

### SCH 3U - Atomic Properties Graphing Assignment

1. Write a clear precise definition for the three main atomic properties:
  - Atomic Radius
  - Ionization Energy
  - Electronegativity
2. Create a data table to show numerical values for all three atomic properties for the first twenty five elements only. The headings in your data table should read as follows.

Name of Element	Atomic Symbol	Atomic Radius (Å)	Ionization Energy (V)	Electro-negativity (Paulings)
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The values for atomic radius, ionization energy and electronegativity can be found on the back side of the periodic table you have purchased. Use the key found in the bottom left hand corner to locate each atomic property. Ionization energy is called first ionization potential on your periodic table.

3. Make three separate graphs entitled:
  - Atomic Radius vs Element
  - Ionization Energy vs Element
  - Electronegativity vs Element
- a) For all three graphs, use the longer of the two possible axis for the Element Symbol. This will be the horizontal axis. Plot information for the first 25 elements only. This means one element per major division on the graph paper works well. Label this axis Element Symbol. This is the independent variable.
- b) The vertical axis of each graph will contain the dependent variables, one of the three atomic properties from above. Label each axis appropriately. Be sure to include units in each case (i.e. Atomic Radius (Å) where the funny looking A is for Angstroms).
- c) Choose an appropriate scale for each vertical axis. To do this you must find the largest value you will need to plot from your data table. Whatever scale you choose, it must accommodate this largest value. The vertical axis will have 18 large divisions. Therefore, divide the largest value by 18 to get the minimum possible value for the scale division. The value you obtain however will be unworkable as a scale division and must be rounded up to give a more workable value. To do this round the scale division up to the nearest value that contains **ONLY ONE** of the digits: 1,2,4 or 5. Your scale division can contain as many 0's as you like.

Possible acceptable scale divisions go up by:

10, 20, 40, 50  
0.1, 0.2, 0.4, 0.5  
100, 200, 400, 500  
0.001, 0.002, 0.004, 0.005 etc. scale

Unacceptable scale divisions are 0.25 or 0.3

0.25 is unacceptable because it contains more than one of the digits 1,2,4 or 5  
0.3 is unacceptable because it contains a "3"

4. Add vertical (as in up and down) lines to each graph that separate the periods. In other words, draw a line between He and Li, Ne and Na, Ar and K.

Complete the following questions right on these sheets and add to your graphs. Use point form please (single words when possible):

1. What is a period on the periodic table? Be specific.
2. What is a group or family on the periodic table? Be specific.
3. What is true about the number of valence electrons with any particular group or family?
4. Write the group number, name and all symbols for the eight groups found in the main group of elements.

FAMILY #	NAME OF FAMILY	ELEMENT SYMBOLS
I		
II		
III		
IV		
V		
VI		
VII		
VIII		

5. Identify the elements with the largest atomic radius in each period. You will need to consult the periodic table for the periods that you did not graph. Write out the symbols for these elements and write the name of the family to which they belong.
6. Identify the elements with the smallest atomic radius in each period. Write out the symbols for these elements and write the name of the family to which they belong.
7. State a generalization about atomic radii within any given period you have graphed so far. (The periods should be divided by the dotted lines)
8. Compare the atomic radii within at least three different families of elements and then state a generalization about atomic radii as you go down any family in the periodic table.

9. Identify the elements with the largest ionization energy in each period. Write out the symbols for these elements and write the name of the family to which they belong.
10. Identify the elements with the smallest ionization energy in each period. Write out the symbols for these elements and write the name of the family to which they belong.
11. State a generalization about ionization energies within any given period you have graphed so far.
12. Compare the ionization energies within at least three different families of elements and then state a generalization about ionization energies as you go down any family in the periodic table.
13. Identify the elements with the largest electronegativity in each period. Write out the symbols for these elements and write the name of the family to which they belong.
14. Identify the elements with the smallest electronegativity in each period. Write out the symbols for these elements and write the name of the family to which they belong.
15. State a generalization about electronegativities within any given period you have graphed so far.
16. Compare the electronegativities within at least three different families of elements and then state a generalization about electronegativities as you go down any family in the periodic table.
17. Complete this table using the words increases and decreases to summarize the above results.

	ACROSS A PERIOD (LEFT TO RIGHT)	DOWN A GROUP
ATOMIC RADII		
IONIZATION ENERGIES		
ELECTRONEGATIVITIES		