

## Chemistry

State Standard Number	State Standard Area/Description	Unit Name	Course Topic Description
N.12	Nature of Science		
0	Scientific inquiry is the process by which humans systematically examine the natural world. Scientific inquiry is a human endeavor and involves observation, reasoning, insight, energy, skill, and creativity. Scientific inquiry is used to formulate and test explanations of nature through observation, experiments, and theoretical or mathematical models. Scientific explanations and evidence are constantly reviewed and examined by others. Questioning, response to criticism and open communication are integral to the process of science.	The Scientific Method	Scientific Method
N.12.A	Students understand that a variety of communication methods can be used to share scientific information.		
0	Using Data		
N.12.A.1	Students know tables, charts, illustrations and graphs can be used in making arguments and claims in oral and written presentations.		Covered throughout the course
0	Record-keeping		
N.12.A.2	Students know scientists maintain a permanent record of procedures, data, analyses, decisions, and understandings of scientific investigations.	The Scientific Method	Scientific Method
0	Accuracy		
N.12.A.3	Students know repeated experimentation allows for statistical analysis and unbiased conclusions.	The Scientific Method	Accuracy and Precision Labs Throughout Course
0	Safe Experimentation		
N.12.A.4	Students know how to safely conduct an original scientific investigation using the appropriate tools and technology.		Labs Throughout Course
0	Models		
N.12.A.5	Students know models and modeling can be used to identify and predict cause-effect relationships.		
N.12.A.6	Students know organizational schema can be used to represent and describe relationships of sets.		
0	Technology defines a society or era. It can shape the environment in which people live, and it has increasingly become a larger part of people's lives. While many of technology's effects on society are regarded as desirable, other effects are seen as less desirable. These concepts are shared across subject areas such as science, math, technology, social studies and language arts. The development and use of technology affects society and the environment in which we live, and, at the same time, society influences the development of technology and its impact on culture.	Nuclear Chemistry	Fission and Fusion
N.12.B	Students understand the impacts of science and technology in terms of costs and benefits to society.	Nuclear Chemistry	Fission and Fusion

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0	Risks and Benefits		
N.12.B.1	Students know science, technology, and society influenced one another in both positive and negative ways.	Nuclear Chemistry	Fission and Fusion
0	Ethical Behavior		
N.12.B.2	Students know consumption patterns, conservation efforts, and cultural or social practices in countries have varying environmental impacts.		
N.12.B.3	Students know the influence of ethics on scientific enterprise.		
0	Collaboration		
N.12.B.4	Students know scientific knowledge builds on previous information.		
P.12	Physical Science		
0	Matter has various states with unique properties that can be used as a basis for organization. The relationship between the properties of matter and its structure is an essential component of study in the physical sciences. The understanding of matter and its properties leads to practical applications, such as the capability to liberate elements from ore, create new drugs, manipulate the structure of genes and synthesize polymers.	Chemistry Fundamentals	Atoms
		Solids, Liquids, and Gases	Change of State
P.12.A	Students understand that atomic structure explains the properties and behavior of matter.	Atoms/Periodic Table	Group Names
			Trends in the Periodic Table
0	Properties of Matter		
P.12.A.1	Students know different molecular arrangements and motions account for the different physical properties of solids, liquids, and gases.	Chemistry Fundamentals	Atoms
		Solids, Liquids, and Gases	Change of State;
P.12.A.2	Students know elements in the periodic table are arranged into groups and periods by repeating patterns and relationships.	Atoms/Periodic Table	Group Names
			Trends in the Periodic Table
0	Mixtures and Compounds		
P.12.A.3	Students know identifiable properties can be used to separate mixtures.		
P.12.A.4	Students know atoms bond with one another by transferring or sharing electrons.	Ionic Compounds	Ionic and Covalent Compounds
P.12.A.5	Students know chemical reactions can take place at different rates, depending on a variety of factors (i.e. temperature, concentration, surface area, and agitation).	Reaction Rates	Kinetics
P.12.A.6	Students know chemical reactions either release or absorb energy.	Thermodynamics	Thermodynamics
P.12.A.7	Students know that, in chemical reactions, elements combine in predictable ratios, and the numbers of atoms	Atoms/Periodic Table	Atom

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	of each element do not change.		
		Chemical Reactions	What is a Chemical Reaction?
0	Atomic Structure		
P.12.A.8	Students know most elements have two or more isotopes, some of which have practical applications.	Atoms/Periodic Table	Atomic Number Mass Number and Isotopes
P.12.A.9	Students know the number of electrons in an atom determines whether the atom is electrically neutral or an ion.	Ionic Compounds	Ionic and Covalent Compounds
0	The laws of motion are used to describe the effects of forces on the movement of objects.		
P.12.B	Students understand the interactions between force and motion.		
0	Motion		
P.12.B.1	Students know laws of motion can be used to determine the effects of forces on the motion of objects.		
0	Forces		
P.12.B.2	Students know magnetic forces and electric forces can be thought of as different aspects of electromagnetic force.		
P.12.B.3	Students know the strength of the electric force between two objects increases with charge and decreases with distance.		
P.12.B.4	Students know the strength of the gravitational force between two objects increases with mass and decreases rapidly with distance.		
0	The total energy of the universe is constant. All events involve the transfer of energy in one form or another. In all energy transfers, the overall effect is that the energy is spread out uniformly.	Thermodynamics	Thermodynamics Conservation of Energy-- Calorimetry
P.12.C	Students understand that there are interactions between matter and energy.	Thermodynamics	Thermodynamics Conservation of Energy-- Calorimetry
0	Waves		
P.12.C.1	Students know waves (I.e. sound, seismic, electromagnetic) have energy that can be transferred when the waves interact with matter.		
0	Forms and Uses of Energy		
P.12.C.2	Students know energy forms can be converted.	Thermodynamics	Thermodynamics Conservation of Energy-- Calorimetry
P.12.C.3	Students know nuclear reactions convert a relatively small amount of material into a large amount of energy.	Nuclear Chemistry	Nuclear Chemistry
P.12.C.4	Students know characteristics, applications and impacts of radioactivity.	Nuclear Chemistry	Fission and Fusion



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P.12.C.5	Students know the relationship between heat and temperature.	Thermodynamics	Thermodynamics
0	Electricity		
P.12.C.6	Students know electricity is transferred from generating sources for consumption and practical uses.		