



Alignment Document

State of Georgia And Aventa Learning Chemistry

Chemistry 2005-2007 Benchmark Blueprint

State Standard Number	State Standard Area / Description	Unit Name	Course Topic Description
C	Chemistry		
0	Co-Requisite - Characteristics of Science		
0	Habits of Mind		
C.SCSh1	Students will evaluate the importance of curiosity, honesty, openness, and skepticism in science.		
C.SCSh1.a	Exhibit the above traits in their own scientific activities.		
C.SCSh1.b	Recognize that different explanations often can be given for the same evidence.		
C.SCSh1.c	Explain that further understanding of scientific problems relies on the design and execution of new experiments which may reinforce or weaken opposing explanations.		
C.SCSh2	Students will use standard safety practices for all classroom laboratory and field investigations.		
C.SCSh2.a	Follow correct procedures for use of scientific apparatus.		
C.SCSh2.b	Demonstrate appropriate techniques in all laboratory situations.		
C.SCSh2.c	Follow correct protocol for identifying and reporting safety problems and violations.		



C.SCSH3	Students will identify and investigate problems scientifically.		
C.SCSH3.a	Suggest reasonable hypotheses for identified problems.	Measurement	Scientific Method
C.SCSH3.b	Develop procedures for solving scientific problems.	Measurement	Scientific Method
C.SCSH3.c	Collect, organize and record appropriate data.	Solutions	Lab: make solution of kool-aid
C.SCSH3.d	Graphically compare and analyze data points and/or summary statistics.		
C.SCSH3.e	Develop reasonable conclusions based on data collected.		
C.SCSH3.f	Evaluate whether conclusions are reasonable by reviewing the process and checking against other available information.		
C.SCSH4	Students will use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.		
C.SCSH4.a	Develop and use systematic procedures for recording and organizing information.		
C.SCSH4.b	Use technology to produce tables and graphs.		
C.SCSH4.c	Use technology to develop, test, and revise experimental or mathematical models.		
C.SCSH5	Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations.		
C.SCSH5.a	Trace the source on any large disparity between estimated and calculated answers to problems.		
C.SCSH5.b	Consider possible effects of measurement errors on calculations.		
C.SCSH5.c	Recognize the relationship between accuracy and precision.		
C.SCSH5.d	Express appropriate numbers of significant figures for calculated data, using scientific notation where appropriate.	Measurement	Significant Figures

C.SCSH5.e	Solve scientific problems by substituting quantitative values, using dimensional analysis and/or simple algebraic formulas as appropriate.	Matter	Stoichiometry
		Thermodynamics	Solving Problems involving Heat Flow
C.SCSH6	Students will communicate scientific investigations and information clearly.		
C.SCSH6.a	Write clear, coherent laboratory reports related to scientific investigations.		
C.SCSH6.b	Write clear, coherent accounts of current scientific issues, including possible alternative interpretations of the data		
C.SCSH6.c	Use data as evidence to support scientific arguments and claims in written or oral presentations.		
C.SCSH6.d	Participate in group discussions of scientific investigation and current scientific issues.		
0	The Nature of Science		
C.SCSH7	Students will analyze how scientific knowledge is developed. Students recognize that:		
C.SCSH7.a	The universe is a vast single system in which the basic principles are the same everywhere.		
C.SCSH7.b	Universal principles are discovered through observation and experimental verification.		

C.SCSH7.c	From time to time, major shifts occur in the scientific view of how the world works. More often, however, the changes that take place in the body of scientific knowledge are small modifications of prior knowledge. Major shifts in scientific views typically occur after the observation of a new phenomenon or an insightful interpretation of existing data by an individual or research group.	Atoms	The Periodic Table
		Atoms	The Atom
		Nuclear Chemistry	Inside the Atom
C.SCSH7.d	Hypotheses often cause scientists to develop new experiments that produce additional data.		
C.SCSH7.e	Testing, revising, and occasionally rejecting new and old theories never ends.		
C.SCSH8	Students will understand important features of the process of scientific inquiry. Students will apply the following to inquiry learning practices:		
C.SCSH8.a	Scientific investigators control the conditions of their experiments in order to produce valuable data.		
C.SCSH8.b	Scientific researchers are expected to critically assess the quality of data including possible sources of bias in their investigations' hypotheses, observations, data analyses, and interpretations.		
C.SCSH8.c	Scientists use practices such as peer review and publication to reinforce the integrity of scientific activity and reporting.		
C.SCSH8.d	The merit of a new theory is judged by how well scientific data are explained by the new theory.		
C.SCSH8.e	The ultimate goal of science is to develop an understanding of the natural universe which is free of biases.		

