

## Chemistry

State Standard Number	State Standard Area/Description	Unit Name	Course Topic Description
P	Physical Science		
P.1	Newton's laws of motion and gravitation describe the relationships among forces acting on and between objects, their masses, and changes in their motion - but have limitations		
P.1.a	Gather, analyze and interpret data and create graphs regarding position, velocity and acceleration of moving objects		
P.1.b	Develop, communicate and justify an evidence-based analysis of the forces acting on an object and the resultant acceleration produced by a net force		
P.1.c	Develop, communicate and justify an evidence-based scientific prediction regarding the effects of the action-reaction force pairs on the motion of two interacting objects		
P.1.d	Examine the effect of changing masses and distance when applying Newton's law of universal gravitation to a system of two bodies		
P.1.e	Identify the limitations of Newton's laws in extreme situations		
P.2	Matter has definite structure that determines characteristic physical and chemical properties	Chemistry Fundamentals	Section 3, Part A
P.2.a	Develop, communicate, and justify an evidence-based scientific explanation supporting the current model of an atom	Atoms/Periodic Table	Section 1, Part A
P.2.b	Gather, analyze and interpret data on chemical and physical properties of elements such as density, melting point, boiling point, and conductivity		

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P.2.c	Use characteristic physical and chemical properties to develop predictions and supporting claims about elements' positions on the periodic table	Atoms/Periodic Table	Section 2, Parts A, B, C
P.2.d	Develop a model that differentiates atoms and molecules, elements and compounds, and pure substances and mixtures	Chemistry Fundamentals	Section 3, Part B
P.3	Matter can change form through chemical or nuclear reactions abiding by the laws of conservation of mass and energy	Chemistry Fundamentals	Section 1, Part A
P.3.a	Recognize, analyze, interpret, and balance chemical equations (synthesis, decomposition, combustion, and replacement) or nuclear equations (fusion and fission)	Chemical Reactions	Section 1, Parts A, B, C, D Section 2, Parts A, B, C, D
P.3.b	Predict reactants and products for different types of chemical and nuclear reactions	Chemical Reactions Nuclear Chemistry	Section 2, Parts A, B, C, D Section 2, Parts A, B, C, D
P.3.c	Predict and calculate the amount of products produced in a chemical reaction based on the amount of reactants	Chemical Reactions	Section 3, Part B
P.3.d	Examine, evaluate, question, and ethically use information from a variety of sources and media to investigate the conservation of mass and energy		

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P.4	Atoms bond in different ways to form molecules and compounds that have definite properties	Ionic Compounds	Section 1, Parts B, C
P.4.a	Develop, communicate, and justify an evidence-based scientific explanation supporting the current models of chemical bonding		
P.4.b	Gather, analyze, and interpret data on chemical and physical properties of different compounds such as density, melting point, boiling point, pH, and conductivity	Scientific Method	Section 2, Part A
P.4.c	Use characteristic physical and chemical properties to develop predictions and supporting claims about compounds' classification as ionic, polar or covalent	Ionic Compounds	Section 1, Parts B, C
P.4.d	Describe the role electrons play in atomic bonding	Ionic Compounds	Section 1, Part A
P.4.e	Predict the type of bonding that will occur among elements based on their position in the periodic table	Ionic Compounds	Section 1, Parts B, C
P.5	Energy exists in many forms such as mechanical, chemical, electrical, radiant, thermal, and nuclear, that can be quantified and experimentally determined	Thermodynamics	Section 1, Parts B, C
P.5.a	Develop, communicate, and justify an evidence-based scientific explanation regarding the potential and kinetic nature of mechanical energy		

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P.5.b	Use appropriate measurements, equations and graphs to gather, analyze, and interpret data on the quantity of energy in a system or an object	Thermodynamics Solids, Liquids, Gases	Section 2, Parts A, B, C, D, E, G Section 4, Parts B, C
P.5.c	Use direct and indirect evidence to develop predictions of the types of energy associated with objects		
P.5.d	Identify different energy forms, and calculate their amounts by measuring their defining characteristics		
P.6	When energy changes form, it is neither created nor destroyed; however, because some is necessarily lost as heat, the amount of energy available to do work decreases	Thermodynamics	Section 1, Part C
P.6.a	Use direct and indirect evidence to develop and support claims about the conservation of energy in a variety of systems, including transformations to heat	Thermodynamics	Section 1, Part C
P.6.b	Evaluate the energy conversion efficiency of a variety of energy transformations		
P.6.c	Describe energy transformations both quantitatively and qualitatively	Thermodynamics	Section 1, Parts A, B, C, D Section 2, Parts A, B, C, D, E, F, G
P.6.d	Differentiate among the characteristics of mechanical and electromagnetic waves that determine their energy		

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P.6.e	Examine, evaluate, question, and ethically use information from a variety of sources and media to investigate energy conservation and loss		
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