

Name: _____ Per _____

Periodic Trends lab

I. **Purpose:** In your own words write the purpose of this lab

II. **Data:** Fill out the following Chart:

Element	Number of Protons/Electrons for a Neutral Atom	Row Number	Group Number	Electron Configuration for the neutral atom	Ion	Number of Electrons in the Ion
Hydrogen					H ⁺	
Helium					He	
Lithium					Li ⁺	
Beryllium					Be ²⁺	
Boron					B ³⁺	
Carbon					C ⁴⁺	
Nitrogen					N ³⁻	
Oxygen					O ²⁻	
Fluorine					F ⁻	
Neon					Ne	
Sodium					Na ⁺	
Magnesium					Mg ²⁺	
Aluminum					Al ³⁺	
Silicon					Si ⁴⁺	
Phosphorus					P ³⁻	
Sulfur					S ²⁻	
Chlorine					Cl ⁻	
Argon					Ar	
Potassium					K ⁺	
Calcium					Ca ²⁺	

III. **Procedure:**

a. Using the data below you will make three graphs.

i. **Atomic and Ionic Radius vs. Atomic Number**

- Plot the atomic radius for each element. Connect the points with a line. Color the points and line and label the color on the legend beside atomic radius.
- Plot the ionic radius for each element. Connect the points with a line. Color the points and line and label the color on the legend beside ionic radius.

ii. **Ionization Energy vs. Atomic Number**

- Plot the ionization energy for each element. Connect the points with a line.

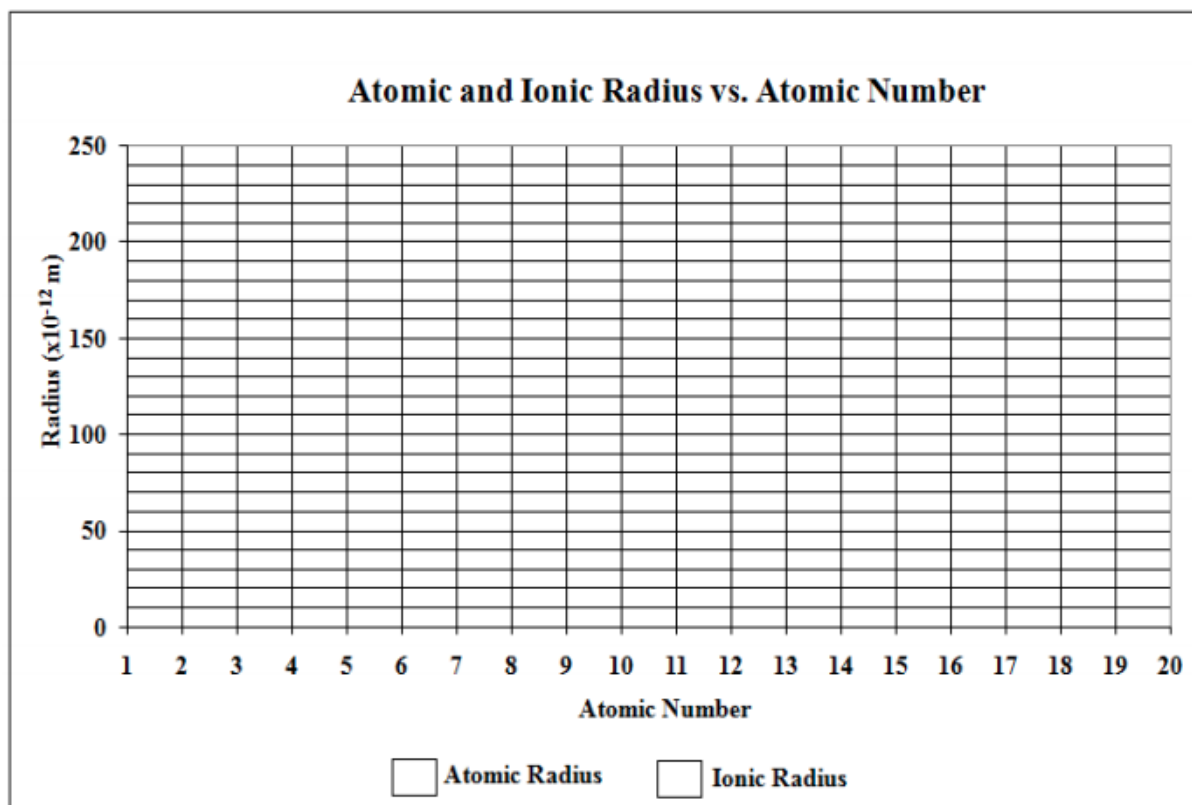
iii. **Electronegativity vs. Atomic Number**

- Plot the electronegativity for each element. Connect the points with a line.