C.SCSH8.f	Science disciplines and traditions differ from one another in what is studied, techniques used, and outcomes sought.		
C.SCSH9	Students will enhance reading in all curriculum areas by:		
C.SCSH9.a	Reading in All Curriculum Areas		
C.SCSH9.a.1	Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas		
C.SCSH9.a.2	Read both informational and fictional texts in a variety of genres and modes of discourse		
C.SCSH9.a.3	Read technical texts related to various subject areas		
C.SCSH9.b	Discussing books		
C.SCSH9.b.1	Discuss messages and themes from books in all subject areas.		
C.SCSH9.b.2	Respond to a variety of texts in multiple modes of discourse.		
C.SCSH9.b.3	Relate messages and themes from one subject area to messages and themes in another area.		
C.SCSH9.b.4	Evaluate the merit of texts in every subject discipline.		
C.SCSH9.b.5	Examine author's purpose in writing.		
C.SCSH9.b.6	Recognize the features of disciplinary texts.		
C.SCSH9.c	Building vocabulary knowledge		
C.SCSH9.c.1	Demonstrate an understanding of contextual vocabulary in various subjects.		
C.SCSH9.c.2	Use content vocabulary in writing and speaking.		
C.SCSH9.c.3	Explore understanding of new words found in subject area texts.		
C.SCSH9.d	Establishing context		
C.SCSH9.d.1	Explore life experiences related to subject area content.		
C.SCSH9.d.2	Discuss in both writing and speaking how certain words are subject area related.		

C.SSh9.d.3	Determine strategies for finding content and contextual meaning for unknown words.		
0	Co-Requisite - Content		
C.SC1	Students will analyze the nature of matter and its classifications.		
C.SC1.a	Relate the role of nuclear fusion in producing essentially all elements heavier than helium.		
C.SC1.b	Identify substances based on chemical and physical properties.	Solutions	Lab: make solution of kool-aid
C.SC1.c	Predict formulas for stable ionic compounds (binary and tertiary) based on balance of charges.	Bonding	Ionic Bonding
C.SC1.d	Use IUPAC nomenclature for both chemical names and formulas:	Bonding	Covalent Bonding
C.SC1.d.1	Ionic compounds (Binary and tertiary)	Bonding	Ionic Bonding
C.SC1.d.2	Covalent compounds (Binary and tertiary)	Bonding	Covalent Bonding
C.SC1.d.3	Acidic compounds (Binary and tertiary)	Acids & Bases	Definition of Acids and Bases
C.SC2	Students will relate how the Law of Conservation of Matter is used to determine chemical composition in compounds and chemical reactions.		
C.SC2.a	Identify and balance the following types of chemical equations:	Matter	Classifying Chemical Reactions
C.SC2.a.1	Synthesis	Matter	Classifying Chemical Reactions
C.SC2.a.2	Decomposition	Matter	Classifying Chemical Reactions
C.SC2.a.3	Single Replacement	Matter	Classifying Chemical Reactions
C.SC2.a.4	Double Replacement	Matter	Classifying Chemical Reactions
C.SC2.a.5	Combustion	Matter	Classifying Chemical Reactions
C.SC2.b	Experimentally determine indicators of a chemical reaction specifically precipitation, gas evolution, water production, and changes in energy to the system.		
C.SC2.c	Apply concepts of the mole and Avogadro's number to conceptualize and calculate	Matter	The Mole

