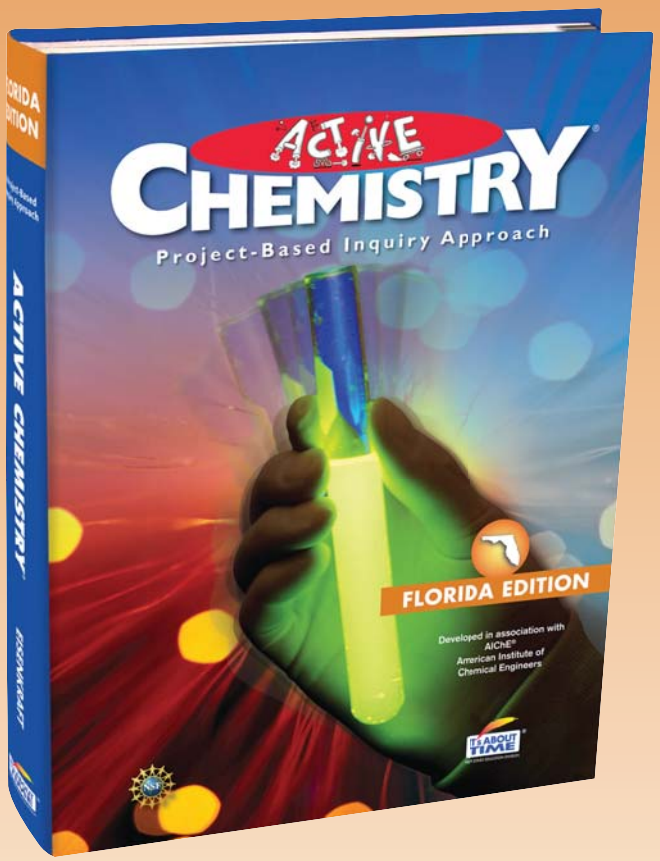
Florida Edition

Active Chemistry

CORRELATION
FLORIDA DEPARTMENT OF EDUCATION
INSTRUCTIONAL MATERIALS CORRELATION
COURSE STANDARDS



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Correlation of Florida Next Generation Sunshine State Standards to *Active Chemistry*

Florida Next Generation Sunshine State Standards Scheme and Descriptor	Active Chemistry
Standard 1: The Practice of Science	
A: Scientific inquiry is a multifaceted activity; The processes of science include the formulation of scientifically investigable questions, construction of investigations into those questions, the collection of appropriate data, the evaluation of the meaning of those data, and the communication of this evaluation.	
B: The processes of science frequently do not correspond to the traditional portrayal of "the scientific method."	
C: Scientific argumentation is a necessary part of scientific inquiry and plays an important role in the generation and validation of scientific knowledge.	
D: Scientific knowledge is based on observation and inference; it is important to recognize that these are very different things. Not only does science require creativity in its methods and processes, but also in its questions and explanations.	
SC.912.N.1.1 Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence, 5. plan investigations, 6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), 7. pose answers, explanations, or descriptions of events, 8. generate explanations that explicate or describe natural phenomena (inferences), 9. use appropriate evidence and reasoning to justify these explanations to others, 10. communicate results of scientific investigations, and 11. evaluate the merits of the explanations produced by others.	1. pose questions about the natural world, *Questions about the natural world are posed throughout the book. Examples include the following:* Chapter 1, Section 1, pp. 7-10; Section 5, pp. 48-50 Chapter 2, Section 2, p. 101; Section 4, p. 120 Chapter 3, Section 2, p. 202 Chapter 4, Section 4, p. 311 Chapter 5, Section 2, p. 389 Chapter 6, Section 6, p. 511; Section 8, p. 532 Chapter 7, Section 1, p. 551 Chapter 8, Section 5, p. 682; Section 6, p. 691 2. conduct systematic observations, *Nearly all* Investigates *include instructions for conducting systematic observations. Examples include the following:* Chapter 1, Section 2, pp. 22-24 Chapter 2, Section 2, pp. 101-104 Chapter 3, Section 3, pp. 213-215 Chapter 4, Section 4, pp. 314-315; Section 7, p. 344 Chapter 5, Section 1, pp. 381-383; Section 4, pp. 407-410 Chapter 6, Section 2, pp. 473-475 Chapter 7, Section 3, pp. 573-574 Chapter 8, Section 6, pp. 691-693

