Chemistry Unit 3: Bonding and Nomenclature
Chapter 7, 8, and 9

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

Standards and Learning Targets:

SC2. Obtain, evaluate, and communicate information about the chemical and physical properties of matter resulting from the ability of atoms to form bonds.

a. Plan and carry out an investigation to gather evidence to compare the physical and chemical properties at the macroscopic scale to infer the strength of intermolecular and intramolecular forces.
   - I can distinguish between intermolecular (IMF's) and intramolecular forces (bonds) and compare their strengths.
   - I can relate the properties of ionic compounds (such as brittleness, high melting point, solid at room temperature) to the strong intermolecular forces.
   - I can relate the properties of covalent compounds (such as melting point, state of matter at room temperature, viscosity) to the strength of the intermolecular forces between neighboring molecules.

b. Construct an argument by applying principles of inter- and intra- molecular forces to identify substance based on chemical and physical properties.
   - I can arrange the major intermolecular forces between molecules in terms of their strength. [electrostatic forces, hydrogen bonding, dipole-dipole, and London dispersion forces]
   - I can explain the relation between the intermolecular forces present within a substance and the temperatures associated with changes in its physical state.

c. Construct an explanation about the importance of molecular-level structure in the functioning of designed materials.
   - I can describe metallic bonding and the "sea" of electrons.
   - I can relate the properties of metals to the type of bonding that occurs in metals.

d. Develop and use models to evaluate bonding configurations from nonpolar covalent to ionic bonding.
   - I can calculate the electronegative difference between two elements based on their electronegativities.
   - I can distinguish between ionic, nonpolar covalent, and polar covalent bonding based on electronegativity difference, what happens to the electrons, types of elements involved, Lewis dot structures, charges on the atoms involved (or partial charges or no charges), definitions, properties, and names.
   - I can predict bond type as nonpolar covalent, covalent, or ionic based on whether elements that are bonding are metals, nonmetals, or metalloids.
   - I can explain the behavior of covalent and ionic substances based on their bonding.
   - I can draw electron dot structures for elements, binary ionic, and covalent compounds.

e. Ask questions about chemical names to identify patterns in IUPAC nomenclature in order to predict chemical names for ionic (binary and ternary), acidic, and inorganic covalent compounds.
   - I can label metals, nonmetals, and metalloids in compounds.
   - I can recognize and classify covalent, ionic, and acidic compounds.
   - I can name acids given their chemical formulas and a table of common polyatomic ions.
   - I can ask questions about chemical names to identify patterns in IUPAC nomenclature in order to predict chemical names for ionic (binary and ternary), acidic, and inorganic covalent compounds.

f. Develop and use bonding models to predict chemical formulas including ionic (binary and ternary), acidic, and inorganic covalent compounds.
   - I can identify ionic, covalent and acidic compounds based on their name.
   - I can identify chemical formulas including ionic (binary and ternary), acidic, and inorganic covalent compounds.
   - I can write formulas for binary and ternary ionic, covalent and acidic compounds.

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

1. Unit 3 Planning Guide
2. Unit 3 Learning Path
3. Chapter 7 Powerpoint
4. Chapter 7 Outline
5. Section 7.3 Lesson Video
6. Section 9.1 Lesson Video
7. Chapter 8 Powerpoint
8. Chapter 8 Outline
9. Section 9.3 Lesson Video
10. Section 8.1 Lesson Video
11. Electronegativity Chart
2. Ion Electron Configuration Tutorial Video
3. Balancing Charges Tutorial Video
4. Lewis Dot Structure Tutorial Video Part 1
5. Lewis Dot Structures Tutorial Video Part 2
6. Lewis Dot Structure Tutorial Video Part 3
7. Nonpolar, Polar, or Ionic Tutorial Video
8. Intermolecular Forces Tutorial Video
9. Chapter 9 Powerpoint
10. Chapter 9 Outline
11. Polyatomic Ions Chart
12. Unit 3 Practice Sheet
13. Regular Chapter 7, 8, and 9 Study Guide
14. Regular Metal Nomenclature Tutorial Video
15. Transition Metal Nomenclature Tutorial Video
16. Nonmetals Nomenclature Tutorial Video
17. Acids Nomenclature Tutorial Videos
18. Review Games
19. Extra Practice Sheets
20. Unit 3 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 6 – Gold Penny Lab
- Lab 7 – VSEPR Balloon Lab
- Lab 8 – Forming and Naming Chemical Compounds Lab

Unit 3 Test (You will complete the post test at the end of this unit to show mastery.)

Unit 3 Reflection: Reflect on what you could have done better to master this unit.