

Chemistry

Essential Curriculum

Unit 1: Atomic and Nuclear Chemistry

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-PS1-1](#))

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-PS1-3](#))

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. ([HS-PS1-8](#))

Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. ([HS-PS1-7](#))

Unit 2: Electrons and the Periodic Table

Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other. ([HS-PS4-3](#))

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-PS1-1](#))

Unit 3: Chemical Bonding

Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials. ([HS-PS2-6](#)).

Unit 4: Chemical Reactions

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-PS1-2](#))

Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in the total bond energy. ([HS-PS1-4](#))

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-PS1-5](#))

Evaluate or refine a technological solution that reduces impacts of human activities on natural systems. ([HS-ESS3-4](#))

Unit 5: The Mole and Stoichiometry

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-PS1-2](#))

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-PS1-5](#))

Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. ([HS-PS1-7](#))

Unit 6: Intermolecular Forces and Solutions

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-PS1-3](#))

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-PS1-5](#))

Unit 7: Gas Laws/Kinetic Molecular Theory

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-PS1-3](#))

Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. ([HS-PS1-7](#))

Unit 8: Thermochemistry

Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics). ([HS-PS3-4](#))

Unit 9 Acids and Bases/ Equilibrium

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-PS1-2](#))

Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium. ([HS-PS1-6](#))

Evaluate or refine a technological solution that reduces impacts of human activities on natural systems. ([HS-ESS3-4](#))