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	3. examine books and other sources of information to see what is already known, *Other sources are examined throughout the book. Examples include the following:* Chapter 1, Section 2, p. 33 Chapter 2, Section 4, p. 128 Chapter 3, Section 3, p. 220 Chapter 4, Section 7, p. 352 Chapter 5, Section 3, p. 406 Chapter 6, Section 5, p. 510 Chapter 7, Section 3, p. 581; Section 7, p. 614 Chapter 8, Section 2, p. 657; Section 7, p. 708 4. review what is known in light of empirical evidence, *Reviews of empirical evidence gathered in investigations appear throughout the book in* Chapter Challenges *and* Mini-Challenges*. Examples include the following:* Chapter 1, Chapter Challenge, pp. 87-89 Chapter 2, Chapter Challenge, pp. 187-189 Chapter 3, Chapter Challenge, pp. 267-269 Chapter 4, Chapter Challenge, pp. 369-371 Chapter 5, Chapter Challenge, pp. 453-455 Chapter 6, Chapter Challenge, pp. 539-541 Chapter 7, Chapter Challenge, pp. 631-633 Chapter 8, Chapter Challenge, pp. 719-721 5. plan investigations, *Student-planned investigations appear throughout the book. Examples include the following:* Chapter 1, Section 4, p. 41 Chapter 2, Section 6, p. 151 Chapter 3, Section 2, p. 204; Section 7, p. 260 Chapter 4, Section 3, p. 310; Section 4, p. 321 Chapter 5, Section 2, p. 388; Section 5, p. 428 Chapter 6, Section 1, pp. 467, 472 Chapter 7, Section 3, pp. 572-574 Chapter 8, Section 3, p. 667 6. use tools to gather, analyze, and interpret data, *Students use equipment to measure data and graphs to analyze it throughout the book. Examples include the following:* Chapter 1, Section 5, pp. 48-51 Chapter 2, Section 3, pp. 110-112 Chapter 3, Section 3, pp. 213-214 Chapter 4, Section 5, p. 325; Section 6, pp. 332-333 Chapter 5, Section 1, pp. 381-383 Chapter 6, Section 2, pp. 473-475; Section 7, pp. 519-521 Chapter 7, Section 3, pp. 573-575 Chapter 8, Section 2, pp. 649-652

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	7. pose answers, explanations, or other descriptions of events, *Students give detailed answers and descriptions of investigation results throughout the book. Examples include the following:* Chapter 1, Section 6, pp. 60-62 Chapter 2, Section 4, p. 122 Chapter 3, Section 5, p. 232 Chapter 4, Section 4, pp. 314-315 Chapter 5, Section 1, p. 383; Section 3, p. 399 Chapter 6, Section 6, pp. 512-513 Chapter 7, Section 2, pp. 562-564 Chapter 8, Section 3, p. 569 8. generate explanations that explicate or describe natural phenomena (inferences), *Examples appear throughout the text in* Investigates *and in all* Chem Essential Questions. *Examples include the following:* Chapter 1, Section 3, p. 37; Section 6, p. 62 Chapter 2, Section 5, p. 136; Section 6, p. 145 Chapter 3, Section 5, p. 239 Chapter 4, Section 1, p. 282; Section 4, p. 319 Chapter 5, Section 2, p. 395; Section 4, p. 414 Chapter 6, Section 4, p. 498; Section 8, p. 536 Chapter 7, Section 6, p. 605 Chapter 8, Section 3, p. 665; Section 5, p. 688 9. use appropriate evidence and reasoning to justify these explanations to others, *Evidence and reasoning are used to justify results throughout the book. Examples include the following:* Chapter 1, Section 4, p. 41; Section 6, p. 62 Chapter 2, Section 8, p. 163 Chapter 3, Section 5, p. 241 Chapter 4, Section 6, p. 335 Chapter 5, Section 7, p. 438 Chapter 6, Section 1, p. 467 Chapter 7, Section 2, p. 564; Section 6, p. 602 Chapter 8, Section 2, p. 651; Section 4, p. 670 10. communicate results of scientific investigations, *Students are asked to share their work with their groups or class throughout the book, including their* Mini-Challenges, Chapter Challenges, *and answers to* What Do You Think (Now)? *questions. Examples of the last include the following:* Chapter 1, Section 6, p. 65; Section 8, p. 76 Chapter 2, Section 3, p. 112; Mini-Challenge, pp. 138-139 Chapter 3, Mini-Challenge, pp. 242-243 Chapter 4, Section 4, p. 318; Mini-Challenge, pp. 322-323 Chapter 5, Mini-Challenge, pp. 416-417; Section 5, p. 426 Chapter 6, Mini-Challenge, pp. 500-501; Section 7, p. 528 Chapter 7, Mini-Challenge, pp. 582-583; Section 8, p. 627 Chapter 8, Mini-Challenge, pp. 680-681; Section 7, p. 706

