Chemistry Principles

5 credits - Level: II (This course fulfills the chemistry requirement for graduation.)
Grades: 10-12
Prerequisite: None

This laboratory course in chemistry emphasizes the development of appropriate problem solving, critical thinking, and scientific skills needed by high school graduates today. Through an activity-based study of topics ranging from the structure and activity of the elements to the complex interactions of compounds, students acquire an understanding of chemicals in their environment. They also learn how these chemicals can be both beneficial and harmful, which makes them prudent and intelligent consumers/citizens in a technological society.

Proficiencies

MATTER

- Define chemistry and describe its role in science and technology.
- Safely and correctly use the tools of the chemist to determine the physical and chemical properties of matter.
- Define the states of matter and describe matter using qualitative, quantitative, physical and chemical properties.
- Differentiate (classify) types of matter based on physical and chemical properties.

THE ATOMIC MODEL

- Discuss the historical development of Atomic Theory from the Early Greeks to current Quantum Theory.
- Discuss the development of the various Atomic Models from Plum Pudding to the Quantum Mechanical Model using Bohr-Rutherford models to describe electrons.
- Detail the mass, charge, location and behavior of subatomic particles.

ELEMENTS AND PERIODICITY

- Identify an element based on its atomic number, name, symbol, mass or location on the periodic table.
- Identify the contributions of various scientists as to the development of the periodic table
- Detail the mass, charge, location and behavior of subatomic particles.
- Define and account for the trends in atomic radii, ionization energy.

BONDING

- Predict the type of bond formed between two atoms and the polarity of various molecules.
- Discuss the properties and formation of monatomic and binary ions using Lewis dot structures to illustrate the formation of ionic bonds.
- Discuss the properties and formation of single, double, and triple covalent bonds.
- Use proper nomenclature when naming compounds.

REACTIONS

- Describe the 4 basic chemical reactions (synthesis, decomposition, single, and double replacement) and use them to predict the products formed when given the reactants.
- Apply the mathematics of chemical reactions by balancing equations and utilizing molar mass and the law of conservation.
- Discuss the factors that affect chemical reactions.
- Discuss the involvement of energy in chemical reactions. (Exo and Endothermic)