

Periodic Trends WebQuest

Purpose:

Your job today is to research the periodic trends of certain properties of elements. The outcomes of this will be:

1. Define the various properties of the elements.
2. You will be able to explain how the properties of each element relate to its position on the Periodic Table of Elements
3. You will construct 3 graphs using Excel or other program to illustrate what you have learned about the periodicity of the elements.

Procedure:

With one partner, follow the instructions on each page of this site.

Type up your answer packet to upload to your site.

Your finished work should look finished and everything should have a font size of 12.

What to turn in:

A typed and neatly formatted answer packet

3 graphs

The periodic trends that you are going to be studying are: • Atomic radius

- Electronegativity
- Ionization energy
- Metallic characteristics
- Ionic Radius for anions and cations
- Number of valence electrons

Part I: Definitions

Find definitions for the following terms:

1. Atomic radius (there are four ways to measure it)
 - a. Covalent Radius
 - b. van der Waals Radius
 - c. Metallic Radius
 - d. Atomic Radius
2. Electronegativity
3. Ionization energy
4. Metallic characteristics
5. Ionic Radius
6. Number of valence electrons

Part II. Use the [Cool Periodic Table link](#).

Use the data sheets that follow to compile the information from this page.

For each of the **first three** elements in **Periods 2 and 3**, find the Atomic Radius

1. What appears to be the trend in atomic radius as you move across a Period?
2. What appears to be the trend in atomic radius as you move down a group?
3. **Predict** the change in atomic radius of the next elements in a row (**C, Si**), **then check** those properties. Do they match your predictions?

4. **Check** the atomic radius of the next elements in the series (N,P). How do they fit the predicted pattern?
5. Characterize the patterns as either absolute or general **and** explain your answer.

Repeat the same steps and questions, but look at the property of **first ionization energy** and then repeat again for **electronegativity**.

Data sheet for **Part II** - Atomic Radius

Atomic Radii for several elements		
Li	Be	B
Na	Mg	Al

Answers to questions about atomic radius.

1.

2.

3.

4.

5.

Data sheet for **Part II** - First Ionization Energy

First Ionization Energy for several elements		
Li	Be	B
Na	Mg	Al

Answers to questions about first ionization energy

1.

2.

3.

4.

5.

Data sheet for **Part II** -Electronegativity

Electronegativity for several elements		
Li	Be	B
Na	Mg	Al

Answers to questions about electronegativity.

1.

2.

3.

4.

5.

Part III - Graphing your data

You will be turning in your three graphs when you finish

In this portion of the activity you are going to **graph** the relationship between three atomic properties and the atomic numbers of the **first 56 elements**.

- You will be making graphs for first ionization energy, electronegativity, and atomic radius.
- Make appropriate graphs for these properties, one for each. Be sure that each graph includes a title, labeled axes, and units of measurement when appropriate.
- The data for each property can be easily found in your Reference Tables.
- All of the data needs to be represented using graphs that you make using a computer.

There are two things that need to be written by hand on each of the three graphs:

1. The symbol of each element should be written in next to the point plotted on the graph.
2. Brackets should be drawn on the graphs to indicate which elements belong to the same periods of the Periodic Table.

Part IV - An assortment of questions

- 1) Explain the relationship between x and y variables on your graphs.

- 2) Explain what happens to the size of an atom when it becomes an anion.

- 3) Explain what happens to the size of an atom when it becomes a cation.

- 4) Where do you think you would find the most metallic elements of the Periodic Table? Why?

- 5) How is the group number related to the number of valence electrons?

- 6) Identify the group number for each of the following:
 1. Alkali metals:
 2. Alkaline Earth Metals
 3. Halogens
 4. Noble Gases

- 7) Identify the 7 metalloids.