**4. The Elements homework (Chemistry)**

Name and date submitted (3 pts):

Instructions: Create space in the Word document below, and write or type your answers. Turn in your completed work as an email attachment.

(20 questions, 100 points possible).

Questions 1-6: The Periodic Table. You will need to use the Internet and your textbook to research these questions.

1. Lavoisier, in 1793, produced a list of thirty substances that he declared could not be broken down into simpler substances. He called them “elements”. What did he do wrong?
2. Dalton, in 1803, produced his own list of elements, some of which were wrong. What is the story behind that?
3. Dobereiner, in 1829, arranged his elements by *atomic mass*, grouping them in “triads”. Some didn’t hold up. Give the story…
4. Newlands, in 1864, arranged the elements in *octaves* (groups of 8), and saw a connection with the musical “octave”. What was the reasoning behind this?
5. Mendeleev, in 1869, arranged his elements by *atomic mass*. Elements with the same chemical properties were placed in the same “Groups” or columns.

1. Why did he leave some empty spaces in his table? Explain.
2. What did his *Periodic Law* state? Summarize.

1. State the modern ‘Periodic Law’. Be careful, it differs *slightly* from Mendeleev’s version.
2. What does the atomic number “Z” of an element tell us?
3. What does the atomic mass “A” (also known as ‘atomic weight’) tell us about an element?

1. What are the general physical properties of metals? In other words, why do we call some elements on the Periodic Table, “metals”?
2. What are the general physical properties of non-metals? In other words, why do we call some elements on the Periodic Table, “non-metals”?
3. Explain the term “metalloids”.
4. Atomic radius
5. In general, atomic radii (increase) / (decrease) in size as you move from left to right across a given row.
6. Why is this the case? Explain in some detail.
7. Ionization energy
8. Ionization energy of an atom is the energy we need to supply in order to remove \_\_\_\_\_\_\_\_\_\_\_\_\_.
9. Ionization energies generally (increase) / (decrease) as we move from left to right across a given row.
10. Explain why this is the case. I’m looking for 2-3 well-written sentences.
11. Electron affinity
12. Electron affinity is the amount of energy released or given-off when we add \_\_\_\_\_\_\_\_\_\_\_.
13. In general, electron affinity (increases) / (decreases) as we move from left to right across a row.
14. Explain why.
15. Electronegativity
16. Electronegativity is a term developed by the brilliant U.S. chemist named \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
17. Explain the concept of “electronegativity”.
18. List the top 3 elements in order of their electronegativity. Your Sargent-Welch Periodic Table has this information on the back.
19. How many elements are on the modern Periodic Table?
20. Alkali metals (Group 1)
21. Show the symbols of the first 4 alkali metals. (Hint: lithium, sodium, potassium, rubidium). For each one, give the number of protons, neutrons, and electrons in the neutral atom. (The above figure may help with this). Arrange this information in a nice, neat table here.
22. Davy isolated the alkali metals in what year?
23. What are their physical properties?
24. What are their chemical properties?
25. Where do we get the term, “alkali metals”? (will require Internet research)
26. Alkaline-earth metals (Group 2)
27. Show the symbols of the first 5 alkaline-earth metals. (Hint: start with Beryllium). For each one, give the number of protons, neutrons, and electrons in the neutral atom. Arrange this information in a nice, neat table here.
28. What are their physical properties?
29. What are their chemical properties?
30. Where do we get the term, “alkaline-earth metals”? (may require Internet research)
31. Oxygen family (Group 16)
32. Show the symbols of the first 3 elements in the Oxygen family. (Hint: start with Oxygen). For each one, give the number of protons, neutrons, and electrons in the neutral atom. Arrange this information in a nice, neat table here.
33. Oxygen itself was discovered by the famous chemist/clergyman named \_\_\_\_\_\_\_\_\_\_\_\_\_ in 1774.
34. How did he discover oxygen? Describe his process.
35. The chemical properties of Oxygen and Sulfur are similar. Summarize what they are.
36. What are some of the many uses for Selenium? (may require Internet research)
37. Halogen family (Group 17)
38. Show the symbols of the first 4 elements in the Halogen family. (Hint: start with Fluorine). For each one, give the number of protons, neutrons, and electrons in the neutral atom. Arrange this information in a nice, neat table here.
39. How was Chlorine discovered/recognized in 1771? Describe the process.
40. How was Iodine discovered/recognized in 1811? Describe the process.
41. Try to summarize the chemical properties of the halogen group.