C.SC2.c.1	Empirical/molecular formulas,	Matter	Molar Mass
C.SC2.c.2	Mass, moles and molecules relationships,	Matter	Atoms, Molecules, and Moles
		Matter	Molar Mass
C.SC2.c.3	Molar volumes of gases.	Matter	Atoms, Molecules, and Moles
C.SC2.d	Identify and solve different types of stoichiometry problems, specifically relating mass to moles and mass to mass.	Matter	Atoms, Molecules, and Moles
		Matter	Molar Mass
		Matter	Stoichiometry
		Matter	Lab: Conservation of mass (P/P only)
C.SC2.e	Demonstrate the conceptual principle of limiting reactants.		
C.SC2.f	Explain the role of equilibrium in chemical reactions.	Equilibrium	Definition of Chemical Equilibrium
C.SC3	Students will use the modern atomic theory to explain the characteristics of atoms.		
C.SC3.a	Discriminate between the relative size, charge, and position of protons, neutrons, and electrons in the atom.	Atoms	Electrons in Atoms
		Nuclear Chemistry	Inside the Atom
C.SC3.b	Use the orbital configuration of neutral atoms to explain its effect on the atom's chemical properties.		
C.SC3.c	Explain the relationship of the proton number to the element's identity.	Nuclear Chemistry	Radioactive Isotopes
C.SC3.d	Explain the relationship of isotopes to the relative abundance of atoms of a particular element.	Atoms	The Atom
C.SC3.e	Compare and contrast types of chemical bonds (i.e., ionic, covalent).	Bonding	Lab: Bonding (P/P only)
		Bonding	Ionic Bonding
		Bonding	Covalent Bonding
		Bonding	Ionic Bonding
		Bonding	Covalent Bonding
C.SC3.f	Relate light emission and the movement of electrons to element identification.	Atoms	Electrons in Atoms

C.SC4	Students will use the organization of the Periodic Table to predict properties of elements.		
C.SC4.a	Use the Periodic Table to predict periodic trends including atomic radii, ionic radii, ionization energy, and electronegativity of various elements.	Atoms	The Elements
		Atoms	Trends in the Periodic Table
C.SC4.b	Compare and contrast trends in the chemical and physical properties of elements and their placement on the Periodic Table.	Atoms	Trends in the Periodic Table
		Atoms	Valence Electrons
		Atoms	Lab: Periodic Table (P/P only)
		Atoms	The Elements
C.SC5	Students will understand that the rate at which a chemical reaction occurs can be affected by changing concentration, temperature, or pressure and the addition of a catalyst.		
C.SC5.a	Demonstrate the effects of changing concentration, temperature, and pressure on chemical reactions.	Equilibrium	Concentration
		Rates	Temperature
C.SC5.b	Investigate the effects of a catalyst on chemical reactions and apply it to everyday examples.	Rates	Catalyst
C.SC5.c	Explain the role of activation energy and degree of randomness in chemical reactions.		
C.SC6	Students will understand the effects motion of atoms and molecules in chemical and physical processes.		
C.SC6.a	Compare and contrast atomic/molecular motion in solids, liquids, gases, and plasmas.		
C.SC6.b	Collect data and calculate the amount of heat given off or taken in by chemical or physical processes.	Thermodynamics	Lab: Calc heat of fusion using calorimeter
C.SC6.c	Analyzing (both conceptually and quantitatively) flow of energy during change of state (phase).		

C.SC7	Students will characterize the properties that describe solutions and the nature of acids and bases.		
C.SC7.a	Explain the process of dissolving in terms of solute/solvent interactions:	Solutions	The Dissolution Process
C.SC7.a.1	Observe factors that effect the rate at which a solute dissolves in a specific solvent,	Solutions	Factors that Affect the Dissolution Process
C.SC7.a.2	Express concentrations as molarities,	Solutions	Lab: make solution of kool-aid
		Solutions	Concentration
C.SC7.a.3	Prepare and properly label solutions of specified molar concentration,	Solutions	Lab: make solution of kool-aid
C.SC7.a.4	Relate molality to colligative properties.		
C.SC7.b	Compare, contrast, and evaluate the nature of acids and bases:		
C.SC7.b.1	Arrhenius, Bronsted-Lowry Acid/Bases	Acids & Bases	Definitions of Acids and Bases
C.SC7.b.2	Strong vs. weak acids/bases in terms of percent dissociation	Acids & Bases	The pH Scale
		Acids & Bases	Acid and Base Strength
C.SC7.b.3	Hydronium ion concentration	Acids & Bases	Acid and Base Strength
C.SC7.b.4	pH	Acids & Bases	The pH Scale
C.SC7.b.5	Acid-Base neutralization		