



CHEMISTRY

MATTER AND CHANGE

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STANDARDS	PAGE REFERENCES
Science Goal 1: Expectation and Indicators	
Goal 1 Skills and Processes for Biology Assessment The student will demonstrate ways of thinking and acting inherent in the practice of science. The student will use the language and instruments of science to collect, organize, interpret, calculate, and communicate information.	
Expectation 1.1 The student will explain why curiosity, honesty, openness, and skepticism are highly regarded in science.	
Indicator 1.1.1 The student will recognize that real problems have more than one solution and decisions to accept one solution over another are made on the basis of many issues.	Student Edition: <i>Chemistry Online</i> 830 <i>Chemistry and Society</i> 20, 110, 834 <i>Problem-Solving Lab</i> 860 Teacher Wraparound Edition: A 853; CJ 781, 825; DI 824; E 196
Indicator 1.1.2 The student will modify or affirm scientific ideas according to accumulated evidence.	Student Edition: <i>ChemLab</i> 410-411 <i>MiniLab</i> 604 <i>Problem-Solving Lab</i> 191, 860 <i>Section Assessment</i> 716 #22 Teacher Wraparound Edition: A 15, 95, 137, 583; CJ 708

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<p>Indicator 1.1.3 The student will critique arguments that are based on faulty, misleading data or on the incomplete use of numbers.</p>	<p>Student Edition: <i>ChemLab</i> 19 #6, 79 #7, 551 #7 Teacher Wraparound Edition: A 824; CJ 781; P 456</p>
<p>Indicator 1.1.4 The student will recognize data that are biased.</p>	<p>Student Edition: <i>ChemLab</i> 19 #6, 79 #7, 551 #7 Teacher Wraparound Edition: A 824; P 456</p>
<p>Indicator 1.1.5 The student will explain factors that produce biased data.</p>	<p>Proper data collection and analysis techniques are discussed in: Student Edition: 10-13, 36-42 Teacher Wraparound Edition: AC 33; IM 38</p>
<p>Expectation 1.2 The student will pose scientific questions and suggest investigative approaches to provide answers to questions.</p>	
<p>Indicator 1.2.1 The student will identify meaningful, answerable scientific questions.</p>	<p>Student Edition: <i>Chapter Assessment</i> 22 #34 <i>ChemLab</i> 18-19 <i>Discovery Lab</i> 775 <i>Problem-Solving Lab</i> 44, 267, 390 Teacher Wraparound Edition: A 833, 860; E 183; QD 168</p>
<p>Indicator 1.2.2 The student will pose meaningful, answerable scientific questions.(NTB)</p>	<p>Student Edition: <i>ChemLab</i> 627 #1, 833 #2 <i>Problem-Solving Lab</i> 372, 478 <i>Section Assessment</i> 585 #24 Teacher Wraparound Edition: A 392, 618, 763, 863; P 614</p>

STANDARDS	PAGE REFERENCES
<p>Indicator 1.2.3 The student will formulate a working hypothesis.</p>	<p>Student Edition: <i>ChemLab</i> 109 #5, 202 #2, 300 #4, 550 #4, 863 #5 <i>Discovery Lab</i> 385 <i>MiniLab</i> 230, 439 Teacher Wraparound Edition: A 109, 533</p>
<p>Indicator 1.2.4 The student will test a working hypothesis.(NTB)</p>	<p>Student Edition: <i>ChemLab</i> 202-203, 300-301, 550-551 <i>MiniLab</i> 439 Teacher Wraparound Edition: A 109, 533</p>
<p>Indicator 1.2.5 The student will select appropriate instruments and materials to conduct an investigation.</p>	<p>Student Edition: <i>ChemLab</i> 480-481, 520-521, 626-627, 688-689, 832-833 <i>Problem-Solving Lab</i> 478 Teacher Wraparound Edition: A 409, 481, 746, 763</p>
<p>Indicator 1.2.6 The student will identify appropriate methods for conducting an investigation, including independent and dependent variables, and affirm the need for proper controls in an experiment.</p>	<p>Student Edition: 10-13 <i>ChemLab</i> 18-19, 300-301, 550-551 <i>Problem-Solving Lab</i> 478 Teacher Wraparound Edition: A 392, 411, 542; E 11, 13</p>
<p>Indicator 1.2.7 The student will use relationships discovered in the lab to explain phenomena observed outside the laboratory.</p>	<p>Student Edition: <i>Chemistry Online</i> 599 <i>ChemLab</i> 202-203 <i>MiniLab</i> 638 <i>Problem-Solving Lab</i> 583, 624, 647 Teacher Wraparound Edition: CJ 362, 609; P 441, 614</p>
<p>Indicator 1.2.8 The student will defend the need for verifiable data.</p>	<p>Student Edition: 11-12, 36-42 <i>ChemLab</i> 18-19 Teacher Wraparound Edition: IM 38</p>

