



Chemistry

Concepts and Applications

© 2009

STANDARDS	PAGE REFERENCES
<p>Goal 1: Skills And Processes</p> <p>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.</p>	
<p>EXPECTATION</p> <p>1.1 The student will explain why curiosity, honesty, openness, and skepticism are highly regarded in science.</p>	
<p>INDICATOR</p> <p>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.</p>	<p>Student Edition:</p> <p>57, 772-773</p> <p><i>Chemistry and Technology</i> 574, 724-725</p> <p><i>Fact of the Matter</i> 636</p> <p><i>Physics Connection</i> 230</p> <p><i>Student Resources</i> 779, 782</p> <p>Teacher Wraparound Edition:</p> <p>CB 89; CJ 772; D 88, 760; E 52; IM 68, 229</p>

STANDARDS	PAGE REFERENCES
<p>INDICATOR</p> <p>1.1.2 The student will modify or affirm scientific ideas according to accumulated evidence.</p>	<p>Student Edition:</p> <p>50-53, 60-63, 84-89, 228-233, 392-396, 404-412, 757-760</p> <p><i>Chemistry and Society</i> 29, 144</p> <p><i>Chemlab</i> 36-37, 204-205, 386-387</p> <p><i>History Connection</i> 56, 305</p> <p><i>MiniLab</i> 87, 696</p> <p><i>Physics Connection</i> 230</p> <p>Teacher Wraparound Edition:</p> <p>AC 394, 405; CB 62; CJ 76; E 52; IM 229; IS 244</p>
<p>INDICATOR</p> <p>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:</p> <p>61-63, 67-68, 86-89, 228-230</p> <p><i>Art Connection</i> 754</p> <p><i>Chemistry Handbook</i> 789-791</p> <p><i>Student Resources</i> 781</p> <p>Teacher Wraparound Edition:</p> <p>AC 63; D 88; IM 68</p>
<p>INDICATOR</p> <p>1.1.4 The student will recognize data that are biased.</p>	<p>Student Edition:</p> <p><i>History Connection</i> 305</p> <p><i>Student Resources</i> 781</p> <p>Teacher Wraparound Edition:</p> <p>DE 6-7; E 52, 56; IM 4</p>
<p>INDICATOR</p> <p>1.1.5 The student will explain factors that produce biased data (incomplete data, using data inappropriately, conflicts of interest, etc.).</p>	<p>Student Edition:</p> <p><i>History Connection</i> 305</p> <p><i>Student Resources</i> 781</p> <p>Teacher Wraparound Edition:</p> <p>DE 6-7; E 52, 56; IM 4</p>

STANDARDS	PAGE REFERENCES
<p>EXPECTATION</p> <p>1.2 The student will pose scientific questions and suggest investigative approaches to provide answers to questions.</p>	
<p>INDICATOR</p> <p>1.2.1 The student will identify meaningful, answerable scientific questions.</p>	<p>Student Edition:</p> <p><i>Chemistry and Society</i> 29, 144, 495 <i>Chemistry and Technology</i> 424-425, 485, 750-751 <i>Chemlab</i> 54-55, 386-387, 649-651 <i>Connection to Chemistry</i> 71, 566 <i>Launch Lab</i> 3, 403 <i>Student Resources</i> 781</p> <p>Teacher Wraparound Edition:</p> <p>CD 9</p>
<p>INDICATOR</p> <p>1.2.2 The student will pose meaningful, answerable scientific questions. (NTB)</p>	<p>Student Edition:</p> <p><i>Analyze the Issue</i> 29, 44, 495 <i>Chemlab</i> 54-55, 386-387, 649-650 <i>Discuss the Technology</i> 424-425, 485, 750-751 <i>Inquiry Extension</i> 37, 422, 711 <i>Launch Lab</i> 3, 403 <i>Student Resources</i> 782</p> <p>Teacher Wraparound Edition:</p> <p>CD 9</p>
<p>INDICATOR</p> <p>1.2.3 The student will formulate a working hypothesis.</p>	<p>Student Edition:</p> <p>57 <i>Chemlab</i> 134-135, 234-235, 266-267, 326-327, 422-423, 674-675 <i>Inquiry Extension</i> 11, 205, 593, 651, 721</p> <p>Teacher Wraparound Edition:</p> <p>TS 56</p>
<p>INDICATOR</p> <p>1.2.4 The student will test a working hypothesis. (NTB)</p>	<p>Student Edition:</p> <p>57 <i>Chemlab</i> 134-135, 234-235, 266-267, 326-327, 422-423, 674-675</p> <p>Teacher Wraparound Edition:</p> <p>TS 56</p>

