



## Lab-Aids Correlations for

### 2023 NORTH CAROLINA STANDARD COURSE OF STUDY STANDARDS K-12 SCIENCE, CHEMISTRY

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This document is intended to show how *A Natural Approach to Chemistry, 3<sup>rd</sup> edition* materials align with the [2023 North Carolina Standard Course of Study, K-12 Science, Chemistry](#) standards.

#### ABOUT OUR PROGRAMS

Lab-Aids has based its home offices and operations in Ronkonkoma, NY, since 1963. We publish over 200 kits and core curriculum programs to support science teaching and learning, grades 6-12. All core curricula support an inquiry-driven pedagogy, with support for literacy skill development and with assessment programs that clearly show what students know and are able to do as a result of program use. All programs have extensive support for technology and feature comprehensive teacher support. For more information, please visit [www.lab-aids.com](http://www.lab-aids.com) and navigate to the program of interest.

#### ABOUT A NATURAL APPROACH TO CHEMISTRY

*A Natural Approach to Chemistry (NAC)*, written by Manos Chaniotakis, PhD, is published by, and available exclusively from, Lab-Aids, Inc., Ronkonkoma NY. Fully integrated instructional materials include a Student Book (SB), Lab Investigations Manual (LIM), Teacher Edition (TE), and a variety of materials packages.

Chapters 1-4 present a comprehensive overview of the “big picture,” main ideas in chemistry, such as the atomic nature of matter, systems, temperature, and energy. Chapters 5-14 provide in-depth coverage of the big ideas laid out in the first four chapters. The treatment includes strong conceptual development as well as algebra-based quantitative problem solving. All academic content and instruction standards for chemistry have been met by the end of Chapter 14. Chapters 15-21 dive deeper into significant areas of interest in chemistry related to the natural world and applications of chemistry to our daily lives.

#### ABOUT THE LAB-AIDS CITATIONS

This correlation is intended to show selected locations in *A Natural Approach to Chemistry* student materials that support the North Carolina Standard Course of Study standards for Chemistry. It is not an exhaustive list; other locations may exist that are not listed here.

Citations included in the correlation document are as follows:

Student Book: Chapter, Section	SB: 6.2, 6.3
Lab Investigations Manual (LIM): Investigation	LIM: 7A, 7B

Strand: Matter and its Interactions		
Standard	Objectives	Where addressed in <i>A Natural Approach to Chemistry</i>
<b>PS.Chm.1</b> <i>Analyze the structure of atoms and isotopes.</i>	PS.Chm.1.1 Use models to explain how the scientific understanding of atomic structure has evolved.	Ch 5.1, 5.2 LIM 5A, 5C
	PS.Chm.1.2 Use models to compare nuclear reactions including alpha decay, beta decay and gamma decay; nuclear fusion and nuclear fission.	Ch 20.2, 20.4 LIM 20A, 20B
	PS.Chm.1.3 Use models to explain how electrons are distributed in atoms.	Ch 5.1, 5.3, 7.2 LIM 5A, 6C
<b>PS.Chm.2</b> <i>Understand the physical and chemical properties of atoms based on their position in the Periodic Table.</i>	PS.Chm.2.1 Use the Periodic Table as a model to predict the relative properties of elements based on the pattern of valence electrons in the outermost energy levels of atoms.	Ch 6.2, 6.3 LIM 7A
	PS.Chm.2.2 Construct an explanation to infer the atomic size, reactivity, electronegativity, and ionization energy of an element based on its position in the Periodic Table.	Ch 6.1, 6.2, 6.3
<b>PS.Chm.3</b> <i>Understand the bonding that occurs in simple compounds in terms of bond type, strength, and properties.</i>	PS.Chm.3.1 Analyze and interpret data to explain the mechanisms and properties of the two main types of intramolecular (ionic and covalent) bonds.	Ch 4.1, 7.1
	PS.Chm.3.2 Construct an explanation to summarize the influences intermolecular forces have on the properties of chemical compounds.	Ch 8.3
	PS.Chm.3.3 Use models to predict chemical names and formulas including ionic (binary & ternary), acidic, and binary covalent compounds.	Ch 2.2, 4.1, 4.2, 4.3, 7.1, 7.2, 7.3, 8.1, 8.2 LIM 8A, 8B
<b>PS.Chm.4</b> <i>Analyze chemical reactions in terms of quantities, product formation, and energy.</i>	PS.Chm.4.1 Use models to explain the exothermic or endothermic nature of chemical changes.	Ch 4.2, 10.4
	PS.Chm.4.2 Carry out investigations to predict the outcome of simple chemical reactions that obey the Law of Conservation of Mass.	Ch 4.2, 10.1* LIM 4C, 10B
	PS.Chm.4.3 Use mathematics and computational thinking to analyze quantitatively the composition of a substance (empirical formula, molecular formula, percent composition, and mole conversions).	Ch 2.1, 2.2, 4.2, 7, 8.1, 8.4, 9.2, 11.1,
	PS.Chm.4.4 Use mathematics and computational thinking to apply the mole concept in the stoichiometric relationships inherent in chemical reactions.	2.2, 9.2, 11, 13.3, 13.4

Strand: Matter and its Interactions		
Standard	Objectives	Where addressed in <i>A Natural Approach to Chemistry</i>
<b>PS.Chm.5</b> <i>Understand the factors affecting rate of reaction and chemical equilibrium.</i>	PS.Chm.5.1 Carry out investigations to explain the effects of temperature, surface area, stirring, the concentration of reactants, and the presence of catalysts on the rate of chemical reactions according to Collision Theory.	Ch 12*  LIM 12A, 12B, 12C
	PS.Chm.5.2 Analyze and interpret data to predict how stressors on a reaction (concentration, temperature, pressure) would shift equilibrium.	Ch 12.1, 12.2  LIM 12C
<b>PS.Chm.6</b> <i>Understand solutions and the solution process.</i>	PS.Chm.6.1 Carry out investigations to summarize the factors that affect the formation and properties of solutions.	Ch 9*  LIM 9A, 9C, 10A
	PS.Chm.6.2 Use models to explain the quantitative nature of a solution (molarity, dilution, titration).	Ch 9.2, 11.1, 13.3, 13.4
	PS.Chm.6.3 Carry out investigations to compare properties and behaviors (qualitative and quantitative) of acids and bases.	Ch 13*  LIM 13A, 13B, 13C, 13D
Strand: Energy		
<b>PS.Chm.7</b> <i>Understand the relationship among pressure, temperature, volume, and phase.</i>	PS.Chm.7.1 Use models to explain how changes in energy affect the arrangement and movement of the particles in solids, liquids, and gases, as well as the relative strengths of their intermolecular forces.	Ch 1.2, 3.1, 3.3, 14.1
	PS.Chm.7.2 Use mathematics and computational thinking to execute simple calorimetric calculations based on the Law of Conservation of Energy.	Ch 3.2, 3.3  LIM 3A, 3B, 3D, 9C, 10C
	PS.Chm.7.3 Use mathematics and computational thinking to explain the relationships among pressure, temperature, volume, and quantity of gas, both qualitatively and quantitatively.	Ch 14.2, 14.3  LIM 14A, 14B

\* denotes partial coverage