STANDARDS	PAGE REFERENCES
<p>Expectation 1.3 The student will carry out scientific investigations effectively and employ the instruments, systems of measurement, and materials of science appropriately.</p>	
<p>Indicator 1.3.1 The student will develop and demonstrate skills in using lab and field equipment to perform investigative techniques.(NTB)</p>	<p>Student Edition: <i>ChemLab</i> 142-143, 480-481, 626-627, 688-689, 832-833 Teacher Wraparound Edition: A 405, 437, 618, 725; CJ 620</p>
<p>Indicator 1.3.2 The student will recognize safe laboratory procedures.</p>	<p>Student Edition: 14-16 <i>ChemLab</i> 18 #4, 78 #2, 108 #7, 300 #2, 520 #2 <i>Problem-Solving Lab</i> 478 Teacher Wraparound Edition: A 392, 405; P 16</p>
<p>Indicator 1.3.3 The student will demonstrate safe handling of the chemicals and materials of science.(NTB)</p>	<p>Student Edition: <i>ChemLab</i> 18-19, 78-79, 300-301, 342-343, 520-521, 654-655 <i>Discovery Lab</i> 55 Teacher Wraparound Edition: A 392, 405, 618</p>
<p>Indicator 1.3.4 The student will learn the use of new instruments and equipment by following instructions in a manual or from oral direction.(NTB)</p>	<p>Student Edition: <i>ChemLab</i> 480-481, 626-627, 688-689, 796-797, 832-833, 862-863 Teacher Wraparound Edition: A 437</p>
<p>Expectation 1.4 The student will demonstrate that data analysis is a vital aspect of the process of scientific inquiry and communication.</p>	
<p>Indicator 1.4.1 The student will organize data appropriately using techniques such as tables, graphs, and webs (for graphs: axes labeled with appropriate quantities, appropriate units on axes, axes labeled with appropriate intervals, independent and dependent variables on correct axes, appropriate title).</p>	<p>Student Edition: <i>ChemLab</i> 550-551 <i>MiniLab</i> 164, 819 <i>Problem-Solving Lab</i> 267, 503 Teacher Wraparound Edition: A 729; CU 819; MC 167, 218, 315</p>

