

Periodicity

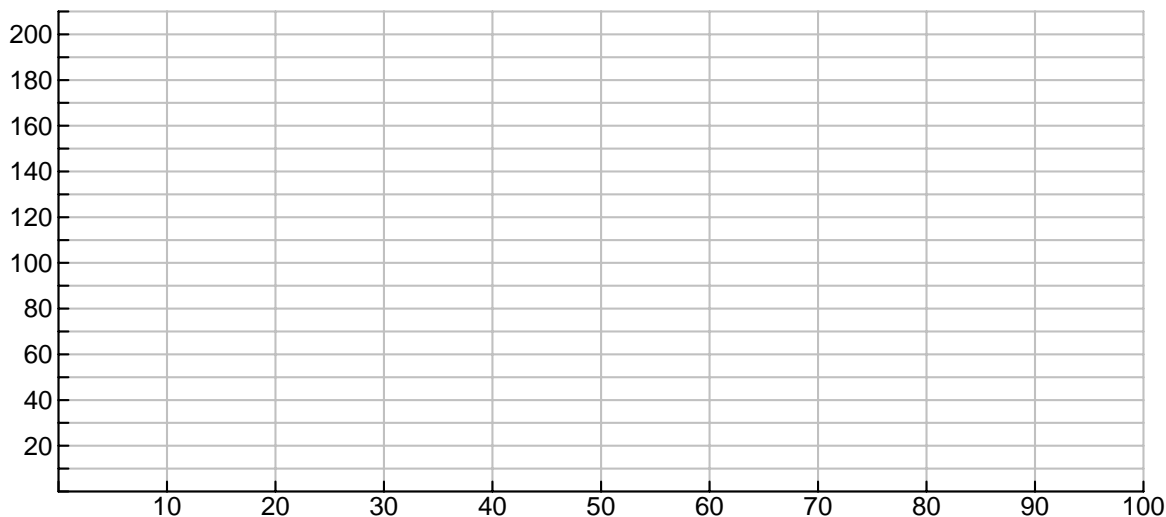
For many years scientists tried to classify and organize the elements that create the world around us. It was not until the late 1800's when a number of scientists were able to observe certain properties of the known elements and began to organize them in systematic way. Below is a table of properties of many of the known elements. [Periodic Table](#)

Objective:

Different properties of the elements will be plotted and from this, a system of organization for the elements will be developed.

Name	Symbol	Atomic Number	Atomic Mass	Atomic Radius	Ionize Potential	Electroneg
Hydrogen	H	1	1.01	37	13.6	2.2
Helium	He	2	4	0	24.59	0
Lithium	Li	3	6.941	152	5.39	1
Beryllium	Be	4	9.012	111	9.32	1.5
Boron	B	5	10.81	80	8.3	2
Carbon	C	6	12.01	77	11.26	2.5

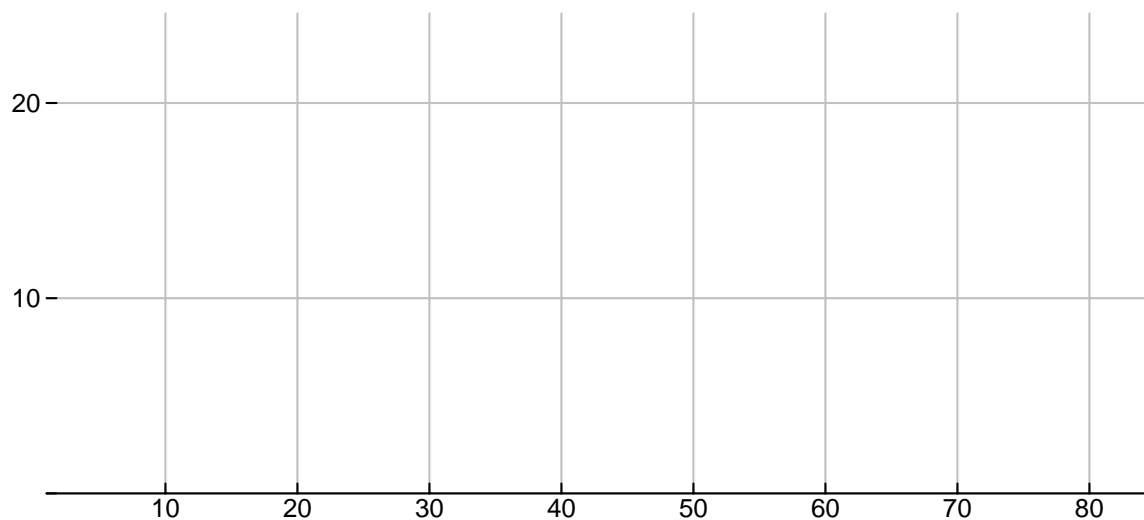
- Plot the atomic number (Z) on the x-axis and atomic mass on the y-axis. Add appropriate labels.
 - Double Click on the graph
 - The data is in a spread sheet the x values are in column c and the y values are in column d.