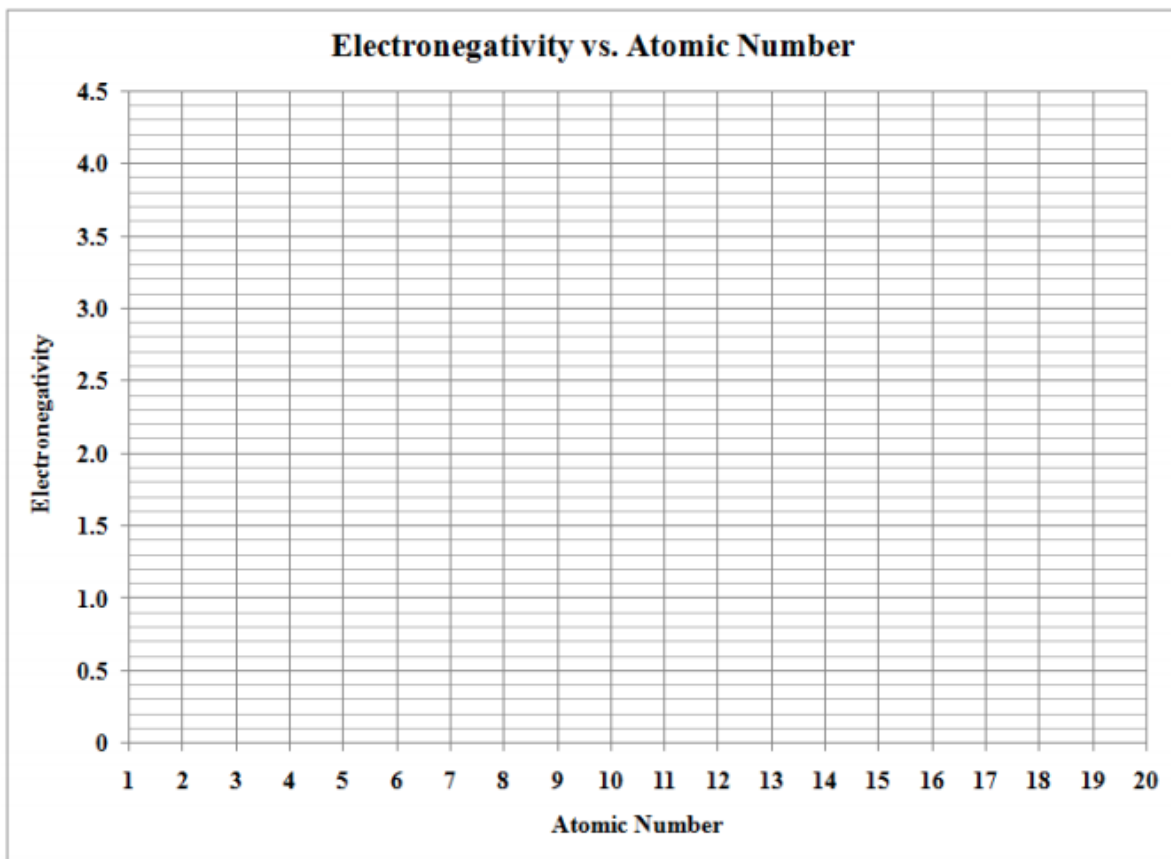
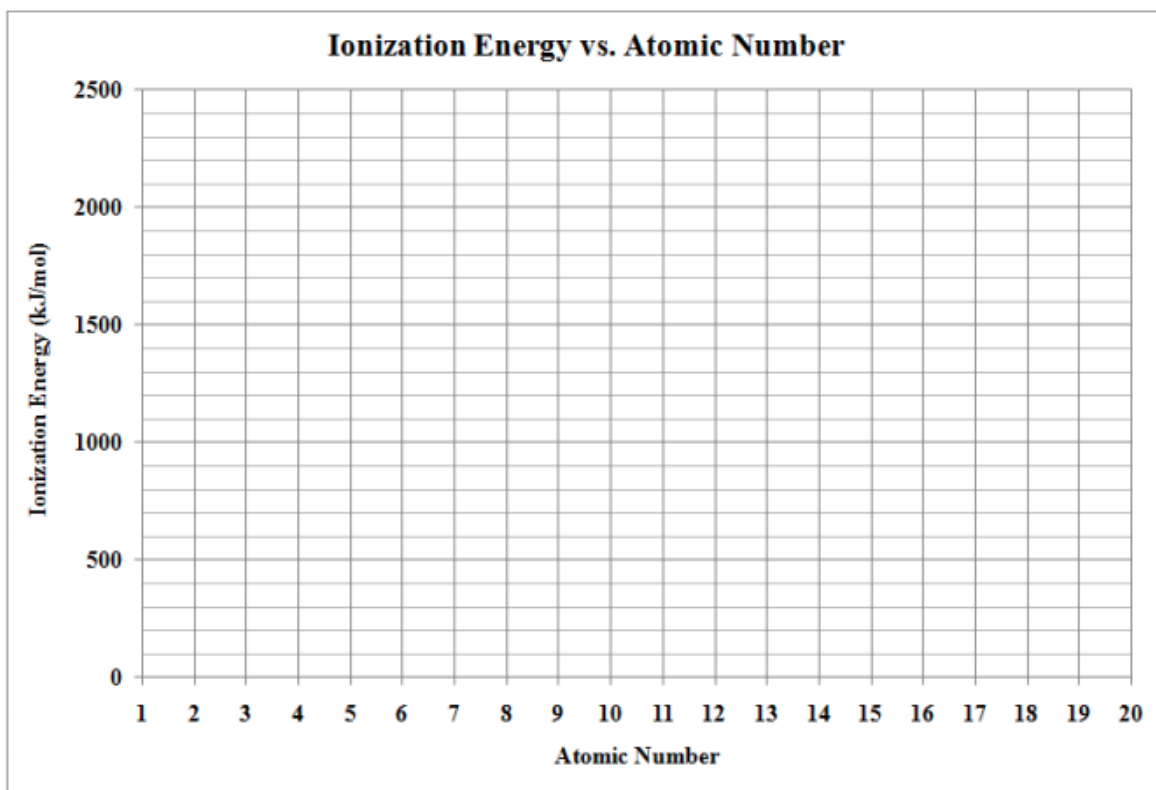
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IV. Data and Graphs:

Element	Atomic Number	Atomic Radius (x 10 ⁻¹² m)	Ionization Energy (kJ/mol)	Electronegativity	Ion	Ionic Radius (x 10 ⁻¹² m)
Hydrogen	1	37	1312	2.1	H ⁺	0
Helium	2	32	2372	0	He	No Ion/32
Lithium	3	152	519	1.0	Li ⁺	60
Beryllium	4	111	900	1.5	Be ²⁺	31
Boron	5	88	799	2.0	B ³⁺	27
Carbon	6	77	1088	2.5	C ⁴⁺	15
Nitrogen	7	70	1406	3.0	N ³⁻	146
Oxygen	8	66	1314	3.5	O ²⁻	140
Fluorine	9	64	1682	4.0	F ⁻	136
Neon	10	62	2080	0	Ne	No Ion/62
Sodium	11	186	498	0.9	Na ⁺	95
Magnesium	12	160	736	1.2	Mg ²⁺	65
Aluminum	13	143	577	1.5	Al ³⁺	50
Silicon	14	117	787	1.8	Si ⁴⁺	26
Phosphorus	15	110	1063	2.1	P ³⁻	212
Sulfur	16	104	1000	2.5	S ²⁻	184
Chlorine	17	99	1255	3.0	Cl ⁻	181
Argon	18	94	1519	0	Ar	No Ion/94
Potassium	19	231	418	0.8	K ⁺	133
Calcium	20	197	590	1.0	Ca ²⁺	99



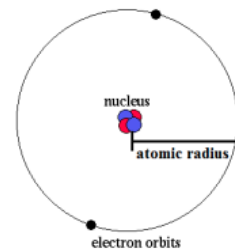
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V. **Questions:**

Atomic Radius: Atomic radius is the size of an atom. The atomic radius is measured as distance from the nucleus to the farthest electron shell.



- 1) Look at your graph for **Atomic Radius**, what overall trends do you notice?

- 2) What happens to the **atomic radius** as you go down a group? Compare the atomic radius for Lithium, Sodium, and Potassium.

As you go down each group of the periodic table, atomic radius _____

- 3) What happens to **atomic radius** as you go across a row? Compare the atomic radius for Lithium, Beryllium, Boron, Carbon, Nitrogen, Oxygen, Fluorine and Neon.

As you go across each row of the periodic table, atomic radius _____

Ionic Radius: Ionic radius is the radius of an atom's ion.

- 1) What happens to the **ionic radius** as you go down a group? Compare the ionic radius for Lithium ion, Sodium ion, and Potassium ion.

As you go down each group of the periodic table, the ionic radius for CATIONS _____

- 2) What happens to the **ionic radius** as you go down a group? Compare the ionic radius for Fluorine ion and Chlorine ion.

As you go down each group of the periodic table, ionic radius for ANIONS _____

- 3) What happens to **ionic radius** as you go across a row? Compare the ionic radius for Lithium ion, Beryllium ion, Boron ion, Carbon ion, Nitrogen ion, Oxygen ion, and Fluorine ion.

As you go across each row of the periodic table, ionic radius _____

Ionization Energy: Ionization energy is the energy required to remove one electron from an atom.

- 1) Look at your graph for **ionization energy**, what overall trends do you notice? _____

- 2) What happens to the **ionization energy** as you go down a group? Compare the ionization energy for Lithium, Sodium, and Potassium.

As you go down each group of the periodic table, ionization energy _____

- 3) What happens to **ionization energy** as you go across a row? Compare the ionization energy for Lithium, Beryllium, Boron, Carbon, Nitrogen, Oxygen, Fluorine, and Neon.

As you go across each row of the periodic table, ionization energy _____

Electronegativity: Electronegativity is the measure of the ability of an atom in a chemical compound to attract the electrons of the other atom in a bond.

- 1) Look at your graph for **Electronegativity**, what overall trends do you notice? _____

- 2) What happens to the **electronegativity** as you go down a group? Compare the electronegativity for Lithium, Sodium, and Potassium.

As you go down each group of the periodic table, electronegativity _____

- 3) What happens to **electronegativity** as you go across a row? Compare the electronegativity for Lithium, Beryllium, Boron, Carbon, Nitrogen, Oxygen, Fluorine, and Neon.

As you go across each row of the periodic table, electronegativity _____