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	11. evaluate the merits of the explanations produced by others, *Explanations are presented as part of the learning process throughout the book; evaluating them is an integral part of each chapter's* Mini-Challenge. *Examples include the following:* Chapter 1, Mini-Challenge, pp. 46-47 Chapter 2, Mini-Challenge, pp. 138-139 Chapter 3, Mini-Challenge, pp. 242-243 Chapter 4, Mini-Challenge, pp. 322-323 Chapter 5, Mini-Challenge, pp. 416-417 Chapter 6, Mini-Challenge, pp. 500-501 Chapter 7, Mini-Challenge, pp. 582-583 Chapter 8, Mini-Challenge, pp. 680-681
SC.912.N.1.2 Describe and explain what characterizes science and its methods.	*Scientific methods are elucidated throughout the book, and each section of each chapter contains a highlighting in terms of the* Chem Essential Questions. *Examples include the following:* Nature of Science pp. NS2, NS3, NS7 Chapter 1, Section 7, p. 71 Chapter 2, Section 5, pp. 136-137 Chapter 3, Section 3, p. 219 Chapter 4, Section 1, p. 287 Chapter 5, Section 4, p. 414 Chapter 6, Section 7, p. 529 Chapter 7, Section 1, p. 559 Chapter 8, Section 3, p. 665
SC.912.N.1.3 Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.	*Students are required to apply logic and critical thinking, evaluating the usefulness of argumentation in scientific inquiry throughout the book. Examples include the following:* Nature of Science pp. NS2, NS7 Chapter 1, Section 3, p. 37; Section 6, p. 67 Chapter 2, Section 3, p. 117 Chapter 3, Section 3, p. 219 Chapter 4, Section 4, p. 321; Section 5, p. 330 Chapter 5, Section 6, p. 434 Chapter 6, Section 5, p. 508 Chapter 7, Section 2, p. 569 Chapter 8, Section 6, p. 698
SC.912.N.1.4 Identify sources of information and assess their reliability according to the strict standards of scientific investigation.	*Throughout the book, students are asked to seek various external information sources, such as online educational sites and government sites, to complete their work, ascertaining their reliability. Examples include the following:* Nature of Science pp. NS2, NS3, NS5, NS7 Chapter 1, Section 1, p. 20 Chapter 2, Section 4, p. 128 Chapter 3, Section 2, p. 212, Section 8, p. 260 Chapter 4, Section 5, p. 331 Chapter 5, Section 3, p. 406 Chapter 6, Section 5, p. 510; Section 8, p. 537 Chapter 7, Section 7, p. 614 Chapter 8, Section 1, p. 648; Section 3, p. 667

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SC.912.N.1.5 Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.	Nature of Science p. NS2 Chapter 2, Scenario, p. 97; Section 3, pp. 113-116, 118; Section 4, pp. 123-125; Section 7, pp. 157-158 Chapter 3, Section 2, pp. 206-209 Chapter 8, Section 1, p. 648
SC.912.N.1.6 Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.	*Scientific inference is a key component of* Active Chemistry, *and students are required to observe and report their findings throughout the book. Examples include the following:* Nature of Science pp. NS2, NS3, NS4, NS5, NS7 Chapter 1, Section 2, pp. 22-25 Chapter 2, Section 6, pp. 140-144 Chapter 3, Section 3, pp. 213-215 Chapter 4, Section 5, pp. 324-325 Chapter 5, Section 5, pp. 418-420 Chapter 6, Section 3, pp. 482-483 Chapter 7, Section 6, pp. 600-602 Chapter 8, Section 7, pp. 701-703
SC.912.N.1.7 Recognize the role of creativity in constructing scientific questions, methods and explanations.	Active Chemistry *emphasizes the role creativity plays in scientific discovery, and each* Chapter Challenge *contains a creative component as well as a written component to provide students an opportunity to create unique solutions to presented problems. Students must then clearly communicate their results. Examples include the following:* Nature of Science pp. NS1, NS2, NS8 Chapter 1, Section 2, p. 33; Chapter Challenge, pp. 87-89 Chapter 2, Section 1, p. 100; Chapter Challenge, pp. 187-189 Chapter 3, Section 7, p. 260; Chapter Challenge, pp. 267-269 Chapter 4, Section 6, p. 341; Section 8, p. 367; Chapter Challenge, pp. 369-371 Chapter 5, Section 1, p. 388; Section 8, p. 451; Chapter Challenge, pp. 453-455 Chapter 6, Section 1, p. 472; Section 5, p. 510, Section 6, p. 518; Chapter Challenge, pp. 539-541 Chapter 7, Section 7, p. 614; Chapter Challenge, pp. 631-633 Chapter 8, Section 3, p. 667; Chapter Challenge, pp. 719-721
Standard 2: The Characteristics of Scientific Knowledge	
A: Scientific knowledge is based on empirical evidence, and is appropriate for understanding the natural world, but it provides only a limited understanding of the supernatural, aesthetic, or other ways of knowing, such as art, philosophy, or religion.	
B: Scientific knowledge is durable and robust, but open to change.	
C: Because science is based on empirical evidence it strives for objectivity, but as it is a human endeavor the processes, methods, and knowledge of science include subjectivity, as well as creativity and discovery.	
SC.912.N.2.1 Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).	Nature of Science pp. NS2, NS4, NS6 Chapter 7, Extending the Connection, p. 634A

