Chemistry You Need to Know and North Carolina Science Standards

	North Carolina Standards	Chpt 1--Scientists Tools	Chpt 2--Antacids	Chpt 3--Airbags	Chpt 4--Light	Chpt 5--Soap	Chpt 6--Sports Drinks	Chpt 7--Hot packs	Chpt 8--Industry	Chpt 9--Forensics	Chpt 10--Batteries	Chpt 11--Polymers	Chpt 12--Nuclear radiation
1.01	• Identify questions and suggest hypotheses.	Introduced in Section 1-1 and throughout (at least 1 student-designed lab per chapter)											
	• Identify variables.	Introduced in Section 1-1 and throughout (at least 1 student-designed lab per chapter)											
	• Use a control when appropriate.	Introduced in Section 1-1 and throughout (at least 1 student-designed lab per chapter)											
	• Select and use appropriate measurement tools.	Introduced in Section 1-2 and throughout (at least 1 student-designed lab per chapter)											
	• Collect and organize data in tables, charts and graphs.	Introduced in Section 1-2 and throughout (at least 1 student-designed lab per chapter)											
	• Analyze and interpret data.	Introduced in Section 1-3 and throughout (at least 1 student-designed lab per chapter)											
	• Explain observations.	Introduced in Section 1-3 and throughout (at least 1 student-designed lab per chapter)											
	• Make inferences and predictions.	Introduced in Section 1-2 and throughout (at least 1 student-designed lab per chapter)											
	• Explain the relationship between evidence and explanation.	Introduced in Section 1-1 and throughout (at least 1 student-designed lab per chapter)											
	• Identify how scientists share findings.	Introduced in Section 1-1 and throughout (at least 1 student-designed lab per chapter)											
1.02	• Appropriate sample.	Introduced in Section 1-1 and throughout (at least 1 student-designed lab per chapter)											
	• Adequacy of experimental controls.	Introduced in Section 1-1 and throughout (at least 1 student-designed lab per chapter)											
	• Replication of findings.	Introduced in Section 1-1 and throughout (at least 1 student-designed lab per chapter)											
	• Alternative interpretations of the data	Introduced in Section 1-1 and throughout (at least 1 student-designed lab per chapter)											
1.03	• Identify and avoid potential safety hazards given a scenario.	Introduced in Section 1-1 and throughout (at least 1 student-designed lab per chapter)											
	• Differentiate between safe and unsafe procedures.	Introduced in Section 1-1 and throughout (at least 1 student-designed lab per chapter)											
	• Use information from the MSDS (Material Safety Data Sheets) to assess chemical hazards.												
2.01	• Early contributions: Democritus and Dalton.				Section 4-1								
	• The discovery of the electron: Thomson and Millikan.				Section 4-1								

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	• The discovery of the nucleus, proton and neutron: Rutherford and Chadwick.				Section 4-1								
	• The Bohr model.				Section 4-1								
	• The quantum mechanical model.				Section 4-1								
2.02 I	• Subatomic particles: protons, neutrons, and electrons.				Section 4-1, 4-2, 4-3								
	• Mass number.				Section 4-2								
	• Atomic number.				Section 4-2								
	• Isotopes.				Section 4-2								
2.03 A	• Name compounds using the IUPAC conventions.		Section 2-2, 2-4										
	• Write formulas of simple compounds from their names.		Section 2-3, 2-4										
2.04 I	• Melting points.			Section 3-2		Section 5-1, 5-6							
	• Boiling points.			Section 3-2		Section 5-1, 5-6							
	• Density.			Section 3-3									
	• Solubility.									Section 9-1, 9-2			
2.05 A	• Ideal Gas Equation.			Section 3-7									

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	• Combined Gas Law.			Section 3-7									
	• Dalton's Law of Partial Pressures.												
2.06						Section 5-1	Section 6-1						
2.07	• Molecular.					Section 5-2, 5-3, 5-4, 5-5, 5-6							
	• Macromolecular.											Section 11-1, 11-2	
	• Hydrogen bonding and other intermolecular forces (dipole/dipole interaction, dispersion).					Section 5-5, 5-6							
	• VSEPR theory.					Section 5-3							
2.08	• Interpret phase diagrams.							Section 7-3					
	• Factors that affect phase changes.					Section 5-6	Section 6-7	Section 7-3					
3.01	• Groups (families).				Section 4-4								
	• Periods.				Section 4-4								
	• Representative elements (main group) and transition elements.				Section 4-4								
	• Electron configuration and energy levels.				Section 4-3, 4-4								
	• Ionization energy.				Section 4-5								

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	• Atomic and ionic radii.				Section 4-5								
	• Electronegativity.				Section 5-4								
3.02	• Particles to moles.			Section 3-5									
	• Mass to moles.			Section 3-5									
	• Volume of a gas to moles.			Section 3-7									
	• Molarity of solutions.						Section 6-2						
	• Empirical and molecular formula.									Section 9-3			
	• Percent composition.									Section 9-3			
3.03	• Moles of each species in a reaction.						Section 6-5, 6-6						
	• Mass of each species in a reaction.						Section 6-5, 6-6						
	• Volumes of gaseous species in a reaction.						Section 6-5, 6-6						
4.01	• The spectrum of electromagnetic energy.				Section 4-7								
	• Emission and absorption of electromagnetic energy as electrons change energy levels.				Section 4-7								
4.02	• Differentiate between heat and temperature.							Section 7-1					
	• Analyze heating and cooling curves.							Section 7-1					

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	• Calorimetry, heat of fusion and heat of vaporization calculations.							Section 7-2, 7-3					
	• Endothermic and exothermic processes including interpretation of potential energy.							Section 7-1, 7-4					
	• Diagrams (energy vs reaction pathway), enthalpy and activation energy.		Section 2-8										
4.03	Analyze the relationship between entropy and disorder in the universe.												
4.04	• Radioactivity: characteristics of alpha, beta and gamma radiation.												Section 12-1, 12-2
	• Decay equations for alpha and beta emission.												Section 12-1
	• Half-life.												Section 12-1
	• Fission and fusion.												Section 12-2
5.01	• Analyze reactions by types: single replacement, double replacement (including acidbase neutralization), decomposition, synthesis, and combustion including simple hydrocarbons.		Section 2-6	Lab 3-4			Section 6-4			Section 9-1	Section 10-2		
	• Predict products.		Section 2-6										
5.02	• Write and balance formulas and equations.		Section 2-7										
	• Write net ionic equations.												
5.03	• Formation of a precipitate.						Section 6-4			Section 9-1			

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	• Evolution of a gas.			Section 3-4									
	• Color changes.			Section 3-4									
	• Absorption or release of heat.			Section 3-4				Section 7-4					
5.04	• General properties of acids and bases.		Section 2-5										
	• Concentration and dilution of acids and bases.		Section 2-5										
	• Ionization and the degree of dissociation (strengths) of acids and bases.		Section 2-5				Section 6-3						
	• Indicators.		Section 2-5										
	• Acid-base titration.						Section 6-5						
	• pH and pOH.		Section 2-5				Section 6-5						
5.05	• Assign oxidation numbers to elements in REDOX reactions										Section 10-1, 10-2		
	• Identify the elements oxidized and reduced.										Section 10-1, 10-2		
	• Write simple half reactions.										Section 10-1, 10-2		
	• Assess the practical applications of oxidation and reduction reactions.										Section 10-3		

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5.06 A	• The nature of the reactants.		Section 2-8										
	• Temperature.		Section 2-8										
	• Concentration.		Section 2-8										
	• Surface area.		Section 2-8										
	• Catalyst.		Section 2-8										