw the 3-D representation of CH_3Br .

3. What is the molecular geometry (MG) of a CH_3Br molecule? → _____
4. Draw all possible resonance structures for the carbonate ion.

Station #7:

1. Why do electron pairs in the outer levels of atoms in a molecule spread as far apart as possible?
2. Draw the Lewis structure for oxygen difluoride.
3. Build the oxygen difluoride molecule with the molecular kit **AND** draw the 3-D representation of oxygen difluoride.
4. What is the molecular geometry (MG) of an oxygen difluoride molecule? → _____

Station #8:

1. What are the bond angles in a linear molecule? → _____
2. What are the bond angles in a trigonal pyramidal molecule? → _____
3. To predict molecular geometry (MG), it is necessary to know the _____ for the molecule.
4. How many total valence electrons are in the Lewis structures for:
 - a. PH_3 → _____
 - b. PCl_5 → _____
 - c. SO_4^{2-} → _____
5. Draw the Lewis structures for EACH of the molecules in #4.
 - a. PH_3 →
 - b. PCl_5 →
 - c. SO_4^{2-} →