Name _____

Marshmallow Madness!

Recently in class you have been learning about the history of the atom and the parts that make up an atom. Today your kitchen will be assigned two elements to "build" out of marshmallows.

Kitchen One: ${}^{3}_{1}\mathrm{H}$ and ${}^{34}_{16}S^{2-}$

Kitchen Two: ${}^{5}_{2}\mathrm{He}$ and ${}^{32}_{15}\mathrm{P}^{3-}$

Kitchen Three: ${}^{17}_{8}O^{-2}$ and ${}^{29}_{14}\mathrm{Si}$

Kitchen Four: ${}^{10}_{4}\mathrm{Be}$ and ${}^{37}_{17}Cl^{1-}$

Kitchen Five: ${}^{12}_{5}\mathrm{B}$ and ${}^{20}_{9}F^{1-}$

Kitchen Six: ${}^{13}_{6}\mathrm{C}$ and ${}^{15}_{7}\mathrm{N}^{3-}$

You will be provided with a large colored marshmallows and mini marshmallows. The protons and neutrons are about 1000 times bigger than the electrons of an atom. While the large colored marshmallows are certainly not 1000 times bigger than the mini marshmallows, it will it least help you remember that the protons and neutrons are bigger. ☺

The Rules

1. Pick one color to represent protons and one color to represent neutrons. The white mini marshmallows will represent the electrons.

2. Determine how many protons, neutrons and electrons your assigned elements have. Use the example below to help you:

   If you were assigned ${}^{139}_{56}\mathrm{Ba}$, it would have…

   56 protons…because it has an atomic # of 56

   56 electrons…because it is neutral, you need to have positive and negative particles "balance"

   83 neutrons…because the mass number is 139, and the mass number is the protons plus neutrons added together, so…

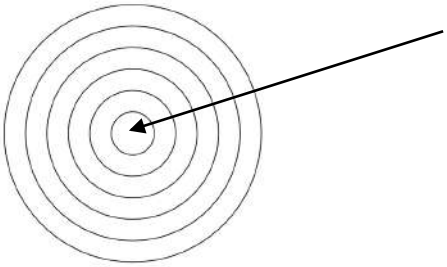
   139 (Protons + Neutrons) – 56 (Protons only) = 83 Neutrons

3. Count out the appropriate number of marshmallows.

4. Glue your "proton and neutron" marshmallows to the center of a piece of butcher paper/mini poster board. (Don't worry about the "electron marshmallows" yet).

5. Look at which horizontal row your element is in on the periodic table. The row that your element is in tells you how many levels of electron clouds there are. (Barium, for example, has six "layers" worth of electron clouds because it is in the 6th row of the periodic table).

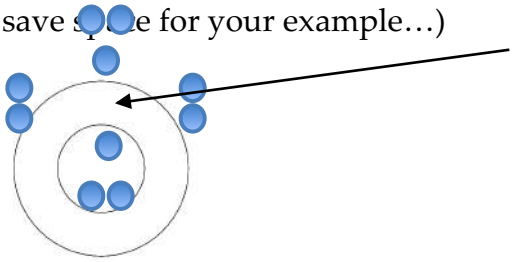
6. Draw the right number of circles around your proton/neutron marshmallows. (1 circle if your element is in the first row, 2 circles if your element is in the second row, etc.) Barium is done for you below as an example. *Only draw however many circles you need – don't automatically draw six just because that is how many are in this example!*



7. Each layer of electron clouds can only hold a certain amount of electrons maximum. Use these guidelines to determine how many electron "mini marshmallows" should be glued to each circle:

   1st layer: 2 electrons maximum
   2nd layer: 8 electrons maximum
   3rd layer: 18 electrons maximum

   The first two layers of Barium are shown here as an example. (You should show *all* of your layers – this was just to save space for your example…)



8. Glue the correct number of mini marshmallows to each circle.

9. Label your assigned isotope ($^{139}_{56}$Ba, for example) at the top. Create a "legend" box to tell people what each color marshmallow represents. (Pink = protons, green = neutrons, white = electrons, for example)

10. You're all done!