

**Georgia Science Grades 9-12  
Contents Standards Mapping**

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CHEMISTRY	Boardworks High School Chemistry Presentation
<b>SC1 Students will analyze the nature of matter and its classifications.</b>	
a. <i>Relate the role of nuclear fusion in producing essentially all elements heavier than helium.</i>	–
b. Identify substances based on chemical and physical properties.	Comparing Bonding
c. Predict formulas for stable ionic compounds (binary and tertiary) based on balance of charges.	Ionic Bonding Types of Formulae
d. Use IUPAC nomenclature for both chemical names and formulas:	Covalent Bonding
i. Ionic compounds (Binary and tertiary)	Ionic Bonding
ii. Covalent compounds (Binary and tertiary)	Ionic Compounds
iii. Acidic compounds (Binary and tertiary)	Naming Compounds
<b>SC2 Students will relate how the Law of Conservation of Matter is used to determine chemical composition in compounds and chemical reactions.</b>	
a. Identify and balance the following types of chemical equations:	
i. Synthesis	Combustion
ii. Decomposition	Neutralization
iii. Single Replacement	Reacting Masses
iv. Double Replacement	Thermal Decomposition
v. Combustion	
b. Experimentally determine indicators of a chemical reaction specifically precipitation, gas evolution, water production, and changes in energy to the system.	Endothermic Reactions Exothermic Reactions
c. Apply concepts of the mole and Avogadro's number to conceptualize and calculate:	
i. Empirical/molecular formulas,	Gases and Moles
ii. Mass, moles and molecules relationships,	Molar Mass
iii. Molar volumes of gases.	Types of Formulae What are Moles?
d. Identify and solve different types of stoichiometry problems, specifically relating mass to moles and mass to mass.	Molar Mass What are Moles?
e. <i>Demonstrate the conceptual principle of limiting reactants.</i>	–
f. Explain the role of equilibrium in chemical reactions.	Dynamic Equilibrium Le Chatelier's Principle
<b>SC3 Students will use the modern atomic theory to explain the characteristics of atoms.</b>	
a. Discriminate between the relative size, charge, and position of protons, neutrons, and electrons in the atom.	Atomic Structure Electron Configuration

b. Use the orbital configuration of neutral atoms to explain its effect on the atom's chemical properties.	Orbitals
c. Explain the relationship of the proton number to the element's identity.	Electron Structure and the Periodic Table
d. Explain the relationship of isotopes to the relative abundance of atoms of a particular element.	Isotopes Relative Atomic Mass
e. Compare and contrast types of chemical bonds (i.e. ionic, covalent).	Comparing Bonding Covalent Bonding Ionic Bonding
f. Relate light emission and the movement of electrons to element identification.	Observing Line Spectra
<b>SC4. Students will use the organization of the Periodic Table to predict properties of elements.</b>	
a. Use the Periodic Table to predict periodic trends including atomic radii, ionic radii, ionization energy, and electronegativity of various elements.	Electron Structure and the Periodic Table Electronegativity Ionization Energy Patterns of Behavior
b. Compare and contrast trends in the chemical and physical properties of elements and their placement on the Periodic Table.	Electronegativity Ionization Energy Electron Structure and the Periodic Table Patterns of Behavior
<b>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.</b>	
a. Demonstrate the effects of changing concentration, temperature, and pressure on chemical reactions.	Concentration, Pressure and Reaction Rates Le Chatelier's Principle Temperature and Reaction Rates
b. Investigate the effects of a catalyst on chemical reactions and apply it to everyday examples.	Surface Area, Catalysts and Reaction Rates
c. Explain the role of activation energy and degree of randomness in chemical reactions.	Bonds and Activation Energy
<b>SC6. Students will understand the effects motion of atoms and molecules in chemical and physical processes.</b>	
a. Compare and contrast atomic/molecular motion in solids, liquids, gases, and plasmas.	Particles in Action
b. Collect data and calculate the amount of heat given off or taken in by chemical or physical processes.	Calorimetry
c. Analyzing (both conceptually and quantitatively) flow of energy during change of state (phase).	Changing State
<b>SC7. Students will characterize the properties that describe solutions and the nature of acids and bases.</b>	

<p>a. Explain the process of dissolving in terms of solute/solvent interactions:</p> <ul style="list-style-type: none"><li>i. Observe factors that effect the rate at which a solute dissolves in a specific solvent,</li><li>ii. Express concentrations as molarities,</li><li>iii. Prepare and properly label solutions of specified molar concentration,</li><li>iv. Relate molality to colligative properties.</li></ul>	<p>Solutions Solubility</p>
<p>b. Compare, contrast, and evaluate the nature of acids and bases:</p> <ul style="list-style-type: none"><li>i. Arrhenius, Bronsted-Lowry Acid/Bases</li><li>ii. Strong vs. weak acids/bases in terms of percent dissociation</li><li>iii. Hydronium ion concentration</li><li>iv. pH</li></ul>	<p>Neutralization pH and Indicators Properties of Acids and Alkalis</p>