

## Graphing Directions:

Graph 1: Graph the Atomic Radius for each element in Period 2 in one color. On the same graph, graph the atomic radius for each element in Period 3 in a second color, Period 4 in a third color and period 5 in a fourth color. Make sure to label the key for which color is which period.

Graph 2: Repeat the process above for the electronegativity for each element in Period 2, 3, 4 and 5. Make sure to label the key for which color is which period.

Graph 3: Repeat the process above for the 1<sup>st</sup> Ionization Energy for each element in Period 2, 3, 4 and 5. Make sure to label the key for which color is which period.

## Questions and Analysis:

1. In general, as you go across a period, what happens to the

A) Atomic radius? decrease      B) Ionization energy? increase      C) Electronegativity? increase

2. ~~Where are~~ <sup>were</sup> there exceptions to these general trends? AR-NO EN-NO IE-NO

If Yes, What Exceptions? ionization energy should increase, decrease, then increase again because of +1- ions

3. The elements in the same group are graphed up and down in each of the graphs. For example elements 4, 12, 20, and 38 are all in group 2A. In general as you go down a group, what happens to the

A) Atomic radius? increase      B) Ionization energy? decrease ~~increase~~      C) Electronegativity? (EN) decrease

4. ~~Where are~~ <sup>were</sup> there exceptions to these general trends? AR-NO EN-YES IE-YES

If Yes, What Exceptions? EN-group 13, 14 IE-group 13

5. Radium is in the seventh period.

a. Would you expect it to be larger or smaller than barium? Larger Why? AR trend

b. Would you expect it to be larger or smaller than francium? smaller Why? ↓

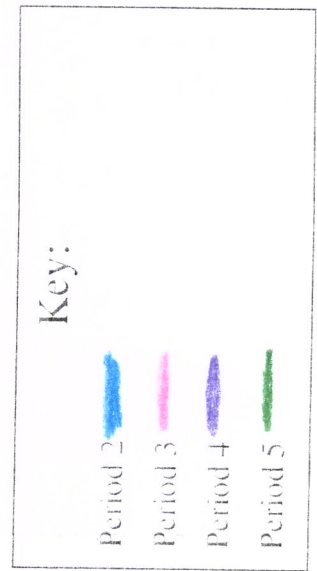
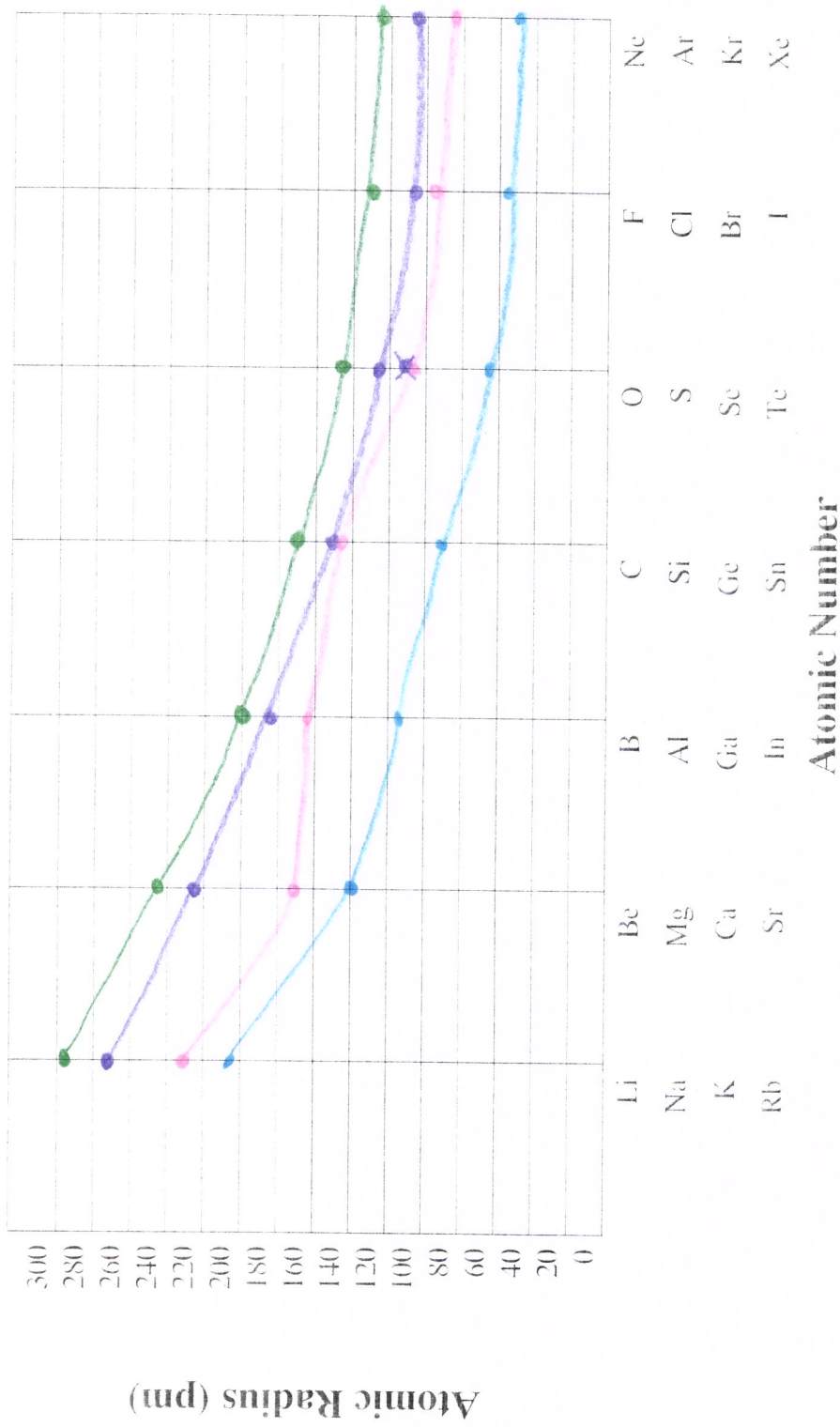
c. Would you expect its ionization energy to be larger than barium's? smaller Why? IE trend

