#_____ Scientist: _____

Date: _____-_____-_____ HR: _____

Lab: "Making Models of Molecules"

The purpose of this lab is to make models of molecules and to learn about atoms and chemical bonds.

Investigation Plan:

1. Gather the following list of materials for your team: 4 spheres of 1 color of clay, 1 sphere of a different color of clay, 4 toothpicks, and a piece of paper towel.

The Water Molecule

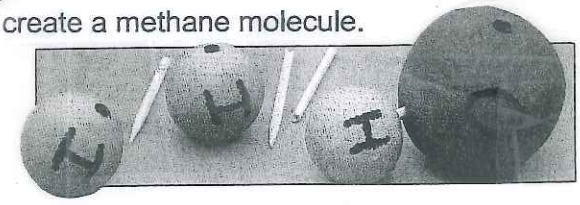
1. Roll 1 sphere from clay in a ball, between your hands, of one color. This sphere represents one atom.
2. Carve the letter O on it to represents the element _____. Then, place 2 dots on the atom by inserting 2 toothpicks in the positions shown on the diagram. These dots show how many chemical bonds one atom of oxygen can form.
3. Create 2 other clay spheres from different colored clay. Carve the letter H on it to represent the element _____ and place the appropriate number of dots for chemical bonds on it.
4. Use a toothpick to connect one dot on the oxygen atom with the dot on the hydrogen atom. Complete the molecule by connecting the remaining dots on the oxygen atom to hydrogen atoms. When all the bonds have been filled, your water molecule is complete.
5. Fill in the chart for the compound, water. To draw each molecule, use circles for atoms and straight lines for chemical bonds.
6. Disassemble your water molecule, as you will need to reuse these materials for the next molecule.

The Ammonia Molecule

7. Make 1 nitrogen atom from one color of clay. Carve a N to represent the element _____ and place 3 dots on the atom, as shown, in the diagram.
8. Create 3 hydrogen atoms from the other color of clay. Place ____ dot(s) on each of them.
9. Use a toothpick to connect one dot on the nitrogen atom with the dot on the hydrogen atom. Complete the molecule by connecting the remaining dots on the nitrogen atom to hydrogen atoms. When all the bonds have been filled, your ammonia molecule is complete.
10. Fill in the chart for the compound, ammonia.
11. Disassemble your ammonia molecule, as you will need to reuse the materials for the next molecule.

The Methane Molecule

12. Make 1 carbon atom, from one colored clay, using the diagram as a guide. Carve a C on it to represent the element _____.
13. Create ____ hydrogen atoms from the other color of clay.
14. Similar to the other 2 molecules that you already put together, create a methane molecule.
15. Fill in the chart for the compound, methane.
16. Disassembly your methane molecule.



Other:

17. Carefully, roll your atoms into a ball between your hands to improve their spherical shape. All toothpick holes and drawn on letters should disappear during this process.
18. Return all materials to their proper location and answer the questions on the back of this sheet.

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Observation(s):

Compound name	Elements in compound	Atoms in one molecule	Number of bonds	Drawing of molecule model
Water	oxygen, hydrogen ___ ___	1(O) ___ (H)		
Ammonia	nitrogen, hydrogen ___ ___	1(N) ___ (H)		
Methane	carbon, hydrogen ___ ___	1(C) ___ (H)		

Questions:

1. What did the toothpicks represent in this activity?

_____

2. How did you know when each molecule was complete?

_____

_____

Use What You Learned

Each molecule of propane gas contains three carbon atoms in a chain or line. Draw a model of one molecule of propane and predict how many hydrogen atoms are bonded to the three carbon atoms.

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