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<p>Indicator 1.4.2</p> <p>The student will analyze data to make predictions, decisions, or draw conclusions.</p>	<p>Student Edition:</p> <p><i>ChemLab</i> 410-411, 550-551, 766-767 <i>Problem-Solving Lab</i> 155, 219, 288, 314</p> <p>Teacher Wraparound Edition:</p> <p>A 218, 833; CJ 430</p>
<p>Indicator 1.4.3</p> <p>The student will use experimental data from various investigators to validate results.</p>	<p>Student Edition:</p> <p><i>ChemLab</i> 19 #6, 79 #7, 551 #7 <i>MiniLab</i> 68</p> <p>Teacher Wraparound Edition:</p> <p>A 15, 314</p>
<p>Indicator 1.4.4</p> <p>The student will determine the relationships between quantities and develop the mathematical model that describes these relationships.</p>	<p>Student Edition:</p> <p><i>ChemLab</i> 766-767 <i>MiniLab</i> 539 <i>Problem-Solving Lab</i> 44, 267, 314, 390, 830</p> <p>Teacher Wraparound Edition:</p> <p>A 372, 830; MC 218</p>
<p>Indicator 1.4.5</p> <p>The student will check graphs to determine that they do not misrepresent results.</p>	<p>Proper techniques for constructing and interpreting graphs are discussed In:</p> <p>Student Edition:</p> <p>43-45 <i>Appendix B</i> 903-907</p> <p>Teacher Wraparound Edition:</p> <p>R 45</p>
<p>Indicator 1.4.6</p> <p>The student will describe trends revealed by data.</p>	<p>Student Edition:</p> <p>163-169 <i>ChemLab</i> 170-171 <i>Problem-Solving Lab</i> 155, 191, 288</p> <p>Teacher Wraparound Edition:</p> <p>A 44, 218; MC 165, 167; QD 182</p>
<p>Indicator 1.4.7</p> <p>The student will determine the sources of error that limit the accuracy or precision of experimental results.</p>	<p>Student Edition:</p> <p><i>ChemLab</i> 47 #6, 109 #7, 343 #4, 375 #9, 411 #8, 481 #4, 521 #7, 729 #7, 833 #7</p> <p>Teacher Wraparound Edition:</p> <p>A 504</p>

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<p>Indicator 1.4.8</p> <p>The student will use models and computer simulations to extend his/her understanding of scientific concepts.(NTB)</p>	<p>Student Edition:</p> <p><i>ChemLab</i> 862-863 <i>MiniLab</i> 261, 401, 819 <i>Problem-Solving Lab</i> 130, 790</p> <p>Teacher Wraparound Edition:</p> <p>BM 426, 435, 825; R 97</p>
<p>Indicator 1.4.9</p> <p>The student will use analyzed data to confirm, modify, or reject an hypothesis.</p>	<p>Student Edition:</p> <p><i>ChemLab</i> 18-19, 202-203, 300-301, 550-551 <i>MiniLab</i> 439 <i>Problem-Solving Lab</i> 191</p> <p>Teacher Wraparound Edition:</p> <p>A 218, 395, 533; D 458-459</p>
<p>Expectation 1.5</p> <p>The student will use appropriate methods for communicating in writing and orally the processes and results of scientific investigation.</p>	
<p>Indicator 1.5.1</p> <p>The student will demonstrate the ability to summarize data (measurements/observations).</p>	<p>Student Edition:</p> <p><i>Chapter Assessment</i> 592 #79, 632 #107 <i>ChemLab</i> 767 #1 <i>Section Assessment</i> 169 #24</p> <p>Teacher Wraparound Edition:</p> <p>A 203; CJ 397, 404, 430; E 762; P 57</p>
<p>Indicator 1.5.2</p> <p>The student will explain scientific concepts and processes through drawing, writing, and/or oral communication.</p>	<p>Student Edition:</p> <p><i>Chemistry Online</i> 402 <i>Chemistry and Society</i> 80 #1, 482 #1 <i>How It Works</i> 864 #2</p> <p>Teacher Wraparound Edition:</p> <p>A 288, 445, 619, 829; E 334, 762</p>
<p>Indicator 1.5.3</p> <p>The student will use computers and/or graphing calculators to produce the visual materials (tables, graphs, and spreadsheets) that will be used for communicating results.(NTB)</p>	<p>Student Edition:</p> <p><i>ChemLab</i> 480-481, 550-551, 796-797, 832-833, 862-863 <i>MiniLab</i> 164</p> <p>Teacher Wraparound Edition:</p> <p>A 539; MC 167, 218, 315</p>

