

In 1912, Mosely summarized the properties of the elements with relation to their atomic number in a law, which states:

“The properties of the elements are a periodic function of their atomic numbers”

In this activity, you will study the relationship between the atomic numbers of the elements and some of their physical properties. You will compare data on such properties as the ionization energy and the atomic radius of some of the elements with their atomic numbers. You will be graphing elements in the **alkali metal, nitrogen, oxygen, halogen, noble gas** families.

Read and follow these directions carefully to make your graphs:

[1] Plan to make two line graphs.

[2] The atomic number should be plotted on the horizontal axis. Remember, no skipping numbers even though you are not plotting every single element! You must never change the scale you have chosen.

[3] Ionization energy and atomic radius should be plotted on the vertical axis. You are making two separate graphs and the vertical scale for each will be quite different.

[4] Circle each point and label it with the symbol of each element.

[5] Some of the elements will have consecutive atomic numbers. H, He, and Li are examples. Connect the points representing consecutive elements by a solid line in pencil. Use a broken or dashed line to connect the points representing elements that are not consecutive. For example, Li with an atomic number of 3 should be connected with a broken line to N with the atomic number of 7.

[6] Figure out which elements belong to the same family. Connect the elements of the same family with solid lines, *each with a different color.*

[7] Create a key in which you identify the families that relate to the colors you use.

Periodic Table Trends

Element	Graph 1&2 x-axis	Graph 1 y-axis	Graph 2 y-axis
	Atomic Number	Ionization Energy (Electron Volts)	Atomic Radius (Angstroms)
H	1	13.6	0.37
He	2	24.6	0.8
Li	3	5.4	1.23
N	7	14.5	0.74
O	8	13.6	0.74
F	9	17.4	0.722
Ne	10	23.6	1.1
Na	11	5.1	1.57
P	15	11.0	1.10
S	16	10.4	1.04
Cl	17	13.0	0.99
Ar	18	15.8	1.5
K	19	4.3	2.03
As	33	10.5	1.21
Se	34	9.8	1.17
Br	35	11.8	1.14
Kr	36	14.0	1.7
Rb	37	4.2	2.16
Sb	51	8.6	1.41
Te	52	9.0	1.37
I	53	10.4	1.33
Xe	54	12.1	1.9
Cs	55	3.9	2.35