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SC.912.N.2.2 Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as questions addressed by other ways of knowing, such as art, philosophy, and religion.	Nature of Science p. NS6 Chapter 3, Section 1, p. 201
SC.912.N.2.3 Identify examples of pseudoscience (such as astrology, phrenology) in society.	Nature of Science p. NS6 Chapter 7, Extending the Connection, p. 634A
SC.912.N.2.4 Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.	*The durability of scientific knowledge is indicated throughout the book, for example, when detailing historical discoveries and their present-day applications or making comparisons between real-world events and equivalent behavior in models. Examples include the following:* Nature of Science pp. NS2, NS5, NS7 Chapter 1, Section 2, pp. 26-27 Chapter 2, Section 2, p. 105; Section 3, pp. 113-116; Section 4, pp. 123-125; Section 5, pp. 133-136; Section 6, pp. 147-148; Section 7, pp. 157-158; Section 9, p. 176 Chapter 3, Section 2, pp. 206-209; Section 5, pp. 235-236 Chapter 4, Section 2, p. 294; Section 8, pp. 359-360 Chapter 5, Section 2, p. 394; Section 4, pp. 411-413; Section 6, p. 433; Section 7, pp. 439-441 Chapter 6, Section 7, pp. 522-523 Chapter 7, Section 8, p. 623 Chapter 8, Section 1, p. 648; Section 8, pp. 713-714
SC.912.N.2.5 Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.	*Scientists of various backgrounds, interests, and goals are portrayed throughout the book. The importance of their individual histories in developing interpretations about natural phenomena, and the concept of competing interpretations based on these histories, is elucidated throughout the book in the* Chem Talks. *Examples include the following:* Nature of Science pp. NS2, NS7 Chapter 1, Section 5, p. 54 Chapter 2, Section 3, pp. 113-116; Section 4, pp. 123-125; Section 5, pp. 133-136; Section 6, pp. 147-148; Section 7, pp. 157-158; Section 9, p. 176 Chapter 3, Section 2, pp. 206-209 Chapter 4, Section 2, p. 294 Chapter 5, Section 2, p. 394; Section 4, pp. 411-413; Section 6, p. 433 Chapter 6, Section 7, pp. 522-523 Chapter 7, Section 8, p. 622-626 Chapter 8, Section 1, p. 648; Section 8, p. 714

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Standard 3: The Role of Theories, Laws, Hypotheses, and Models	
The terms that describe examples of scientific knowledge, for example: "theory," "law," "hypothesis" and "model" have very specific meanings and functions within science.	
SC.912.N.3.1 Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.	*Students read throughout the book that scientific theories are developed after many scientific investigations by different individuals have taken place, and that evidence of validity has been compiled over time to offer the most powerful explanation for natural phenomena. Examples include the following:* Nature of Science pp. NS2, NS3, NS4, NS5, NS6, NS7 Chapter 1, Section 2. p. 27 Chapter 2, Section 3, pp. 113-116; Section 4, pp. 123-125; Section 5, pp. 133-136; Section 6, pp. 147-148; Section 7, pp. 157-158; Section 9, pp. 176-182 Chapter 3, Section 2, pp. 206-209 Chapter 4, Section 2, p. 294 Chapter 5, Section 2, pp. 392-395; Section 4, pp. 411-413; Section 6, pp. 432-433 Chapter 6, Section 5, p. 506; Section 7, pp. 522-523 Chapter 7, Section 8, pp. 622-626 Chapter 8, Section 8, pp. 712-714
SC.912.N.3.2 Describe the role consensus plays in the historical development of a theory in any one of the disciplines of science.	*The concept of developing a strong theory by community consensus and the historical progression of various theories is examined throughout the book in the* Chem Talks. *Examples include the following:* Nature of Science pp. NS3, NS5 Chapter 1, Section 2, p. 27 Chapter 2, Section 2, p. 105; Section 3, pp. 113-116; Section 4, pp. 123-125; Section 5, pp. 133-136; Section 6, pp. 147-148; Section 7, pp. 157-158; Section 9, pp. 176 Chapter 3, Section 2, pp. 206-209 Chapter 4, Section 2, p. 294 Chapter 5, Section 4, pp. 411-412; Section 6, p. 433 Chapter 6, Section 5, p. 506; Section 7, pp. 522-523 Chapter 7, Section 8, pp. 622-626 Chapter 8, Section 1, p. 648; Section 4, pp. 672-673; Section 8, pp. 712-714