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<p>Indicator 1.5.4</p> <p>The student will use tables, graphs, and displays to support arguments and claims in both written and oral communication.</p>	<p>Student Edition:</p> <p><i>ChemLab</i> 480-481, 550-551, 796-797, 832-833 <i>MiniLab</i> 164</p> <p>Teacher Wraparound Edition:</p> <p>A 218, 539; MC 167, 218, 315</p>
<p>Indicator 1.5.5</p> <p>The student will create and/or interpret graphics (scale drawings, photographs, digital images, etc.).</p>	<p>Student Edition:</p> <p><i>Problem-Solving Lab</i> 96, 130, 424, 679, 720 <i>Section Assessment</i> 512 #37</p> <p>Teacher Wraparound Edition:</p> <p>A 424, 537; CU 104; E 266</p>
<p>Indicator 1.5.6</p> <p>The student will read a technical selection and interpret it appropriately.</p>	<p>Student Edition:</p> <p><i>ChemLab</i> 480-481, 688-689, 796-797 <i>Problem-Solving Lab</i> 130, 624</p> <p>Teacher Wraparound Edition:</p> <p>A 203, 649, 845; E 122, 334</p>
<p>Indicator 1.5.7</p> <p>The student will use, explain, and/or construct various classification systems.</p>	<p>Student Edition:</p> <p><i>ChemLab</i> 170-171, 232-233 <i>Discovery Lab</i> 595 <i>MiniLab</i> 125 <i>Problem-Solving Lab</i> 757</p> <p>Teacher Wraparound Edition:</p> <p>A 66, 69, 158; E 479</p>
<p>Indicator 1.5.8</p> <p>The student will describe similarities and differences when explaining concepts and/or principles.</p>	<p>Student Edition:</p> <p><i>Chemistry Online</i> 159 <i>Chemistry and Technology</i> 344 #2 <i>ChemLab</i> 109 #6 <i>Everyday Chemistry</i> 234 #3</p> <p>Teacher Wraparound Edition:</p> <p>A 786; CJ 76; CU 65, 479; IM 100</p>
<p>Indicator 1.5.9</p> <p>The student will communicate conclusions derived through a synthesis of ideas.</p>	<p>Student Edition:</p> <p><i>Chemistry and Society</i> 20, 80, 482, 834 <i>Problem-Solving Lab</i> 860</p> <p>Teacher Wraparound Edition:</p> <p>A 583; CJ 187; E 59, 196; P 467</p>

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<p>Expectation 1.6 The student will use mathematical processes.</p>	
<p>Indicator 1.6.1 The student will use ratio and proportion in appropriate situations to solve problems.</p>	<p>Student Edition: 75-77, 338-340, 356-357, 387-388 <i>Appendix B</i> 908 <i>Chapter Assessment</i> 378-379 #54-60 <i>ChemLab</i> 342-343, 374-375 Teacher Wraparound Edition: A 355; E 387</p>
<p>Indicator 1.6.2 The student will use computers and/or graphing calculators to perform calculations for tables, graphs, or spreadsheets.(NTB)</p>	<p>Student Edition: <i>ChemLab</i> 47 #2, 551 #2 <i>Section Assessment</i> 439 #55 Teacher Wraparound Edition: A 820; CU 819; DI 371; MC 192, 315, 465</p>
<p>Indicator 1.6.3 The student will express and/or compare small and large quantities using scientific notation and relative order of magnitude.</p>	<p>Student Edition: 31-33, 310-312, 608-616 <i>Chapter Assessment</i> 50-51 #75-78 <i>Problem-Solving Lab</i> 314 Teacher Wraparound Edition: A 32, 312, 612; CU 615; R 35</p>
<p>Indicator 1.6.4 The student will manipulate quantities and/or numerical values in algebraic equations.</p>	<p>Student Edition: 421-430, 467-468 <i>Appendix B</i> 897-899 <i>ChemLab</i> 46-47, 444-445 <i>MiniLab</i> 439 Teacher Wraparound Edition: A 439, 467; CU 45; R 432</p>
<p>Indicator 1.6.5 The student will judge the reasonableness of an answer.</p>	<p>Student Edition: 29, 371-372, 422, 425-427, 429-433, 438, 469, 504 <i>ChemLab</i> 445 #4</p>

