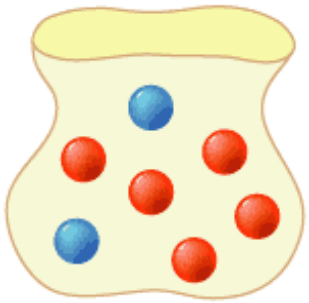
Activity: Bags O'Atoms (Part 3)

Materials: 4 Bags O' Atoms, Balance Record your four bag numbers here: _____ _____ _____ _____

You have learned that some atoms of the same element have different numbers of neutrons, and these are called *isotopes* of the element. Atoms always have an overall charge of zero because the # of protons and # of electrons are equal. What happens if the number of protons and electrons are *not* equal? Examine the bags you are given and answer the questions that follow.

1. Count the pieces of each of your bag and complete the data table below.



Bag #	# Blue Stones (Protons)	# Clear Stones (Neutrons)	# Black Dots (Electrons)

2. Using the # of protons, identify the elements you have in your "bags". USE THE PERIODIC TABLE to find the element symbol, name, group number, and normal electron configuration.

Bag #	Element Symbol	Element Name	Group	Electron Configuration of the Atom

3. Look at the black dots (electrons) on the outside of each bag. Record the electron configuration on each of your bags here. Decide if your bag has more or less electrons than the atoms on the periodic table.

Bag #	Electron Configuration on Bag	More or less electrons than Periodic Table?

4. Why are the electron configurations on your bags different than the electron configurations from the periodic table? What do you think happened?

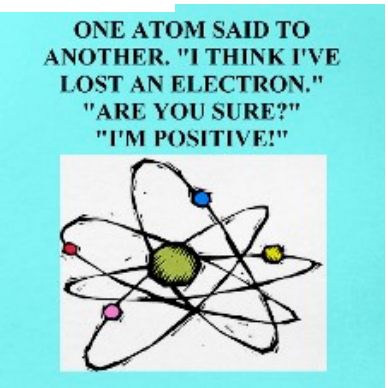
5. If blue stones are protons (+ charge), and black dots are electrons (- charge), and clear stones are neutrons (0 charge), calculate the overall charge be on each of your "element" bags:

Bag #				
# of positive particles in your bag				
# of negative particles on outside of your bag				
Overall Charge				

6. Notice the overall charge on your bags is NOT zero anymore. Why not? What changed?

7. Make the connection between more/less electrons than the atom and +/- overall charge. Try the matching below by drawing a line from the left column to the corresponding charge in the right column.

Lost electrons	overall charge is 0
Gained electrons	overall charge is +
No change in electrons	overall charge is –



8. When the # of protons and # electrons are NOT equal any more, the particle is NOT called an atom any more. *It is now called an ION*. There are two types of ions, CATIONS and ANIONS. Look up these terms, and decide which of your bags represent cations and which bags represent anions. Put your bag #s in the appropriate area below:

Cations

Anions

9. Does a neutral atom *gain* or *lose* electrons to become a cation? _____

10. Is a cation *bigger* or *smaller* than the original atom? Explain your answer.

11. Which atoms become cations, metals or nonmetals? _____

12. What groups of the periodic table contain atoms that become cations? _____

13. Does a neutral atom *gain* or *lose* electrons to become an anion? _____

14. Is an anion *bigger* or *smaller* than the original atom? Explain your answer.

15. Which atoms become anions, metals or nonmetals? _____

16. What groups of the periodic table contain atoms that become anions? _____

17. Define the following words:

Ion –

Valence Electron –

Stable Octet –

Anion –

Cation –