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SC.912.N.3.3 Explain that scientific laws are descriptions of specific relationships under given conditions in nature, but do not offer explanations for those relationships.	*Students learn throughout the book that scientific laws describe specific relationship under given conditions, but do not explain why this happens. Examples include the following:* *Nature of Science pp. NS3, NS4, NS5* Chapter 1, Section 2, p. 27; Section 9, p. 82 Chapter 2, Section 3, pp. 113-116 Chapter 3, Section 2, pp. 205-209 Chapter 4, Section 2, p. 294; Section 8, pp. 357, 359-360 Chapter 5, Section 3, pp. 400-403; Section 4, pp. 411-413; Section 5, pp. 421-425; Section 6, pp. 432-433; Section 7, pp. 438-441 Chapter 6, Section 5, p. 506 Chapter 7, Section 2, p. 565 Chapter 8, Section 4, pp. 672-673
SC.912.N.3.4 Recognize that theories do not become laws, nor do laws become theories; theories are well supported explanations and laws are well supported descriptions.	Nature of Science pp. NS3, NS4, NS5, NS6, NS7 Chapter 2, Section 4, p. 126
SC.912.N.3.5 Describe the function of models in science, and identify the wide range of models used in science.	*Examples of models in science are identified throughout the book. Examples include the following:* Nature of Science p. NS5 Chapter 1, Section 6, p. 63; Section 7, p. 69 Chapter 2, Section 4, pp. 123, 125; Section 5, p. 133 Chapter 3, Section 4, pp. 224-225 Chapter 4, Section 1, p. 285; Section 2, pp. 290, 295 Chapter 5, Section 2, pp. 389-390, 392, 394 Chapter 7, Section 2, pp. 565-566; Section 7, pp. 610-611; Section 8, pp. 617-620, 622-626 Chapter 8, Section 5, p. 687; Section 7, pp. 702, 704-705; Section 8, p. 710
Standard 4: Science and Society	
As tomorrow's citizens, students should be able to identify issues about which society could provide input, formulate scientifically investigable questions about those issues, construct investigations of their questions, collect and evaluate data from their investigations, and develop scientific recommendations based upon their findings.	
SC.912.N.4.1 Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.	Nature of Science pp. NS2, NS7, NS8 Chapter 1, Section 6, pp. 63-64; Section 9, p. 81 Chapter 4, Extending the Connection, pp. 372A-372B Chapter 6, Section 5, p. 504; Section 8, pp. 535-537; Extending the Connection, pp. 542A-542B Chapter 7, Section 1, p. 554; Section 3, p. 576 Chapter 8, Section 3, p. 663
SC.912.N.4.2 Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.	Nature of Science pp. NS7, NS8 Chapter 2, Extending the Connection, pp. 190A-190B Chapter 3, Section 1, p. 200; Section 2, p. 209; Section 7, p.257 Chapter 7, Extending the Connection, p. 634B