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<p>Expectation 1.7</p> <p>The student will show that connections exist both within the various fields of science and among science and other disciplines including mathematics, social studies, language arts, fine arts, and technology.</p>	
<p>Indicator 1.7.1</p> <p>The student will apply the skills, processes, and concepts of biology, chemistry, physics, and earth science to societal issues.</p>	<p>Student Edition:</p> <p><i>Chemistry and Society</i> 20, 80, 110, 482, 834</p> <p>Teacher Wraparound Edition:</p> <p>A 824, 856; CJ 825; E 823; P 859</p>
<p>Indicator 1.7.2</p> <p>The student will identify and evaluate the impact of scientific ideas and/or advancements in technology on society.</p>	<p>Student Edition:</p> <p><i>Chemistry and Society</i> 20, 110</p> <p><i>Chemistry and Technology</i> 344, 690, 768</p> <p>Teacher Wraparound Edition:</p> <p>A 679; CJ 100; DI 824; E 823; TS 110</p>
<p>Indicator 1.7.3</p> <p>The student will describe the role of science in the development of literature, art, and music.(NTB)</p>	<p>Student Edition:</p> <p><i>Chapter Assessment</i> 694 #69</p> <p><i>History Connection</i> 190</p> <p>Teacher Wraparound Edition:</p> <p>AC 200, 600; CD 224, 581, 678; E 823; P 225</p>
<p>Indicator 1.7.4</p> <p>The student will recognize mathematics as an integral part of the scientific process.(NTB)</p>	<p>Student Edition:</p> <p><i>ChemLab</i> 46-47, 342-343, 444-445, 626-627</p> <p><i>MiniLab</i> 439, 505</p> <p>Teacher Wraparound Edition:</p> <p>A 317, 467, 517; CU 140</p>
<p>Indicator 1.7.5</p> <p>The student will investigate career possibilities in the various areas of science.(NTB)</p>	<p>Student Edition:</p> <p><i>Careers Using Chemistry</i> 136, 250, 354, 403, 421</p> <p><i>Chemistry Online</i> 795</p> <p><i>ChemLab</i> 79 #1</p> <p>Teacher Wraparound Edition:</p> <p>A 230, 401; E 829</p>

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<p>Indicator 1.7.6</p> <p>The student will explain how development of scientific knowledge leads to the creation of new technology and how technological advances allow for additional scientific accomplishments.</p>	<p>Student Edition:</p> <p>92, 815</p> <p><i>Chapter Assessment 22 #43</i></p> <p><i>Chemistry and Technology</i> 344</p> <p><i>How It Works</i> 144, 204</p> <p><i>Problem-Solving Lab</i> 96</p> <p>Teacher Wraparound Edition:</p> <p>AC 161; P 159; TS 690</p>
<p>Science Goal 4: Expectation and Indicators</p>	
<p>Goal 4 Concepts of Chemistry</p> <p>The student will demonstrate the ability to use scientific skills and processes (Core Learning Goal 1) to explain composition and interactions of matter in the world in which we live.</p>	
<p>Expectation 4.1</p> <p>The student will explain how the observation of the properties of matter forms the basis for understanding its structure and changes in its structure.</p>	
<p>Indicator 4.1.1</p> <p>The student will select and use appropriate devices to measure directly or indirectly the length, mass, volume, or temperature of a substance. AT LEAST: centigram balances, graduated cylinders & pipettes, metric rulers, thermometers & temperature probes</p>	<p>Student Edition:</p> <p><i>ChemLab</i> 46-47, 444-445, 520-521, 626-627, 862-863</p> <p><i>MiniLab</i> 28</p> <p>Teacher Wraparound Edition:</p> <p>A 28, 58, 329, 409</p>
<p>Indicator 4.1.2</p> <p>The student will gather and interpret data related to physical and chemical properties of matter such as density and percent composition. AT LEAST: constructing data tables, graphing linear relationship, appropriate technology to analyze data</p>	<p>Student Edition:</p> <p>27-29, 328-331</p> <p><i>ChemLab</i> 46-47</p> <p><i>MiniLab</i> 28, 329, 439</p> <p>Teacher Wraparound Edition:</p> <p>A 58, 330; MC 192; QD 330</p>
<p>Indicator 4.1.3</p> <p>The student will demonstrate how matter may be identified and classified in various ways based upon common properties. AT LEAST: states of matter, elements, compounds, mixtures, solutions, metals/nonmetals</p>	<p>Student Edition:</p> <p>58-59, 66-67, 70-71, 155-158, 595-596</p> <p><i>ChemLab</i> 170-171</p> <p>Teacher Wraparound Edition:</p> <p>A 66, 69, 158</p>