d. Would you expect its ionization energy to be larger than francium's? larger Why? ↓

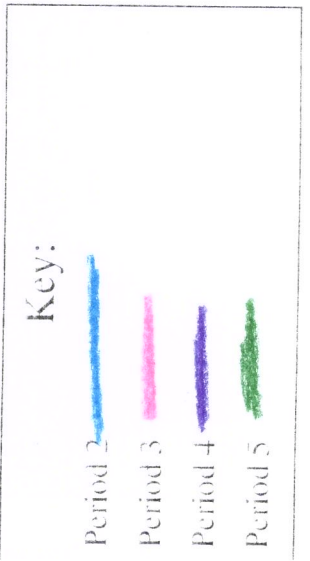
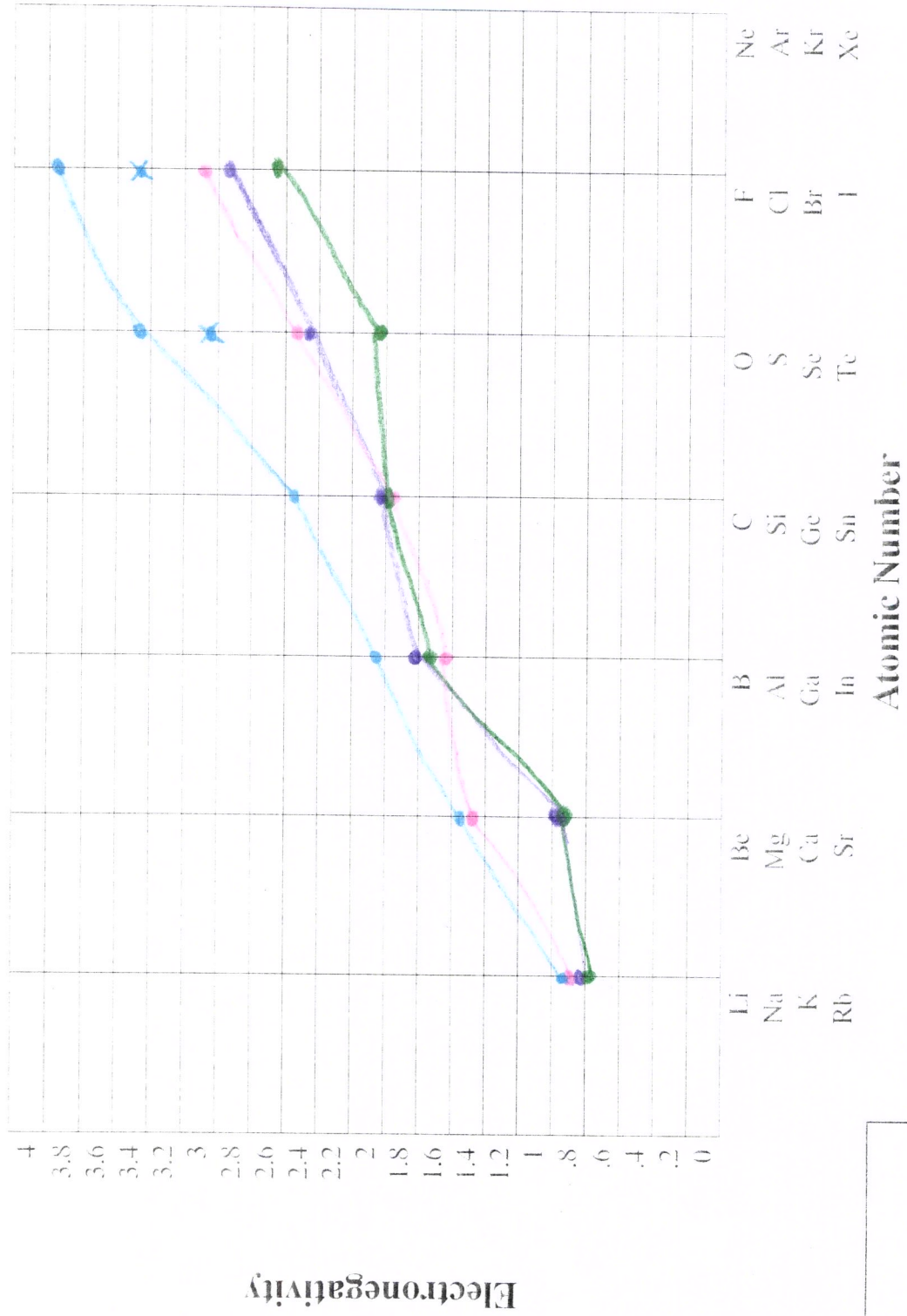
e. Would you expect its electronegativity to be larger than barium's? smaller Why? EN trend