STANDARDS	PAGE REFERENCES
<p>INDICATOR</p> <p>1.2.5 The student will select appropriate instruments and materials to conduct an investigation.</p>	<p>Student Edition:</p> <p><i>Chemistry Handbook</i> 786-790</p> <p><i>Chemlab</i> 18-19, 134-135, 266-267, 326-327, 422-423, 649-651</p> <p><i>Launch Lab</i> 117, 299, 369, 583</p> <p>Teacher Wraparound Edition:</p> <p>DE 58-59</p>
<p>INDICATOR</p> <p>1.2.6 The student will identify appropriate methods for conducting an investigation (independent and dependent variables, proper controls, repeat trials, appropriate sample size, etc.).</p>	<p>Student Edition:</p> <p><i>Chemlab</i> 134-135, 234-235, 386-387, 544-545, 649-651, 674-675</p> <p><i>Launch Lab</i> 117, 369, 583, 703</p> <p>Teacher Wraparound Edition:</p> <p>CD 9</p>
<p>INDICATOR</p> <p>1.2.7 The student will use relationships discovered in the lab to explain phenomena observed outside the laboratory.</p>	<p>Student Edition:</p> <p><i>Art Connection</i> 754</p> <p><i>Chemistry and Society</i> 495, 657</p> <p><i>Chemlab</i> 18-19, 36-37, 326-327, 506-507, 649-651, 720-721</p> <p><i>How It Works</i> 282, 357, 543, 598</p> <p>Teacher Wraparound Edition:</p> <p>D 599; E 594</p>
<p>INDICATOR</p> <p>1.2.8 The student will defend the need for verifiable data.</p>	<p>Student Edition:</p> <p>57</p> <p><i>Art Connection</i> 754</p> <p><i>Chemistry and Society</i> 29, 144, 495, 537</p> <p><i>Chemistry and Technology</i> 424-425, 724-725</p> <p><i>Student Resources</i> 779, 782</p> <p>Teacher Wraparound Edition:</p> <p>CD 9; DE 6-7; IM 57</p>

STANDARDS	PAGE REFERENCES
<p>EXPECTATION</p> <p>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</p> <p>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:</p> <p><i>Chemistry and Technology</i> 236-237, 324-325, 574</p> <p><i>Chemistry Handbook</i> 786-790</p> <p><i>Chemlab</i> 54-55, 134-135, 204-205, 326-327, 422-423, 544-545, 592-593, 674-675</p> <p><i>MiniLab</i> 22</p> <p>Teacher Wraparound Edition:</p> <p>DE 68-69, 308-309</p>
<p>INDICATOR</p> <p>1.3.2 The student will recognize safe laboratory procedures.</p>	<p>Student Edition:</p> <p><i>Chemlab</i> 134-135, 204-205, 360-361, 506-507, 544-545, 592-593, 649-651, 720-721</p> <p><i>Safety Handbook</i> 844-845</p> <p>Teacher Wraparound Edition:</p> <p>DE 34-35, 38-39, 102-103, 122-123, 448-449</p>
<p>INDICATOR</p> <p>1.3.3 The student will demonstrate safe handling of the chemicals and materials of science. (NTB)</p>	<p>Student Edition:</p> <p><i>Chemlab</i> 134-135, 544-545, 592-593, 649-651, 720-721</p> <p><i>Launch Lab</i> 337, 479, 665</p> <p><i>MiniLab</i> 232, 355, 482, 770</p> <p><i>Safety Handbook</i> 844-845</p> <p>Teacher Wraparound Edition:</p> <p>CD 338; QD 233, 354, 691; VL 480</p>
<p>INDICATOR</p> <p>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:</p> <p><i>Chemistry and Technology</i> 236-237, 324-325, 606-608</p> <p><i>Chemistry Handbook</i> 786-790</p> <p><i>Chemlab</i> 326-327, 649-651</p> <p><i>How It Works</i> 375, 543, 569, 706</p> <p>Teacher Wraparound Edition:</p> <p>DE 760-761</p>

