

Name \_\_\_\_\_

Pd \_\_\_\_\_ Sci #: \_\_\_\_\_

2 pts ec printing

## Colored Marshmallow Molecule Lab (71 pts total)

**Objective:** Create models of actual molecules using marshmallows.

**Materials:** marshmallows                      toothpicks                      colored pencils

**Procedure:** Each team of 2 students will complete this section

1. You will need the following number of marshmallows by color for this section

- a. Four \_\_\_\_\_ WHITE little marshmallows –                      hydrogen
- b. Two \_\_\_\_\_ YELLOW little marshmallows –                      oxygen
- c. One \_\_\_\_\_ BLUE little marshmallows –                      nitrogen
- d. One \_\_\_\_\_ LARGE PINK or WHITE marshmallows – carbon

2. Using the toothpicks and the appropriate marshmallow, make the following molecules by connecting the marshmallows with toothpicks. The marshmallows symbolize atoms and the toothpicks symbolize the bonds between atoms. Pay special attention to the type of bond noted in each box.

3. Draw a model of the molecules formed. Be sure to color the marshmallows with the corresponding colors. (2pts ea/10 total)

<b>Water – H<sub>2</sub>O</b>	<b>Hydrogen – H<sub>2</sub> (covalent bond)</b>	<b>Ammonia – NH<sub>3</sub></b>
<b>Carbon dioxide – CO<sub>2</sub> (double bond)</b>	<b>Methane – CH<sub>4</sub></b>	

Give an example of how each compound is used or found in nature. Be sure to use complete sentences. (5 pts)

Water - \_\_\_\_\_

Hydrogen - \_\_\_\_\_

Ammonia - \_\_\_\_\_

Carbon Dioxide - \_\_\_\_\_

Methane - \_\_\_\_\_

**Conclusion For this section: 2 sentences each. 7 words minimum per sentence. Each worth 2 pts (6 total)**

1. Describe how the molecular models you assembled are different from real molecules.

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2. Describe how the molecular models you assembled are similar to real molecules.

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3. Describe how molecular models might prove to be helpful to scientists.

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In teams of 4 you will use colored marshmallows to represent certain elements and toothpicks to represent these bonds, or forces that hold them together. When we combine the elements in very specific ways, we will create a model of a specific compound.

Use the following chart to build your molecule models for this section:

Element	Symbol	Color of Marshmallow	Number
Hydrogen	H	small white	11
Oxygen	O	yellow	14
Carbon	C	LARGE PINK/White	12
Nitrogen	N	small pink	3
Sodium	Na	red	2
Chlorine	Cl	green	2

Step 1: Write the symbol of each element on the marshmallow.

Step 2: Use toothpicks to represent the bonds between the elements.

Step 3: Glue the marshmallow molecule to the paper.

Step 4: Neatly write the formula for your molecule at the top of your paper.

Step 5: Neatly write the name for your molecule at the bottom of your paper.

Step 6: Make sure your name is on the back of your paper.

**Molecular Formulas for compounds (molecules) Build and record on last page. Data table worth:10 pts**

Molecular Formula	Compound Name	Number of Elements	Names of Elements	Number of atoms of each element	Total number of atoms in one molecule
1. H <sub>2</sub> O	Water	2	Hydrogen Oxygen	H = 2 O = 1	3
2. H <sub>2</sub> O <sub>2</sub>	Hydrogen Peroxide				
3. C <sub>12</sub> H <sub>22</sub> O <sub>11</sub>	Table Sugar				
4. CH <sub>2</sub> O	Formaldehyde				
5. CHNO	Caffeine				
6. CO <sub>2</sub>	Carbon Dioxide				

Please do NOT eat our molecules/atoms while doing this experiment: Build these. Record on Last Page

Hydrogen- $H_2$ Oxygen- $O_2$ Sodium Hydroxide- $NaOH$ Carbon Dioxide- $CO_2$	Carbonic Acid- $H_2CO_3$ Hydrochloric Acid- $HCl$ Nitrogen Gas- $N_2$ Sodium Chloride - $NaCl$	Carbon Monoxide- $CO$ Ammonia- $NH_3$ Ozone- $O_3$
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**Marshmallow Molecule Discussion Questions/Conclusion:** Each question is worth 1 pt./conclusion 5 pts (20 pts)

1. A molecule of carbon dioxide is made of one atom of \_\_\_\_\_ and two atoms of \_\_\_\_\_
2. A molecule of hydrogen peroxide is made from two atoms of \_\_\_\_\_ and \_\_\_\_\_ atoms of \_\_\_\_\_
3. Hydrogen, oxygen and chlorine gas are unique elements because their atoms always occur in nature in \_\_\_\_\_  
Because of this they are called diatomic.
4. \_\_\_\_\_ is used to strip wax from floors and clean windows and it has one atom of nitrogen and 3 atoms of \_\_\_\_\_.
5. \_\_\_\_\_ has one more \_\_\_\_\_ atom than \_\_\_\_\_.  
However, carbon monoxide is poisonous and carbon dioxide is essential to plant life.
6. DRANO is known by its scientific name of \_\_\_\_\_ which is composed of one atom of each of the following elements: \_\_\_\_\_, \_\_\_\_\_ and hydrogen.
7. Sodium chloride is also known as \_\_\_\_\_ and it consists of one atom of \_\_\_\_\_ and \_\_\_\_\_ atom of \_\_\_\_\_.
8. We find \_\_\_\_\_ acid in our soft drinks. The chemical formula for it consists of 2 atoms of \_\_\_\_\_ and one atom of \_\_\_\_\_ and 3 atoms of \_\_\_\_\_
9. \_\_\_\_\_ gas, made up of \_\_\_\_\_ atoms of oxygen is being destroyed.  
But we breathe \_\_\_\_\_ gas, which is made up of \_\_\_\_\_ atoms of oxygen.
10. The technical name for the acid in our stomach is \_\_\_\_\_ and it is made up of \_\_\_\_\_ atom of \_\_\_\_\_ and \_\_\_\_\_ atom of \_\_\_\_\_.
11. Which of the molecules you made are just elements? \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_
12. How do you know they are elements? \_\_\_\_\_
13. Which of the molecules you made are compounds? \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_  
\_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_
14. How do you know they are compounds? \_\_\_\_\_
15. How are atoms and molecules related? (use your book if necessary) \_\_\_\_\_
16. How are elements and compounds related? \_\_\_\_\_
- 17: **Lab Conclusion:** what did you learn, what did you like, how will this help you (5 sentence minimum. 5 pts)  
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\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Draw Your Structures Here. Use the correct colored pencils (matching the marshmallows) to show the different elements (1 pt ea) 20pts

1. H <sub>2</sub> O	Hydrogen-H <sub>2</sub>	Nitrogen Gas-N <sub>2</sub>	Carbon Monoxide- CO
2. H <sub>2</sub> O <sub>2</sub>	Oxygen- O <sub>2</sub>	Ozone- O <sub>3</sub>	Sodium Chloride -NaCl
3. C <sub>12</sub> H <sub>22</sub> O <sub>11</sub> (3 pts)		Carbon Dioxide- CO <sub>2</sub>	Hydrochloric Acid-HCl
		Carbonic Acid- H <sub>2</sub> CO <sub>3</sub>	(2 pts)
4. CH <sub>2</sub> O		Sodium Hydroxide- NaOH	
5. CHNO (2 pts)		Ammonia- NH <sub>3</sub>	