**Discovering Periodic Trends Webquest**

**Objective:** To discover the Periodic Trends of specific physical properties of the elements related to their position on the periodic table.

**Background**: 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. Students can discover these patterns by examining the changes in properties of elements on the Periodic Table. The properties that will be examined in this lesson are: atomic radius, first ionization energy, and electronegativity.

**Lesson:**In this exercise you will look at a few physical properties of elements and how those properties are related to their position on the Periodic Table. Analyze the data found on the Periodic Table sites to answer the questions listed below.

**Part 1:** Background information and Atomic Radius

1. Using the link provided, write down a definition for the following terms. <http://chem.libretexts.org/Core/Inorganic_Chemistry/Descriptive_Chemistry/Periodic_Trends_of_Elemental_Properties/Periodic_Trends>
   1. atomic radius:
   2. ionization energy:
   3. electronegativity:
2. Compare the definitions you found online compared to the textbook. Are there any discrepancies between the two? Explain.
3. Using the Periodic table site, determine the atomic radius of the first 3 elements of the second and third rows (Li, Be, B and then Na, Mg, Al). Be sure to include the units for each! <http://periodictable.com/Properties/A/AtomicRadius.st.html>
   1. Li:
   2. Be:
   3. B:
   4. Na:
   5. Mg:
   6. Al:
4. What appears to be the trend as you move from left to right in a row? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. What appears to be the trend as you move down in a column? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. Is the pattern for atomic radius absolute or general (always true or generally true)? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. Using Microsoft Excel, create a graph that compares the atomic number of the element to the atomic radius. You will only need data for the first 56 elements. Be sure to label your axes and title your graph. You will attach the graph to the back of this packet.

**Part 2:** Ionization Energy

1. Using the Periodic table site, determine the 1st ionization energy of the first 3 elements of the second and third rows (Li, Be, B and then Na, Mg, Al). Be sure to include the units for each! <http://periodictable.com/Properties/A/IonizationEnergies.st.html>
   1. Li:
   2. Be:
   3. B:
   4. Na:
   5. Mg:
   6. Al:
2. What appears to be the trend as you move from left to right in a row? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. What appears to be the trend as you move down in a column? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Is the pattern for 1st Ionization energy absolute or general (always true or generally true)? \_\_\_\_\_\_\_\_\_\_\_
5. Using Microsoft Excel, create a graph that compares the atomic number of the element to the 1st Ionization energy. You will only need data for the first 56 elements on the periodic table. Be sure to label your axes and title your graph. You will attach the graph to the back of this packet.

**Part 3:** Electronegativity

1. Using the Periodic table site, determine the electronegativity of the first 3 elements of the second and third rows (Li, Be, B and then Na, Mg, Al). Be sure to include the units for each! <http://periodictable.com/Properties/A/Electronegativity.st.html>
   1. Li:
   2. Be:
   3. B:
   4. Na:
   5. Mg:
   6. Al:
2. What appears to be the trend as you move from left to right in a row? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. What appears to be the trend as you move down in a column? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Is the pattern for electronegativity absolute or general (always true or generally true)? \_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. Using Microsoft Excel, create a graph that compares the atomic number of the element to the electronegativity. Your graph will need to include data on the first 56 elements of the periodic table. Be sure to label your axes and title your graph. You will attach the graph to the back of this packet.