Chemistry Unit 2: Atomic Structure, Electrons, and Periodic Table

Chapter 4, 5, and 6

Graduate Learner Outcome: As a Henry County graduate, I will apply scientific and engineering practices to understand and analyze the nature of matter, the characteristics of compounds and chemical reactions, and the characteristics of atoms and elements.

Pretest Score: _____ **Post Test Score:** _____

Unit 2 Goal: Write a goal that you have for this unit.

Standards and Learning Targets:

SC1. Obtain, evaluate, and communicate information about the use of the modern atomic theory and periodic law to explain the characteristics of atoms and elements.

a. Evaluate merits and limitations of different models of the atom in relation to relative size, charge, and position of protons, neutrons, and electrons in the atom.
   - I can describe the contributions of Thomson, Rutherford, and Bohr to the understanding of the atom.
   - I can explain the merits and limitations of the Thomson, Rutherford, Bohr, and current model of the atom.
   - I can evaluate merits and limitation of different models of the atom in relation to relative size, charge, and position of protons, neutrons, and electrons in the atom.

b. Construct an argument to support the claim that the proton (and not the neutron or electron) defines the element's identity.
   - I can explain what an element is.
   - I can define atomic number and mass number and explain what it communicates about an element or isotope.
   - I can explain what an ion is.
   - I can determine the number of protons, neutrons, and electrons in a given atom, ion, or isotope.
   - I can use the periodic table to discover the atomic number of an element.
   - I can construct an argument to support the claim that the proton defines the element's identity.

c. Construct an explanation based on scientific evidence of the production of elements heavier than hydrogen by nuclear fusion.
   - I can define nuclear fusion.
   - I can use scientific evidence to construct an explanation of how elements heavier than hydrogen are produced by nuclear fusion.

d. Construct an explanation that relates the relative abundance of isotopes of a particular element to the atomic mass of the element.
   - I can define atomic number and mass number and explain what it communicates about an element or isotope.
   - I can explain what an isotope is.
   - I can compare and contrast atomic number, mass number, and average atomic mass according to their placement on the periodic table (or lack thereof), definitions, and use.
   - I can relate the average atomic mass of an element to the relative abundance of isotopes of that element.

e. Construct an explanation of light emission and the movement of electrons to identify elements.
   - I can identify light as a source of energy.
   - I can recognize that electrons can absorb and release energy.
   - I can perform a flame test to identify an element.
   - I can relate the movement of electrons from the ground state to the excited state as the absorb energy and the release of energy in the form of light as they fall back from the excited state to the ground state.

f. Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy levels of atoms)i.e. including atomic radii, ionization energy, and electronegativity).
   - I can relate the arrangement of the periodic table to electron configuration.
   - I can describe the trends (across a period and down a group) in atomic radius, ionization energy, and electronegativity.
   - I can predict and explain why the trends in atomic radius, ionization energy, and electronegativity occur using the concepts of nuclear charge and the number of energy levels.

g. Develop and use models, including electron configuration of atoms and ions, to predict an element's chemical properties.
   - I can give the electron configuration of any main group atom.
   - I can use an element's electron configuration to predict the element's chemical properties.

Activities/Quizzes/Resources: (All resources can be found on my school website.)

1. Unit 2 Planning Guide
2. Unit 2 Learning Path
3. Chapter 4 Powerpoint
4. Chapter 4 Outline
5. Section 4.1 Lesson Video
6. Section 4.2 Lesson Video
7. Chapter 5 Powerpoint
8. Chapter 5 Outline
9. Long Periodic Table
10. Atomic Chart Tutorial Video
11. Average Atomic Mass Tutorial Video
12. Arrow Electron Configuration Tutorial Video
13. Standard Electron Configuration Tutorial Video
14. Noble Gas Configuration Tutorial Video
15. Wavelength/Frequency Formula Tutorial Video
16. Chapter 6 Powerpoint
17. Chapter 6 Outline
18. Section 6.1 Lesson Video
19. Section 6.2 Lesson Video
20. Periodic Trends Note Sheet
21. Periodic Trends Tutorial Video
22. Unit 2 Practice Sheet
23. Regular Chapter 4, 5, and 6 Study Guide
24. Review Games
25. Extra Practice Sheets
26. Unit 2 Quiz

Performance Task/Test:

Based on the learning targets from this unit, you will demonstrate your understanding of the chemical and physical properties of matter resulting from the ability of atoms to form bonds.

- Lab 3 – Imaginary Elements Lab
- Lab 4 – Flame Tests Lab
- Lab 5 – Tie Dye T-shirts Lab

Unit 2 Test (You will complete the post test at the end of this unit to show mastery.)

Unit 2 Reflection: Reflect on what you could have done better to master this unit.