STANDARDS	PAGE REFERENCES
<p>EXPECTATION</p> <p>1.4 The student will demonstrate that data analysis is a vital aspect of the process of scientific inquiry and communication.</p>	
<p>INDICATOR</p> <p>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:</p> <p>85-91, 124, 242-243, 256-259, 346, 381, 390</p> <p><i>Chemistry Handbook</i> 800-804</p> <p><i>Chemlab</i> 10-11, 18-19, 54-55, 98-99, 170-171, 360-361, 649-651, 674-675, 748-749</p> <p><i>MiniLab</i> 87, 244</p> <p>Teacher Wraparound Edition:</p> <p>CD 243; CJ 747</p>
<p>INDICATOR</p> <p>1.4.2 The student will analyze data to make predictions, decisions, or draw conclusions.</p>	<p>Student Edition:</p> <p>57</p> <p><i>Chemistry Handbook</i> 800-804</p> <p><i>Chemlab</i> 234-235, 266-267, 422-423, 649-651</p> <p><i>Launch Lab</i> 151, 369, 515, 703</p> <p><i>MiniLab</i> 87, 260, 384, 722</p> <p><i>Student Resources</i> 779</p> <p>Teacher Wraparound Edition:</p> <p>DE 138-139; QD 51</p>
<p>INDICATOR</p> <p>1.4.3 The student will use experimental data from various investigators to validate results.</p>	<p>Student Edition:</p> <p>50-53, 57, 59-66, 84-91</p> <p><i>Biology Connection</i> 766</p> <p><i>Chemistry and Society</i> 29, 144</p> <p><i>Chemistry and Technology</i> 214-215, 574, 724-725</p> <p><i>History Connection</i> 56, 305</p> <p><i>Physics Connection</i> 230</p> <p><i>Student Resources</i> 781</p> <p>Teacher Wraparound Edition:</p> <p>AC 63; CD 270-271, 724; IM 57</p>

STANDARDS	PAGE REFERENCES
<p>INDICATOR</p> <p>1.4.4 The student will determine the relationships between quantities and develop the mathematical model that describes these relationships.</p>	<p>Student Edition:</p> <p>404-408, 413-416, 418-421, 426-428, 539-542, 707-708, 715-719, 752-753</p> <p><i>Chemistry and Technology</i> 424-425</p> <p><i>Chemlab</i> 422-423, 544-545, 720-721</p> <p><i>Launch Lab</i> 403</p> <p><i>MiniLab</i> 418</p> <p>Teacher Wraparound Edition:</p> <p>CD 405, 414; DE 406-407, 426-427; IM 413; T 421</p>
<p>INDICATOR</p> <p>1.4.5 The student will check graphs to determine that they do not misrepresent results.</p>	<p>Student Edition:</p> <p>52, 66, 124, 309, 346, 362-363</p> <p><i>Chemistry Handbook</i> 800-804</p> <p><i>Chemlab</i> 360-361, 674-675, 748-749</p> <p><i>Everyday Chemistry</i> 17</p> <p><i>Student Resources</i> 781</p> <p>Teacher Wraparound Edition:</p> <p>CU 362</p>
<p>INDICATOR</p> <p>1.4.6 The student will describe trends revealed by data.</p>	<p>Student Edition:</p> <p>85-91, 93-96, 242, 256-259, 280-283, 380-381, 389-390</p> <p><i>Chemistry and Technology</i> 214-215, 424-425</p> <p><i>Chemlab</i> 386-387, 748-749</p> <p><i>MiniLab</i> 87, 96, 260</p> <p>Teacher Wraparound Edition:</p> <p>CD 243; DE 104-105, 268-269; VL 257</p>
<p>INDICATOR</p> <p>1.4.7 The student will determine the sources of error that limit the accuracy or precision of experimental results.</p>	<p>Student Edition:</p> <p>539-542</p> <p><i>Chemistry Handbook</i> 789-790</p> <p><i>Chemlab</i> 54-55, 134-135, 204-205, 360-361, 422-423, 720-721, 748-749</p> <p><i>Inquiry Extension</i> 545</p> <p>Teacher Wraparound Edition:</p> <p>CD 539, 540; TS 543</p>

