**Graphing Periodic Trends**

Name and date (3 points):

The Periodic Table is arranged according to the Periodic Law. The Periodic Law states that when elements are arranged in order of increasing atomic number, their physical and chemical properties show a periodic pattern. These patterns can be discovered by examining the changes in properties of elements on the Periodic Table. The properties that will be examined in this lesson are: atomic size, ionization potential, and electronegativity.

NOTE: Use the Sargent-Welch Periodic Table posted on the Chemistry portal. You will find the data you need on the backside of the Table.

“Period” = a particular row on the Periodic Table. Sodium (Na) occurs in the 3rd period.

“Group or Family” = a particular column on the Periodic Table. The Oxygen Family is Group 16.

Define these terms

1. Atomic Radius –
2. First Ionization Potential (or ‘energy’) –
3. Electronegativity –

Graph 1: Atomic Radius

Plot the Atomic Radius in Angstroms (Å) on y-axis, versus Atomic Numbers #1-36 (Hydrogen through Krypton) on x-axis. Then draw a vertical line (in red pencil?) that indicates the beginning of each period (period = row on the Periodic table).

On the blank Periodic Table below, draw two (2) big arrows indicating increasing atomic radius.







Atomic Radius, continued…

1. How does atomic radius change as you move from left to right across a period? Explain your answer in terms of the *number of protons in the nucleus*. Research this, don’t guess!
2. How does atomic radius change as you move from top to bottom in a group? Explain your answer in terms of the *number of electron shells*. Research this!

Graph 2: First Ionization Potential

Plot the First Ionization Potential in Volts (V) on y-axis, versus Atomic Numbers #1-36 on x-axis. Then draw a vertical line (in red pencil?) that indicates the beginning of each period (period = row on the Periodic table).

On the blank Periodic Table below, draw two (2) big arrows indicating increasing ionization potential.



1. Why does ionization energy change in the way it does as you move from left to right across a period? Explain your answer in terms of the *number of protons in the nucleus.* Don’t guess; research this!
2. Why does ionization energy change in the way it does as you move from top to bottom in a group? Explain your answer in terms of *electron shells.* Don’t just guess!

Graph 3: Electronegativity

Plot the Electronegativity (has no units) on y-axis, versus Atomic Numbers #1-36 on x-axis. Then draw a vertical line (in red pencil?) that indicates the beginning of each period (period = row on the Periodic table).

On the blank Periodic Table below, draw two (2) big arrows indicating increasing atomic radius.

1. Are there any exceptions to the trend in electronegativity as we move from left to right across a period? If so, explain what the exception is and why you think this occurs.
2. Why does electronegativity change the way it does as you move from top to bottom in a group? Explain your answer in terms of *electron shells.* Research it, don’t guess!