



For the following data, plot the atomic number on the x-axis and the property on the y-axis. Each property should be graphed on a separate sheet of graph paper. Please see me if you need help using Excel. After proper graphs are plotted please answer the questions below. This exercise serves two purposes – illustrating periodic trends, and getting you comfortable dealing with raw data in order to convert it into a useful form.

Element	Atomic Number	Atomic Radius (pm)	1 <sup>st</sup> Ionization Energy (kJ/mol)	Electron Affinity (kJ/mol)	Electro negativity (Pauling Units)
H	1	53	1312	-73	2.1
He	2	31	2372	0	NA
Li	3	167	520	-60	1.0
Be	4	112	899	240	1.5
B	5	87	801	-27	2.0
C	6	67	1086	-122	2.5
N	7	56	1402	0	3.0
O	8	48	1314	-141	3.5
F	9	42	1681	-328	4.0
Ne	10	38	2081	0	NA
Na	11	190	496	-53	0.9
Mg	12	145	738	230	1.2
Al	13	118	578	-44	1.5
Si	14	111	787	-134	1.8
P	15	98	1012	-72	2.1
S	16	88	1000	-200	2.5
Cl	17	79	1251	-349	3.0
Ar	18	71	1521	0	NA

### Analysis

- 10) Based on your graphs, what is the trend in atomic radius across a period? down a family?
- 11) Based on your graphs, what is the trend in ionization energy across a period? down a family?
- 12) Based on your graphs, what is the trend in electron affinity across a period? down a family?
- 13) Based on your graphs, what is the trend in electronegativity across a period? down a family?

Based on the concept of periodic trends, answer the following questions for these atoms: Li, Be, Mg, Na

- 14) Which element has the highest first ionization energy?
- 15) Which element has the lowest electronegativity?
- 16) Which element has the least metallic character?
- 17) Which element is the largest atom?

Based on the concept of periodic trends, answer the following questions for these atoms: P, S, Cl, F

- 18) Which element has the highest first ionization energy?
- 19) Which element has the highest electronegativity?
- 20) Which element has the least metallic character?
- 21) Which element has the largest ion?

Based on the concept of periodic trends, answer the following questions for these atoms: Au, Zn, S, Si

- 22) Which element has the highest first ionization energy?
- 23) Which element has the highest electronegativity?
- 24) Which element has the most metallic character?
- 25) Which element has the largest atom?

## **PowerPoint Shows on the Groups of the Periodic Table**

You will be working in small groups (2 or 3) in order to come up with a PowerPoint presentation on a group of elements. There are 18 groups (as you know), and the lanthanides and actinides to choose from. I will count this as a 100 point Exam. Additionally, I will grade the quality, content, and overall appeal of the shows.

### **Purpose:**

In this activity you and your partner will explore a group of elements. Your small team will learn about the history of the discovery of these elements and how those discoveries have led to many new and practical applications. You will also learn how to use a variety of resources to gain the required information.

### **Specifically you will present about:**

- Chemical symbols of elements you studied
- Patterns found in the physical properties of the elements, including atomic number, atomic mass, and the number of protons, neutrons and electrons.
- The appearance, sources and human uses of elements.
- Historical development (when, where and by whom it was discovered) that led to human understanding of these elements

***In other words you should become experts on your family of elements. Please use any media needed, including movies, sound, and graphics.***

### **Instructions:**

#### **PowerPoint Presentation:**

You will prepare a **PowerPoint Presentation**, which will be presented to the class. This presentation must include information about each element in the family your team is researching, as well as an explanation as to why these elements were grouped together (e.g., their similarities). Your project should include much of the following about EACH element:

- Element number, name and chemical symbol, Atomic mass
- Group name, Number of electrons, protons and neutrons
- Properties, state in standard conditions (solid, liquid or gas at room temperature)
- Appearance, boiling point AND melting point
- Color; is the element radioactive?
- Discovery (who, what, when, where)
- Sources (where does this element come from?)
- Uses (what can it be used for?)
- A picture of your element, if possible.
- Citation of all sources used in your project
  - If you are unaware of how to properly cite your sources please see me. Copying material from the web, or any other source is called plagiarism and will result in a 0, which will not help your overall average.
- Finally, I would like a summation slide that illustrates the highpoints of the presentation. What was important, why are these elements **noteworthy**?

***I will leave it up to you to come up with the best order in which to present this information.***

***You may consult me for help with the PowerPoint program, or the presentation of the material. The presentation should be 12-15 minutes in length. I would like to see four shows per block if possible. For those that pick either of the f-blocks we'll need a bit more time. BE CREATIVE!***