f. Would you expect its electronegativity to be larger than francium's? larger Why? ↓

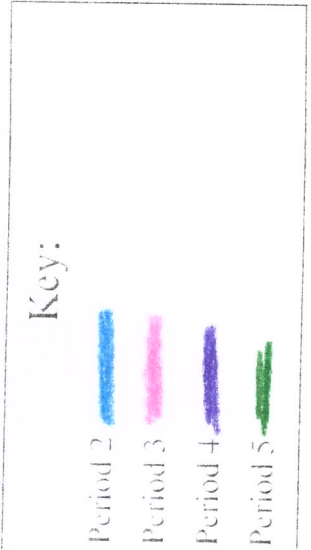
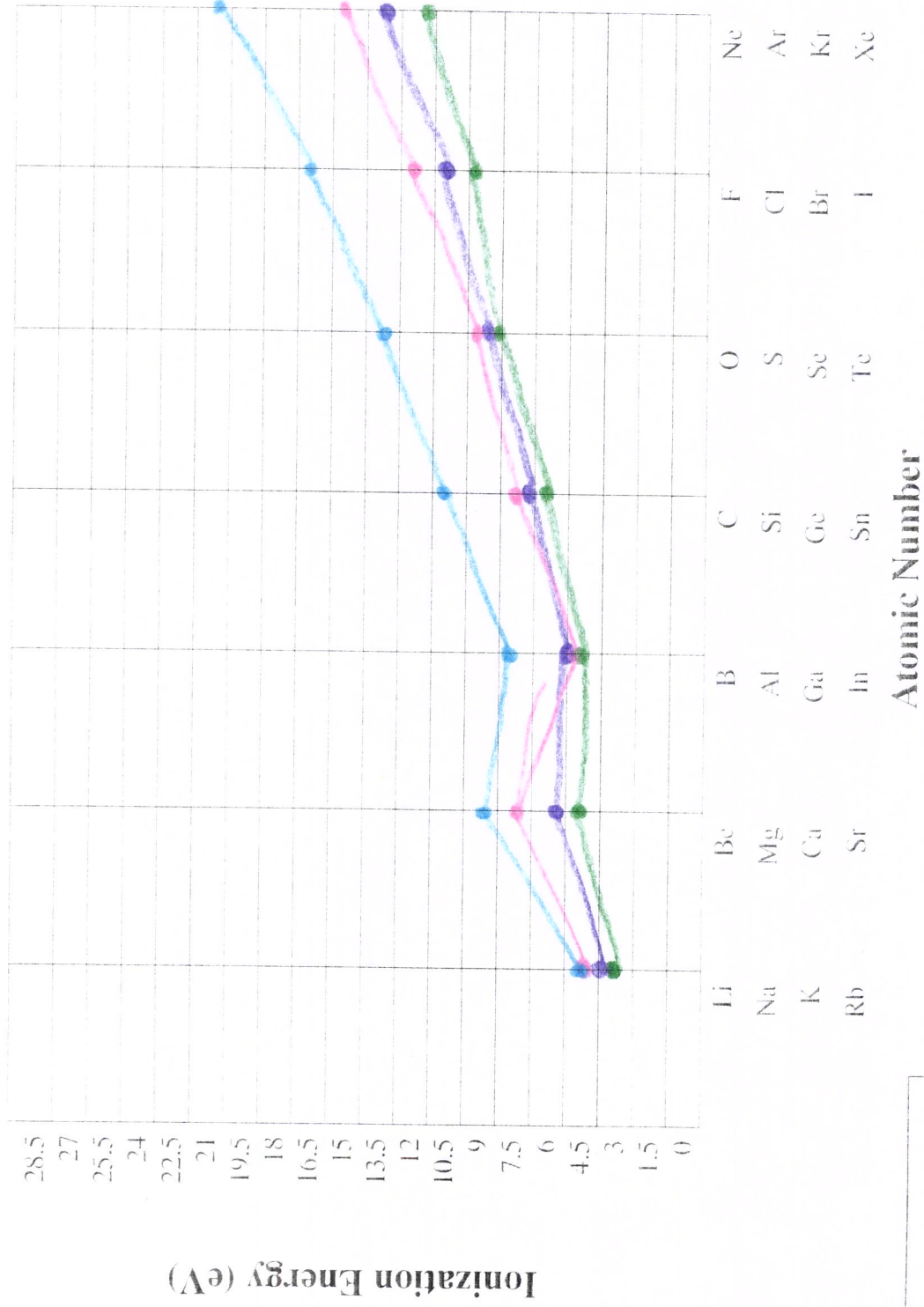
**Graph 1: Atomic Radii**  
**(Must be a LINE GRAPH)**