STANDARDS	PAGE REFERENCES
<p>INDICATOR</p> <p>1.4.8 The student will use models and computer simulations to extend his/her understanding of scientific concepts. (NTB)</p>	<p>Student Edition:</p> <p>8-9, 63, 228-229, 300-301, 313-323</p> <p><i>Chemlab</i> 748-749</p> <p><i>Launch Lab</i> 621</p> <p><i>MiniLab</i> 61, 244, 323</p> <p>Teacher Wraparound Edition:</p> <p>TS 230; VL 59</p>
<p>INDICATOR</p> <p>1.4.9 The student will use analyzed data to confirm, modify, or reject a hypothesis.</p>	<p>Student Edition:</p> <p>57</p> <p><i>Art Connection</i> 754</p> <p><i>Biology Connection</i> 766</p> <p><i>Chemistry Handbook</i> 800-804</p> <p><i>Chemlab</i> 134-135, 234-235, 266-267, 326-327, 422-423, 674-675</p> <p>Teacher Wraparound Edition:</p> <p>IM 57; TS 56; UA 65</p>
<p>EXPECTATION</p> <p>1.5 The student will use appropriate methods for communicating in writing and orally the processes and results of scientific investigation.</p>	
<p>INDICATOR</p> <p>1.5.1 The student will demonstrate the ability to summarize data (measurements/observations).</p>	<p>Student Edition:</p> <p><i>Chemistry Handbook</i> 800-804</p> <p><i>Chemlab</i> 10-11, 18-19, 54-55, 98-99, 170-171, 360-361, 649-651, 674-675, 748-749</p> <p><i>MiniLab</i> 87, 244</p> <p>Teacher Wraparound Edition:</p> <p>CD 243; CJ 747</p>
<p>INDICATOR</p> <p>1.5.2 The student will explain scientific concepts and processes through drawing, writing, and/or oral communication.</p>	<p>Student Edition:</p> <p>242-243</p> <p><i>Chemistry Handbook</i> 800-804</p> <p><i>Chemlab</i> 10-11, 18-19, 54-55, 98-99, 170-171, 360-361, 649-651, 674-675, 748-749</p> <p><i>Student Resources</i> 782</p> <p>Teacher Wraparound Edition:</p> <p>CD 243</p>

STANDARDS	PAGE REFERENCES
<p>INDICATOR</p> <p>1.5.3 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>Chemistry Handbook</i> 796-797</p>
<p>INDICATOR</p> <p>1.5.4 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>124, 242-243, 256-259, 346, 381, 390</p> <p><i>Chemistry Handbook</i> 800-804</p> <p><i>Chemlab</i> 98-99, 170-171, 360-361, 674-675, 748-749</p> <p><i>MiniLab</i> 87, 244</p> <p>Teacher Wraparound Edition:</p> <p>CD 243; CJ 747</p>
<p>INDICATOR</p> <p>1.5.5 The student will create and/or interpret graphics. (scale drawings, photographs, digital images, field of view, etc.)</p>	<p>Student Edition:</p> <p>52-53, 66-70, 75-77, 109-110, 124, 169, 362-363</p> <p><i>Chemistry and Technology</i> 174-176</p> <p><i>Chemistry Handbook</i> 800-804</p> <p><i>Chemlab</i> 360-361, 674-675, 748-749</p> <p><i>Everyday Chemistry</i> 17</p> <p><i>Student Resources</i> 781</p> <p>Teacher Wraparound Edition:</p> <p>CU 362</p>
<p>INDICATOR</p> <p>1.5.6 The student will read a technical selection and interpret it appropriately.</p>	<p>Student Edition:</p> <p><i>Literature Connection</i> 26, 95</p> <p><i>Student Resources</i> 781</p>
<p>INDICATOR</p> <p>1.5.7 The student will use, explain, and/or construct various classification systems.</p>	<p>Student Edition:</p> <p>14-31, 84-91, 94-96, 100-103, 338-339</p> <p><i>Chemlab</i> 98-99, 170-171, 456-457, 560-561, 649-651</p> <p>Teacher Wraparound Edition:</p> <p>DE 86-87; IS 709</p>

