



Alignment Document

State of Texas And Aventa Learning Chemistry

Chemistry 2005-2007 Benchmark Blueprint

State Standard Number	State Standard Area / Description	Unit Name	Course Topic Description
112.45	Chemistry		
0	Scientific processes.		
112.45.1	The student, for at least 40% of instructional time, conducts field and laboratory investigations using safe, environmentally appropriate, and ethical practices.		
112.45.1.A	demonstrate safe practices during field and laboratory investigations;		Labs Throughout Course
112.45.1.B	make wise choices in the use and conservation of resources and the disposal or recycling of materials.		
112.45.2	The student uses scientific methods during field and laboratory investigations.		Labs Throughout Course
112.45.2.A	plan and implement investigative procedures including asking questions, formulating testable hypotheses, and selecting equipment and technology;		Labs Throughout Course
112.45.2.B	collect data and make measurements with precision;		Labs Throughout Course
112.45.2.C	express and manipulate chemical quantities using scientific conventions and mathematical procedures such as dimensional analysis, scientific notation, and significant figures;	The Scientific Method, Significant Figures and Energy, Significant Figures and Energy	Significant Figures
112.45.2.D	organize, analyze, evaluate, make inferences, and predict trends from data;		Labs Throughout Course
112.45.2.E	communicate valid conclusions.		Labs Throughout Course



112.45.3	The student uses critical thinking and scientific problem solving to make informed decisions.	The Scientific Method, Significant Figures and Energy	Scientific Method
112.45.3.A	analyze, review, and critique scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information;	The Scientific Method, Significant Figures and Energy	Scientific Method
112.45.3.B	make responsible choices in selecting everyday products and services using scientific information;	The Scientific Method, Significant Figures and Energy	Scientific Method
112.45.3.C	evaluate the impact of research on scientific thought, society, and the environment;	The Scientific Method, Significant Figures and Energy	Scientific Method
112.45.3.D	describe the connection between chemistry and future careers;		
112.45.3.E	research and describe the history of chemistry and contributions of scientists.	Atoms and the Period Table	Atom
0	Science concepts.		
112.45.4	The student knows the characteristics of matter.	Chemistry Fundamentals	Fundamentals
112.45.4.A	differentiate between physical and chemical properties of matter;	Chemistry Fundamentals	Chemical versus Physical Properties
112.45.4.B	analyze examples of solids, liquids, and gases to determine their compressibility, structure, motion of particles, shape, and volume;	Chemistry Fundamentals	Fundamentals
112.45.4.C	investigate and identify properties of mixtures and pure substances;	Chemistry Fundamentals	Classification of Matter
112.45.4.D	describe the physical and chemical characteristics of an element using the periodic table and make inferences about its chemical behavior.	Atoms and the Period Table	Trends in the Periodic Table
112.45.5	The student knows that energy transformations occur during physical or chemical changes in matter.	Thermodynamics	Conservation of Energy – Calorimetry
112.45.5.A	identify changes in matter, determine the nature of the change, and examine the forms of energy involved;	Chemistry Fundamentals	Physical Change and Chemical Change
112.45.5.B	identify and measure energy transformations and exchanges involved in chemical reactions;	Thermodynamics	Thermodynamics
112.45.5.C	measure the effects of the gain or loss of heat energy on the properties of solids, liquids, and gases.	Thermodynamics	Thermodynamics



112.45.6	The student knows that atomic structure is determined by nuclear composition, allowable electron cloud, and subatomic particles.	Atoms and the Period Table	Atom
112.45.6.A	describe the existence and properties of subatomic particles;	Atoms and the Period Table	Atom
112.45.6.B	analyze stable and unstable isotopes of an element to determine the relationship between the isotope's stability and its application;	Atoms and the Period Table	Atomic Number, Mass Number and Isotopes
112.45.6.C	summarize the historical development of the periodic table to understand the concept of periodicity.	Atoms and the Period Table	Atom
112.45.7	The student knows the variables that influence the behavior of gases.	Solids, Liquids, Gases	Understanding Gas Laws
112.45.7.A	describe interrelationships among temperature, particle number, pressure, and volume of gases contained within a closed system;	Solids, Liquids, Gases	Understanding Gas Laws
112.45.7.B	illustrate the data obtained from investigations with gases in a closed system and determine if the data are consistent with the Universal Gas Law.	Solids, Liquids, Gases	Understanding Gas Laws
112.45.8	The student knows how atoms form bonds to acquire a stable arrangement of electrons.	Ionic Compounds	Ionic and Covalent Compounds
112.45.8.A	identify characteristics of atoms involved in chemical bonding;	Ionic Compounds	Ionic and Covalent Compounds
112.45.8.B	investigate and compare the physical and chemical properties of ionic and covalent compounds;	Ionic Compounds	Ionic and Covalent Compounds
112.45.8.C	compare the arrangement of atoms in molecules, ionic crystals, polymers, and metallic substances;	Ionic Compounds	Ionic and Covalent Compounds
112.45.8.D	describe the influence of intermolecular forces on the physical and chemical properties of covalent compounds.	Solids, Liquids, Gases	Change of State
112.45.9	The student knows the processes, effects, and significance of nuclear fission and nuclear fusion.	Nuclear Chemistry	Fission and Fusion
112.45.9.A	compare fission and fusion reactions in terms of the masses of the reactants and products and the amount of energy released in the nuclear reactions;	Nuclear Chemistry	Fission and Fusion
112.45.9.B	investigate radioactive elements to determine half-life;	Nuclear Chemistry	Fission and Fusion