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Standard 5: Earth in Space and Time	
The origin and eventual fate of the Universe still remains one of the greatest questions in science. Gravity and energy influence the development and life cycles of galaxies, including our own Milky Way galaxy, stars, the planetary systems, Earth, and residual material left from the formation of the solar system. Humankind's need to explore continues to lead to the development of knowledge and understanding of the nature of the Universe.	
SC.912.E.5.1 Cite evidence used to develop and verify the scientific theory of the Big Bang (also known as the Big Bang Theory) of the origin of the Universe.	Chapter 7, Extending the Connection, pp. 634A-634B
Standard 8: Properties of Matter	
A: A working definition of matter is that it takes up space, has mass, and has measurable properties. Matter is comprised of atomic, subatomic, and elementary particles.	
B: Electrons are key to defining chemical and some physical properties, reactivity, and molecular structures. Repeating (periodic) patterns of physical and chemical properties occur among elements that define groups of elements with similar properties. The periodic table displays the repeating patterns, which are related to the atom's outermost electrons. Atoms bond with each other to form compounds.	
C: In a chemical reaction, one or more reactants are transformed into one or more new products. Many factors shape the nature of products and the rates of reaction.	
D: Carbon-based compounds are building-blocks of known life forms on earth and numerous useful natural and synthetic products.	
SC.912.P.8.1 Differentiate among the four states of matter.	Chapter 1, Section 2, p. 26; Section 7, pp. 69-70 Chapter 5, Section 2, pp. 392-393 Chapter 7, Section 4, p. 586; Section 5, pp. 595-596
SC.912.P.8.2 Differentiate between physical and chemical properties and physical and chemical changes of matter.	Chapter 1, Section 4, pp. 42-43; Section 6, pp. 61-64; Section 7, pp. 69-71 Chapter 2, Section 2, pp. 105-106 Chapter 6, Section 1, p. 468; Section 2, pp. 473-478 Chapter 7, Section 4, p. 587; Section 5, pp. 595-596 Chapter 8, Section 1, pp. 643-644, 646-647; Section 2, pp. 652-653; Section 7, pp. 704-705
SC.912.P.8.3 Explore the scientific theory of atoms (also known as atomic theory) by describing changes in the atomic model over time and why those changes were necessitated by experimental evidence.	Chapter 2, Section 3, pp. 113-116; Section 4, pp. 123-125; Section 5, pp. 133, 136; Section 6, pp. 147-148; Section 7, pp. 157-158; Section 9, p. 176
SC.912.P.8.4 Explore the scientific theory of atoms (also known as atomic theory) by describing the structure of atoms in terms of protons, neutrons and electrons, and differentiate among these particles in terms of their mass, electrical charges and locations within the atom.	Chapter 2, Section 4, pp. 123-125; Section 9, p. 176 Chapter 8, Section 3, p. 661

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SC.912.P.8.5 Relate properties of atoms and their position in the periodic table to the arrangement of their electrons.	Chapter 2, Section 6, pp. 140-148; Section 7, pp. 157-158; Section 8, p. 165 Chapter 3, Section 3, pp. 216-217
SC.912.P.8.6 Distinguish between bonding forces holding compounds together and other attractive forces, including hydrogen bonding and van der Waals forces.	Chapter 2, Section 8, pp. 165-167 Chapter 5, Section 2, pp. 392-395
SC.912.P.8.7 Interpret formula representations of molecules and compounds in terms of composition and structure.	Chapter 1, Section 9, pp. 79-80 Chapter 3, Section 5, pp. 233, 237; Section 8, p. 262 Chapter 4, Section 2, pp. 290, 295 Chapter 5, Section 2, pp. 389-392, 394; Section 5, pp. 421-423 Chapter 6, Section 2, pp. 473-476, 478-479; Section 3, pp. 482, 485-486; Section 4, pp. 493-494; Section 8, pp. 532-537 Chapter 7, Section 2, pp. 565-566; Section 3, p. 579; Section 7, pp. 610-611 Chapter 8, Section 4, pp. 674-676
SC.912.P.8.8 Characterize types of chemical reactions, for example: redox, acid-base, synthesis, and single and double replacement reactions.	Chapter 3, Section 2, pp. 205-210; Section 6, pp. 248-249 Chapter 4, Section 1, pp. 281-282; Section 4, pp. 317-318 Chapter 5, Section 1, pp. 385-386; Section 5, pp. 421-425 Chapter 6, Section 4, pp. 495-497; Section 8, pp. 534-537 Chapter 8, Section 4, pp. 676-677; Section 5, p. 687; Section 6, pp. 694-696
SC.912.P.8.9 Apply the mole concept and the law of conservation of mass to calculate quantities of chemicals participating in reactions.	Chapter 3, Section 5, pp. 232-238 Chapter 4, Section 3, pp. 303-307 Chapter 5, Section 5, pp. 421-422
SC.912.P.8.11 Relate acidity and basicity to hydronium and hydroxyl ion concentration and pH.	Chapter 3, Section 2, pp. 205-209 Chapter 6, Section 7, pp. 522-528
SC.912.P.8.12 Describe the properties of the carbon atom that make the diversity of carbon compounds possible.	Chapter 7, Section 8, pp. 615-626; p.T14 Table: Class and Functional Groups or Organic Compounds