STANDARDS	PAGE REFERENCES
<p>Expectation 4.2 The student will explain that all matter has structure and the structure serves as the basis for the properties of and the changes in matter.</p>	
<p>Indicator 4.2.1 The student will illustrate the structure of the atom and describe the characteristics of the particles found there. AT LEAST: protons, neutrons, & electrons, nucleus</p>	<p>Student Edition: 92-97, 100-101, 127-134 <i>Chapter Assessment</i> 112 #36 & #38 Teacher Wraparound Edition: A 97; CJ 94, 133; IM 100</p>
<p>Indicator 4.2.2 The student will demonstrate that the arrangement and number of electrons determine the properties of an element and that these properties repeat in a periodic manner illustrated by their arrangement in the periodic table. AT LEAST: atomic number, mass number, valence electrons, chemical properties/families</p>	<p>Student Edition: 140, 159-169, 179-196, 211-214 <i>ChemLab</i> 170-171 <i>MiniLab</i> 164 Teacher Wraparound Edition: A 161, 185; D 166-167; MC 167</p>
<p>Indicator 4.2.3 The student will explain how atoms interact with other atoms through the transfer and sharing of electrons in the formation of chemical bonds. AT LEAST: characteristics of a neutral atom, formation of ions, ionic bonding, covalent bonding</p>	<p>Student Edition: 211-220, 241-247 <i>ChemLab</i> 232-233 Teacher Wraparound Edition: A 245; CJ 213, 217, 243; D 248-249; P 215</p>
<p>Indicator 4.2.4 The student will distinguish among metallic, ionic, and covalent solids in terms of observable properties. AT LEAST: solubility, melting point, boiling point, conductivity</p>	<p>Student Edition: 266-267, 399-403 <i>Chapter Assessment</i> 414 #47-50 Teacher Wraparound Edition: CU 266; E 400; QD 265; R 266</p>
<p>Indicator 4.2.5 The student will summarize that the properties of a molecule are determined by the number and types of atoms it contains and how they are arranged. AT LEAST: determine the types and numbers of atoms represented by a given formula, polar and nonpolar molecules</p>	<p>Student Edition: 217-220, 264-266, 333-335, 400-403, 717-721, 761-764 <i>Everyday Chemistry</i> 412 Teacher Wraparound Edition: A 395; E 762; P 720</p>
<p>Indicator 4.2.6 The student will explain why organic compounds have such diverse properties and give examples of how they have had an impact on society. AT LEAST: unique characteristics of carbon (tetrahedral structure), fuels and plastics</p>	<p>Student Edition: 698-701, 706, 710, 717-727, 737-738, 761-764 Teacher Wraparound Edition: CJ 726; P 738; VL 701, 763</p>