112.45.9.C	evaluate the commercial use of nuclear energy and medical uses of radioisotopes;	Nuclear Chemistry	Fission and Fusion
112.45.9.D	evaluate environmental issues associated with the storage, containment, and disposal of nuclear wastes.	Nuclear Chemistry	Fission and Fusion
112.45.10	The student knows common oxidation-reduction reactions.		
112.45.10.A	identify oxidation-reduction processes;		
112.45.10.B	demonstrate and document the effects of a corrosion process and evaluate the importance of electroplating metals.		
112.45.11	The student knows that balanced chemical equations are used to interpret and describe the interactions of matter.	Chemical Reactions	What is a Chemical Reaction?
112.45.11.A	identify common elements and compounds using scientific nomenclature;	Ionic Compounds	Ionic and Covalent Compounds
112.45.11.B	demonstrate the use of symbols, formulas, and equations in describing interactions of matter such as chemical and nuclear reactions;	Chemical Reactions	What is a Chemical Reaction
		Nuclear Chemistry	Nuclear Reactions
112.45.11.C	explain and balance chemical and nuclear equations using number of atoms, masses, and charge.	Chemical Reactions	What is a Chemical Reaction?
		Nuclear Chemistry	Nuclear Reactions
112.45.12	The student knows the factors that influence the solubility of solutes in a solvent.	Water, Solutions, Acids and Bases	The Solution Process
112.45.12.A	demonstrate and explain effects of temperature and the nature of solid solutes on the solubility of solids;	Water, Solutions, Acids and Bases	The Solution Process
112.45.12.B	develop general rules for solubility through investigations with aqueous solutions;		
112.45.12.C	evaluate the significance of water as a solvent in living organisms and in the environment.	Water, Solutions, Acids and Bases	Introduction
112.45.13	The student knows relationships among the concentration, electrical conductivity, and colligative properties of a solution.	Water, Solutions, Acids and Bases	Properties of Solution
112.45.13.A	compare unsaturated, saturated, and supersaturated solutions;	Water, Solutions, Acids and Bases	The Solution Process
112.45.13.B	interpret relationships among ionic and covalent compounds, electrical conductivity, and colligative properties of water;	Water, Solutions, Acids and Bases	Colligative Properties



112.45.13.C	measure and compare the rates of reaction of a solid reactant in solutions of varying concentration.	Reactions Rates and Equilibrium	Kinetics
112.45.14	The student knows the properties and behavior of acids and bases.	Water, Solutions, Acids and Bases	
112.45.14.A	analyze and measure common household products using a variety of indicators to classify the products as acids or bases;	Water, Solutions, Acids and Bases	Measuring Acidity
112.45.14.B	demonstrate the electrical conductivity of acids and bases;	Water, Solutions, Acids and Bases	Properties of Acids and Bases
112.45.14.C	identify the characteristics of a neutralization reaction;		
112.45.14.D	describe effects of acids and bases on an ecological system.	Water, Solutions, Acids and Bases	Properties of Acids and Bases
112.45.15	The student knows factors involved in chemical reactions.	Chemical Reactions	Introduction
112.45.15.A	verify the law of conservation of energy by evaluating the energy exchange that occurs as a consequence of a chemical reaction;	Chemical Reactions	What is a Chemical Reaction?
112.45.15.B	relate the rate of a chemical reaction to temperature, concentration, surface area, and presence of a catalyst.	Reactions Rates and Equilibrium	Kinetics