Questions:

- Is there a relationship between atomic number and atomic mass. Explain.
- What does the atomic number represent?
- What is atomic mass? Explain in detail.
- Is there an observable periodic trend in the plot?
- Is the atomic mass dependent on the atomic number? Explain.

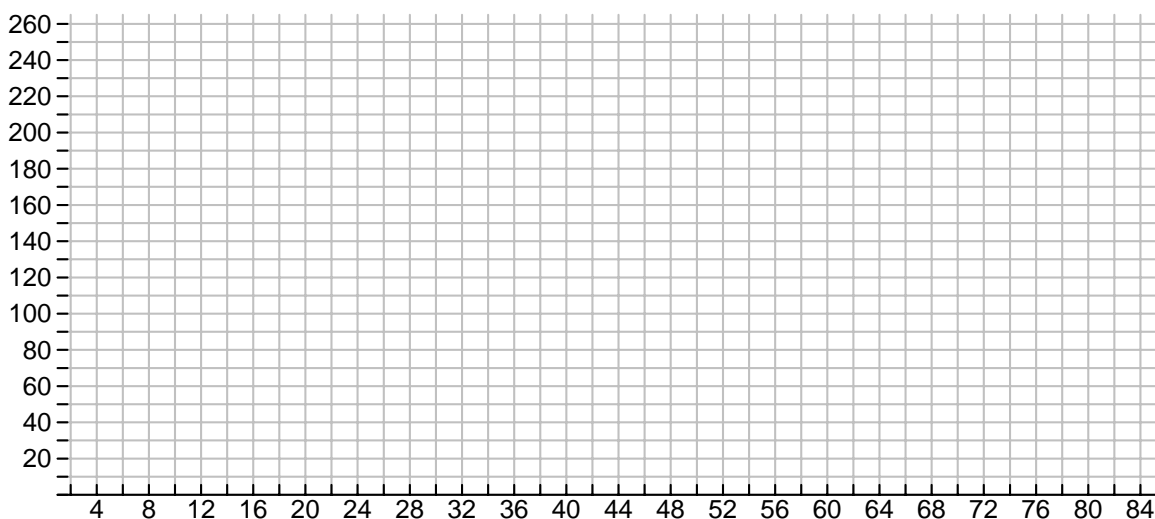
2. Plot atomic number on the x-axis and ionization potential on the y-axis and label the plot appropriately.
- Label each Noble gas with its symbol.
 - Label each Alkali metal.



Questions:

1. Define ionization potential.
2. Does this plot show a periodic trend? Explain.
3. If there is a periodic trend, determine the maximum of each period and record the atomic number. Repeat for the minimum of each period.

3. Atomic radii is determine the bond length created between two atoms. Plot atomic number (Z) on the x-axis and atomic radii on the y-axis and label.
- A. Label each Period.

**Questions:**

1. Define bond length.
2. Define atomic radius.
3. Record the minimum atomic number of the minimum atomic radii.
4. Does atomic radius increase with atomic number? What reasons would it or would it not increase?
5. How can an atom have an atomic radius of zero?

Analysis:

1. Hydrogen bonds to oxygen in a ratio of 2 hydrogen to one oxygen. Sodium also bonds to oxygen in this ratio. What other elements would bond with oxygen in a two to one oxygen ratio?
2. Fluorine bonds to sodium in a one to one ratio. What other elements would have this similar property?