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<p>Expectation 4.3</p> <p>The student will analyze how the basic laws of thermodynamics apply to phase and chemical changes, and why accounting for all the energy associated with change is difficult.</p>	
<p>Indicator 4.3.1</p> <p>The student will illustrate that heat energy in a material consists of the ordered and disordered motions of its colliding particles. AT LEAST: phase changes</p>	<p>Student Edition:</p> <p>385-387, 404-408, 423-427, 538 <i>Problem-Solving Lab</i> 503, 533</p> <p>Teacher Wraparound Edition:</p> <p>A 391, 406; D 62-63; R 541</p>
<p>Indicator 4.3.2</p> <p>The student will explain why the interactions among particles involve a change in the energy system. AT LEAST: exothermic change, endothermic change, specific heat</p>	<p>Student Edition:</p> <p>219-220, 246-247, 404-408, 492-500 <i>ChemLab</i> 520-521</p> <p>Teacher Wraparound Edition:</p> <p>A 406; CU 505; D 492-493; E 246; P 499</p>
<p>Indicator 4.3.3</p> <p>The student will conclude that the conservation of mass and energy holds true for all systems, and that the total amount of energy in any closed system remains constant. AT LEAST: total amount of energy in any closed system remains constant</p>	<p>Student Edition:</p> <p>63-65, 283, 354-356, 490, 498-500</p> <p>Teacher Wraparound Edition:</p> <p>CJ 64, 355; QD 64, 498</p>
<p>Indicator 4.3.4</p> <p>The student will describe the observed changes in pressure, volume, or temperature of a sample of gas in terms of the behavior of particles. AT LEAST: matter is made of small particles, particles are in constant motion, the collisions among particles are elastic collisions</p>	<p>Student Edition:</p> <p>385-387, 419-439 <i>ChemLab</i> 108-109, 444-445</p> <p>Teacher Wraparound Edition:</p> <p>A 391; D 420-421; IM 426; QD 425</p>
<p>Expectation 4.4</p> <p>The student will explain and demonstrate that matter undergoes transformations in such a way that the products have properties that are very different from those of the starting materials.</p>	
<p>Indicator 4.4.1</p> <p>The student will illustrate that substances can be represented by formulas. AT LEAST: know that symbols are used to represent elements, identify the atomic mass of the element, write formulas for compounds given the name of the compound, name binary compounds given the formula, calculate the molecular weight of a compound given the periodic table</p>	<p>Student Edition:</p> <p>70, 102-104, 221-227, 248-251, 331-335</p> <p>Teacher Wraparound Edition:</p> <p>A 227, 251; CJ 250; D 332-333; P 226</p>

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<p>Indicator 4.4.2</p> <p>The student will show that chemical reactions can be represented by symbolic or word equations that specify all reactants and products involved.</p>	<p>Student Edition: 278-283, 354-356 <i>Chapter Assessment</i> 304-305 #58 & #71-79 <i>ChemLab</i> 301 #4 <i>Discovery Lab</i> 489</p> <p>Teacher Wraparound Edition: A 283; CJ 287; CU 355; P 279; R 283</p>
<p>Indicator 4.4.3</p> <p>The student will use the law of conservation of mass and energy to balance simple equations. AT LEAST: use appropriate coefficients to balance a given symbolic equation.</p>	<p>Student Edition: 280-283, 354-356 <i>Chapter Assessment</i> 305 #75-78</p> <p>Teacher Wraparound Edition: A 282, 363; CJ 355</p>
<p>Indicator 4.4.4</p> <p>The student will classify chemical reactions into general types based on the nature of the observed changes. AT LEAST: synthesis and decomposition, combustion, single and double displacement</p>	<p>Student Edition: 284-291, 617-618, 635-637, 762-764 <i>ChemLab</i> 300-301 <i>MiniLab</i> 638, 786</p> <p>Teacher Wraparound Edition: A 291; P 284; QD 637</p>
<p>Indicator 4.4.5</p> <p>The student will demonstrate that adjusting quantities of reactants will affect the amounts of products formed. AT LEAST: use the coefficients of a balanced equation to predict amounts of reactants and products</p>	<p>Student Edition: 358-363 <i>Chapter Assessment</i> 379-380 #64-75 <i>ChemLab</i> 374-375 <i>How It Works</i> 376 #2 <i>MiniLab</i> 362</p> <p>Teacher Wraparound Edition: A 360, 363; CJ 362; CU 363; QD 360</p>
<p>Indicator 4.4.6</p> <p>The student will describe a neutralization reaction. AT LEAST: properties of acids and bases, characteristics of weak and strong acids and bases, characteristics of salts, indicators, pH scale</p>	<p>Student Edition: 595-620 <i>ChemLab</i> 626-627 <i>Discovery Lab</i> 595 <i>How It Works</i> 628 <i>MiniLab</i> 604</p> <p>Teacher Wraparound Edition: A 612, 618; CJ 605; E 620; QD 596</p>