**Graph 2: Electronegativity**  
**(Must be a LINE GRAPH)**



**Graph 3: 1<sup>st</sup> Ionization Energy (eV)**  
**(Must be a LINE GRAPH)**



## Discovering Periodic and Group Trends

Below is a table of properties of the representative elements in the first five periods. By graphing this data we will discover how they change as you go across a period and down a group. There are analysis questions on the back of this page that should be answered after the graphs are drawn.

#	Symbol	1 <sup>st</sup> Ionization Energy (eV)	Atomic Radius	Electronegativity	Period	Group	Name
1	H	13.60	79	2.2	1	1A	Hydrogen
2	He	24.59	49		1	8A	Helium
3	Li	5.39	205	0.98	2	1A	Lithium
4	Be	9.32	140	1.57	2	2A	Beryllium
5	B	8.30	117	2.04	2	3A	Boron
6	C	11.26	91	2.55	2	4A	Carbon
7	N	14.53	75	3.04	2	5A	Nitrogen
8	O	13.62	65	3.44	2	6A	Oxygen
9	F	17.42	57	3.98	2	7A	Fluorine
10	Ne	21.56	51		2	8A	Neon
11	Na	5.14	223	0.93	3	1A	Sodium
12	Mg	7.65	172	1.31	3	2A	Magnesium
13	Al	5.99	162	1.61	3	3A	Aluminum
14	Si	8.15	146	1.9	3	4A	Silicon
15	P	10.49	123	2.19	3	5A	Phosphorus
16	S	10.36	109	2.58	3	6A	Sulfur
17	Cl	12.97	97	3.16	3	7A	Chlorine
18	Ar	15.76	88		3	8A	Argon
19	K	4.34	277	0.82	4	1A	Potassium
20	Ca	6.11	223	1	4	2A	Calcium
31	Ga	6.00	181	1.81	4	3A	Gallium
32	Ge	7.90	152	2.01	4	4A	Germanium
33	As	9.81	133	2.18	4	5A	Arsenic
34	Se	9.75	122	2.55	4	6A	Selenium
35	Br	11.81	112	2.96	4	7A	Bromine
36	Kr	14.00	103		4	8A	Krypton
37	Rb	4.18	298	0.82	5	1A	Rubidium
38	Sr	5.70	245	0.95	5	2A	Strontium
49	In	5.79	200	1.78	5	3A	Indium
50	Sn	7.34	172	1.96	5	4A	Tin
51	Sb	8.64	153	2.05	5	5A	Antimony
52	Te	9.01	142	2.1	5	6A	Tellurium
53	I	10.45	132	2.66	5	7A	Iodine
54	Xe	12.13	124		5	8A	Xenon

Name \_\_\_\_\_

Period: \_\_\_\_\_ Date: \_\_\_\_\_