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Standard 10: Forms of Energy	
A: Energy is involved in all physical and chemical processes. It is conserved, and can be transformed from one form to another and into work. At the atomic and nuclear levels energy is not continuous but exists in discrete amounts. Energy and mass are related through Einstein's equation $E = mc^2$.	
B: The properties of atomic nuclei are responsible for energy-related phenomena such as radioactivity, fission and fusion.	
C: Changes in entropy and energy that accompany chemical reactions influence reaction paths. Chemical reactions result in the release or absorption of energy.	
D: The theory of electromagnetism explains that electricity and magnetism are closely related. Electric charges are the source of electric fields. Moving charges generate magnetic fields.	
E: Waves are the propagation of a disturbance. They transport energy and momentum but do not transport matter.	
SC.912.P.10.1 Differentiate among the various forms of energy and recognize that they can be transformed from one form to others.	Chapter 6, Section 5, p. 506 Chapter 8, Extending the Connection, pp. 634B
SC.912.P.10.2 Explore the Law of Conservation of Energy by differentiating among open, closed, and isolated systems and explain that the total energy in an isolated system is a conserved quantity.	Chapter 4, Section 8, p. 357 Chapter 6, Section 5, p. 506
SC.912.P.10.5 Relate temperature to the average molecular kinetic energy.	Chapter 1, Section 2, pp. 26-27 Chapter 5, Section 4, pp. 412-413
SC.912.P.10.6 Create and interpret potential energy diagrams, for example: chemical reactions, orbits around a central body, motion of a pendulum.	Chapter 4, Section 7, pp. 348-349 Chapter 6, Section 5, pp. 505, 509 Chapter 7, Section 3, p. 578
SC.912.P.10.7 Distinguish between endothermic and exothermic chemical processes.	Chapter 4, Section 7, pp. 346-349 Chapter 6, Section 5, pp. 504-505, 509 Chapter 7, Section 3, pp. 577-578; Section 5, p. 596
SC.912.P.10.9 Describe the quantization of energy at the atomic level.	Chapter 2, Section 5, pp. 133, 136
SC.912.P.10.10 Compare the magnitude and range of the four fundamental forces (gravitational, electromagnetic, weak nuclear, strong nuclear).	Chapter 2, Section 9, pp. 177-179
SC.912.P.10.11 Explain and compare nuclear reactions (radioactive decay, fission and fusion), the energy changes associated with them and their associated safety issues.	Chapter 2, Section 9, pp. 179-181
SC.912.P.10.12 Differentiate between chemical and nuclear reactions.	Chapter 2, Section 9, p. 181

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SC.912.P.10.18 Explore the theory of electromagnetism by comparing and contrasting the different parts of the electromagnetic spectrum in terms of wavelength, frequency, and energy, and relate them to phenomena and applications.	Chapter 4, Section 5, pp. 325-327
Standard 12: Motion of Objects	
A: Motion can be measured and described qualitatively and quantitatively. Net forces create a change in motion. When objects travel at speeds comparable to the speed of light, Einstein's special theory of relativity applies.	
B: Momentum is conserved under well-defined conditions. A change in momentum occurs when a net force is applied to an object over a time interval.	
C: The law of Universal Gravitation states that gravitational forces act on all objects irrespective of their size and position.	
D: Gases consist of great numbers of molecules moving in all directions. The behavior of gases can be modeled by the kinetic molecular theory.	
E: Chemical reaction rates change with conditions under which they occur. Chemical equilibrium is a dynamic state in which forward and reverse processes occur at the same rates.	
SC.912.P.12.10 Interpret the behavior of ideal gases in terms of kinetic molecular theory.	Chapter 5, Section 3, pp. 400-403; Section 4, pp. 411-413; Section 6, pp. 432-433; Section 7, pp. 438-439
SC.912.P.12.11 Describe phase transitions in terms of kinetic molecular theory.	Chapter 7, Section 4, pp. 586-588
SC.912.P.12.12 Explain how various factors, such as concentration, temperature, and presence of a catalyst affect the rate of a chemical reaction.	Chapter 4, Section 7, p. 349 Chapter 6, Section 6, pp. 514-515
SC.912.P.12.13 Explain the concept of dynamic equilibrium in terms of reversible processes occurring at the same rates.	Chapter 6, Section 7, pp. 525-526
Standard 17: Interdependence	
A: The distribution and abundance of organisms is determined by the interactions between organisms, and between organisms and the non-living environment.	
B: Energy and nutrients move within and between biotic and abiotic components of ecosystems via physical, chemical and biological processes.	
C: Human activities and natural events can have profound effects on populations, biodiversity and ecosystem processes.	
SC.912.L.15.2 Discuss the use of molecular clocks to estimate how long ago various groups of organisms diverged evolutionarily from one another.	Chapter 5, Extending the Connection, pp. 456A-456B
SC.912.L.16.10 Evaluate the impact of biotechnology on the individual, society and the environment, including medical and ethical issues.	Chapter 4, Extending the Connection, pp. 372A-372B

