Union County Educational Services Commission
High School Course Syllabus

Title: Chemistry

Timeline: Full Year; 5 Credits

Course Description:
This class focuses on the subatomic level and how interactions within this realm produce global change. The students will learn what matter is composed of and its interactions with everything we see, feel, and hear. By delving into the invisible world of chemistry, students will get a glimpse backstage into the wondrous universe. From nuclear energy to periodic table trends, this course will provide an enriching educational experience for all.

Scope and Sequence:

I. Atomic Theory and Structure
II. The Periodic Table
III. Nuclear Chemistry
IV. Bonding and Chemical Formulae
V. Biochemistry and Chemistry in Society

Refer to the attached curriculum map for a detailed outline of course objectives.

Curriculum Alignment:
New Jersey Student Learning Standards/Next Generation Science Standards - Physical Science

Grading Procedures:

Do Now	10%
Participation	20%
Class Assignments	50%
Assessments	20%

Adoption Date:

Unit	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5
Length of Unit	8 Weeks	8 Weeks	8 Weeks	8 Weeks	8 Weeks
Topic	Atomic Theory and Structure	The Periodic Table	Nuclear Chemistry	Bonding and Chemical Formulae	Biochemistry and Chemistry in Society
Standards	**HS-PS1-1 -** Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms. **HS-PS1-2 -** Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties. **HS-PS1-3 -** Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles.	**HS-PS1-1 -** Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms. **HS-PS1-2 -** Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties. **HS-PS1-3 -** Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles. **HS-PS1-4 -** Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total	**HS-PS1-1 -** Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms. **HS-PS1-2 -** Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties. **HS-PS1-3 -** Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles. **HS-PS1-4 -** Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total	**HS-PS1-1 -** Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms. **HS-PS1-2 -** Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties. **HS-PS1-4 -** Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy. **HS-PS1-5 -** Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the	**HS-ETS1-1 -** Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants. **HS-ETS1-2 -** Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. **HS-ETS1-3 -** Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

		bond energy. **HS-PS1-5 -** Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs. **HS-PS1-6 -** Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium. **HS-PS1-7 -** Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. **HS-PS1-8 -** Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay.	bond energy. **HS-PS1-5 -** Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs. **HS-PS1-6 -** Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium. **HS-PS1-7 -** Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. **HS-PS1-8 -** Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay.	rate at which a reaction occurs. **HS-PS1-6 -** Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium. **HS-PS1-7 -** Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.	
Content/ Disciplinary Core Ideas	Structure and Properties of Matter Chemical Reactions Types of Interactions	Structure and Properties of Matter Chemical Reactions Types of Interactions Optimizing the Design Solution	Structure and Properties of Matter Chemical Reactions Types of Interactions Optimizing the Design Solution	Structure and Properties of Matter Chemical Reactions Types of Interactions Optimizing the Design Solution	Defining and Delimiting Engineering Problems Optimizing the Design Solutions Developing Possible Solutions

		Nuclear Processes	Nuclear Processes	Nuclear Processes	
Skills/ Science and Engineering Principles	Developing and Using Models Constructing Explanations and Designing Solutions Planning and Carrying Out Investigations	Developing and Using Models Constructing Explanations and Designing Solutions Planning and Carrying Out Investigations Using Mathematical and Computational Thinking	Developing and Using Models Constructing Explanations and Designing Solutions Planning and Carrying Out Investigations Using Mathematical and Computational Thinking	Developing and Using Models Constructing Explanations and Designing Solutions Planning and Carrying Out Investigations Using Mathematical and Computational Thinking	Asking Questions and Defining Problems Constructing Explanations and Designing Solutions
Crosscutting Concepts	Patterns	Patterns Energy and Matter Stability and Change	Patterns Energy and Matter Stability and Change	Patterns Energy and Matter Stability and Change	