## Idea Exchange


My Name: **Andria Stafford**

My School: **Fort Nelson Secondary School**

My email: **astafford@husky.sd81.bc.ca**


## Activity Details

Activity Name: Marshmallow Molecules

Targeted Grade Levels: Grade 8 (though I see no reason why it would not work for grades 5 – 10)

Subject or Topic Area: Physical Science (helping students learn the differences between element and compounds; and the difference between atoms and molecules)

**Note**: This lab is based on something that I saw somewhere at some time – so if it is 'borrowed' from you I do apologize but I never knew who it truly 'belonged' to.

## Additional Notes:

As you can see by the table below you will require a lot of marshmallows (depending on how many students you have and how big the groups are). You will require at least **SIX** different colours of marshmallows and I recommend that white be used to represent oxygen as that requires the most and white is the easiest to find.

You could use regular sized marshmallows if you wanted but I use the mini – marshmallows. I bought a package of white mini – marshmallows and a package of coloured mini – marshmallows but when I got home I discovered that I only had five different colours (a big problem).

So I made up a large beaker full of blue food colouring and water and dumped it full of white mini – marshmallows and then I put a second (slightly smaller) beaker on top to push the marshmallows totally into the water. I let them soak for two hours and then I laid them out on plastic wrap to dry (do not use paper towel or the marshmallows stick to it and do not easily separate when dry) over the weekend and by Monday morning I had six different colours of marshmallows. They dye very easily and it does not come off on your fingers (an added bonus).

The other option to get another colour is to have old dried out marshmallows and then have your students use markers to colour on them (it does not work so well on fresh marshmallows)

| Element | Symbol of Element | Colour | Number of atoms (marshmallows) required |
|---|---|---|---|
| Hydrogen | H | | 11 |
| Nitrogen | N | | 3 |
| Sodium | Na | | 2 |
| Carbon | C | | 3 |
| Chlorine | Cl | | 2 |
| Oxygen | O | WHITE | 14 |

I hope your kids have fun with this – mine did! And more importantly it made some of them finally get the difference between elements and compounds; and how atoms make up molecules.

# Marshmallow Molecules

Date: _____

Name(s): _____

**Define the following words:**

1. Element:

2. Compound:

3. Atom:

4. Molecule:

**KEY:** Fill in the below key indicating what colour of marshmallow will be used to represent each element and write in the symbol of each element. Then using the formulas below count up the number of atoms needed of each element.

| Element | Symbol of Element | Colour | Number of atoms (marshmallows) required |
|---|---|---|---|
| Hydrogen | | | |
| Nitrogen | | | |
| Sodium | | | |
| Carbon | | | |
| Chlorine | | | |
| Oxygen | | | |

**Directions:** Use the key above and the formulas below to build each of the following molecules. You will require marshmallows, toothpicks and a partner.

**PLEASE DO NOT EAT OUR ATOMS OR MOLECULES WHILE DOING THIS LAB.**

**Formulas**

| | |
|---|---|
| Hydrogen Gas = $H_2$ | Nitrogen Gas = $N_2$ |
| Oxygen Gas = $O_2$ | Hydrogen Peroxide = $H_2O_2$ |
| Sodium Hydroxide = NaOH | Sodium Chloride = NaCl |
| Carbon Dioxide = $CO_2$ | Carbon Monoxide = CO |
| Carbonic Acid = $H_2CO_3$ | Ammonia = $NH_3$ |
| Hydrochloric Acid = HCl | Ozone Gas = $O_3$ |

# Marshmallow Molecule Discussion Questions

(all the answers come from the above table, the definitions above and the molecules that you made)

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 _____, they are called diatomic.
4. _____ is used to strip wax from floors and clean windows and it has one atom of nitrogen and three 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 two atoms of _____ and one atom of _____ and three atoms of _____.
9. _____ gas, made up of _____ atoms of oxygen is being destroyed. But we breath _____ 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 one atom of _____ and one atom of _____.
11. Which of the molecules you made are elements? _____, _____, _____, and _____.
12. How do you know they are elements? _____

    _____

    How many of the molecules you made are compounds? _____
13. How do you know they are compounds? _____

    _____
14. How are atoms and molecules related? _____

    _____
15. How are elements and compounds related? _____

    _____