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SC.912.L.17.11 Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests.	Chapter 3, Extending the Connection, pp. 270A-270B
SC.912.L.17.15 Discuss the effects of technology on environmental quality.	Chapter 7, Extending the Connection pp. 634A-634B
SC.912.L.17.16 Discuss the large-scale environmental impacts resulting from human activity, including waste spills, oil spills, runoff, greenhouse gases, ozone depletion, and surface and groundwater pollution.	Chapter 6, Extending the Connection, pp. 542A-542B
SC.912.L.17.19 Describe how different natural resources are produced and how their rates of use and renewal limit availability.	Chapter 2, Extending the Connection, p. 190A
SC.912.L.17.20 Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability.	Chapter 2, Extending the Connection, p. 190B
Standard 18: Matter and Energy Transformations	
A: All living things are composed of four basic categories of macromolecules and share the same basic needs for life.	
B: Living organisms acquire the energy they need for life processes through various metabolic pathways (primarily photosynthesis and cellular respiration).	
C: Chemical reactions in living things follow basic rules of chemistry and are usually regulated by enzymes.	
D: The unique chemical properties of carbon and water make life on Earth possible.	
SC.912.L.18.12 Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temperature, expansion upon freezing, and versatility as a solvent.	Chapter 1, Extending the Connection, pp. 90A-90B
Standard 2: Nonfiction	
LA.910.2.2.3 the student will organize information to show understanding or relationships among facts, ideas, and events (e.g., representing key points within text through charting, mapping, paraphrasing, summarizing, comparing, contrasting, or outlining);	*Students are required to organize information and give proof of understanding relationships among facts, ideas, and events throughout the book. Examples include the following:* Chapter 1, Section 4, p. 44 Chapter 2, Section 3, p. 117 Chapter 3, Section 6, p. 250 Chapter 4, Section 7, p. 350 Chapter 5, Section 3, p. 404 Chapter 6, Section 6, p. 516 Chapter 7, Section 3, p. 580 Chapter 8, Section 4, p. 678

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Standard 2: Informative	
LA.910.4.2.2 The student will record information and ideas from primary and/or secondary sources accurately and coherently, noting the validity and reliability of these sources and attributing sources of information;	*Primary and secondary sources are used throughout the book. Examples include the following:* Chapter 1, Section 1, p. 20 Chapter 2, Section 4, p. 128 Chapter 3, Section 2, p. 212 Chapter 4, Section 5, p. 331 Chapter 5, Section 3, p. 406 Chapter 6, Section 5, p. 510; Section 8, p. 537 Chapter 7, Section 7, p. 614 Chapter 8, Section 1, p. 648; Section 3, p. 667
Standard 1: Formulating Questions	
MA.912.S.1.2 Determine appropriate and consistent standards of measurement for the data to be collected in a survey or experiment.	*Appropriate and consistent measurements of data are collected throughout the book. Examples include the following:* Chapter 1, Section 4, pp. 40-41 Chapter 2, Section 2, pp. 101-104 Chapter 3, Section 5, pp. 230-232 Chapter 4, Section 6, pp. 332-335 Chapter 5, Section 4, pp. 407-410 Chapter 6, Section 5, pp. 502-503 Chapter 7, Section 6, pp. 600-602 Chapter 8, Section 6, pp. 691-693
Standard 3: Summarizing Data	
MA.912.S.3.2 Collect, organize, and analyze data sets, determine the best format for the data and present visual summaries from the following: • bar graphs • line graphs • stem and leaf plots • circle graphs • histograms • box and whisker plots • scatter plots • cumulative frequency (ogive) graphs	*Examples of visual summaries of data sets appear throughout the book. Examples include the following:* Chapter 1, Section 2, pp. 22-24 Chapter 2, Section 1, pp. 99-100; Section 6, pp. 141-144 Chapter 4, Section 7, pp. 348-349 Chapter 5, Section 2, p. 392; Section 3, pp. 398-399, 402, 404 Chapter 6, Section 5, p. 509; Section 7, pp. 524-525 Chapter 7, Section 4, pp. 584-585; Section 5, pp. 591-593, 598; Section 6, p. 607 Chapter 8, Section 2, pp. 649-652; Section 4, pp. 671-672

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