STANDARDS	PAGE REFERENCES
<p>Expectation 4.5 The student will investigate the impact of Chemistry on society.</p>	
<p>Indicator 4.5.1 The student will investigate an issue such as hazardous waste disposal, the role of food additives, and the substitution of synthetic products for natural products.</p>	<p>Student Edition: 824-825 <i>Chemistry Online</i> 724, 830, 853 <i>Chemistry and Society</i> 80 <i>Everyday Chemistry</i> 234 #3 Teacher Wraparound Edition: CJ 502, 825; E 196; IM 745</p>
<p>Indicator 4.5.2 The student will conclude that the starting materials of the chemical industry, such as petroleum, are limited resources and decisions must be made about their wise consumption.</p>	<p>Student Edition: 725-726, 741, 765 <i>Chemistry and Technology</i> 690 <i>Everyday Chemistry</i> 730 Teacher Wraparound Edition: A 510; CJ 491; TS 690</p>
<p>Indicator 4.5.3 The student will recognize data that are biased.</p>	<p>Student Edition: <i>ChemLab</i> 19 #6, 79 #7, 551 #7 Teacher Wraparound Edition: A 824; P 456</p>
<p>Indicator 4.5.4 The student will recognize that real problems have more than one solution and decisions to accept one solution over another are made on the basis of many issues.</p>	<p>Student Edition: <i>Chemistry Online</i> 830 <i>Chemistry and Society</i> 20, 110, 834 <i>Problem-Solving Lab</i> 860 Teacher Wraparound Edition: A 853; CJ 781, 825; DI 824; E 196</p>
<p>Indicator 4.5.5 The student will use tables, graphs, and charts to display data in making arguments and claims in both written and oral communication.</p>	<p>Student Edition: <i>ChemLab</i> 480-481, 550-551, 796-797, 832-833 <i>MiniLab</i> 164 Teacher Wraparound Edition: A 218, 539; MC 167, 218, 315</p>

STANDARDS	PAGE REFERENCES
<p>Expectation 4.6</p> <p>The student will show that connections exist both within the various fields of science and among science and other disciplines including mathematics, social studies, language arts, fine arts, and technology.</p>	
<p>Indicator 4.6.1</p> <p>The student will apply chemistry to the concepts of biology, physics, earth science, and environmental science.</p>	<p>Student Edition:</p> <p>775-795, 846-849, 855-861</p> <p><i>Chemistry and Society</i> 80</p> <p><i>Everyday Chemistry</i> 730</p> <p>Teacher Wraparound Edition:</p> <p>A 510; CJ 609, 740, 856; P 859</p>
<p>Indicator 4.6.2</p> <p>The student will recognize mathematics as part of the scientific endeavor, comprehend the nature of mathematical thinking, and become familiar with key mathematical ideas and skills.</p>	<p><i>ChemLab</i> 46-47, 342-343, 444-445, 626-627</p> <p><i>MiniLab</i> 439, 505</p> <p>Teacher Wraparound Edition:</p> <p>A 317, 467, 517; CU 140</p>
<p>Indicator 4.6.3</p> <p>The student will investigate the role of chemistry in all areas of human endeavor and achievement.</p>	<p>Student Edition:</p> <p><i>Chapter Assessment 22 #43</i></p> <p><i>Chemistry and Society</i> 80</p> <p><i>Chemistry and Technology</i> 344, 690, 768</p> <p><i>Everyday Chemistry</i> 412</p> <p><i>How It Works</i> 552</p> <p>Teacher Wraparound Edition:</p> <p>A 818; CJ 100; P 159</p>