STANDARDS	PAGE REFERENCES
<p>INDICATOR</p> <p>1.5.8 The student will describe similarities and differences when explaining concepts and/or principles.</p>	<p>Student Edition:</p> <p>20-24</p> <p><i>Chemistry and Society</i> 29, 537</p> <p><i>Chemistry and Technology</i> 174-176, 724-725</p> <p><i>Chemlab</i> 170-171, 649-651</p> <p><i>How It Works</i> 543, 706</p> <p><i>Launch Lab</i> 3, 151, 299, 479</p> <p><i>MiniLab</i> 518</p> <p><i>Student Resources</i> 779</p> <p>Teacher Wraparound Edition:</p> <p>IM 23</p>
<p>INDICATOR</p> <p>1.5.9 The student will communicate conclusions derived through a synthesis of ideas.</p>	<p>Student Edition:</p> <p>50-53, 75-77, 92</p> <p><i>History Connection</i> 56</p> <p><i>Physics Connection</i> 71</p> <p><i>Student Resources</i> 784</p> <p>Teacher Wraparound Edition:</p> <p>CD 52</p>
<p>EXPECTATION</p> <p>1.6 The student will use mathematical processes.</p>	
<p>INDICATOR</p> <p>1.6.1 The student will use ratio and proportion in appropriate situations to solve problems.</p>	<p>Student Edition:</p> <p>52, 196-199, 218, 376-379, 380-385, 390-396, 404-410, 418-421, 426-428, 541-542</p> <p><i>Chemistry Handbook</i> 798-799, 805</p> <p><i>Chemlab</i> 386-387, 544-545</p> <p><i>MiniLab</i> 373</p> <p>Teacher Wraparound Edition:</p> <p>DE 52-53, 426-427; DIF 371; E 198; ICE 393, 410; IM 197; R 409; UA 405</p>
<p>INDICATOR</p> <p>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:</p> <p><i>Chemistry Handbook</i> 796-797</p>

STANDARDS	PAGE REFERENCES
<p>INDICATOR</p> <p>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:</p> <p>70, 405-407</p> <p><i>Chemistry Handbook</i> 785, 792-795</p> <p><i>Fact of the Matter</i> 406</p> <p>Teacher Wraparound Edition:</p> <p>CB 769; CD 753; DI 754; IM 407; VL 405</p>
<p>INDICATOR</p> <p>1.6.4 The student will manipulate quantities and/or numerical values in algebraic equations.</p>	<p>Student Edition:</p> <p>35, 348, 376-379, 384-385, 393, 409-410, 414-416, 418-421, 426-428, 541-542, 715-716</p> <p><i>Chemistry Handbook</i> 798-799</p> <p><i>Chemlab</i> 422-423, 720-721</p> <p>Teacher Wraparound Edition:</p> <p>CJ 348; DI 501; ICE 390, 393, 416, 502; R 558; TPK 520</p>
<p>INDICATOR</p> <p>1.6.5 The student will judge the reasonableness of an answer.</p>	<p>Student Edition:</p> <p><i>Student Resources</i> 781</p>
<p>EXPECTATION</p> <p>1.7 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</p> <p>1.7.1 The student will apply the skills, processes, and concepts of biology, chemistry, physics, or earth science to societal issues.</p>	<p>Student Edition:</p> <p>719-722, 726-728, 757-760, 763-767</p> <p><i>Art Connection</i> 754</p> <p><i>Biology Connection</i> 278</p> <p><i>Chemistry and Society</i> 29, 58, 144, 447, 495, 657</p> <p><i>Chemistry and Technology</i> 214-215, 388, 574, 724-725</p> <p><i>Everyday Chemistry</i> 417, 505, 711, 771</p> <p><i>How It Works</i> 569, 595, 744</p> <p>Teacher Wraparound Edition:</p> <p>CJ 725; D 767</p>

STANDARDS	PAGE REFERENCES
<p>INDICATOR</p> <p>1.7.2 The student will identify and evaluate the impact of scientific ideas and/or advancements in technology on society.</p>	<p>Student Edition:</p> <p>109-111</p> <p><i>Biology Connection</i> 278</p> <p><i>Chemistry and Society</i> 58, 447, 495, 657</p> <p><i>Chemistry and Technology</i> 106-107, 214-215, 388, 574, 724-725</p> <p><i>Everyday Chemistry</i> 417, 505, 711, 771</p> <p><i>Physics Connection</i> 566</p> <p>Teacher Wraparound Edition:</p> <p>AC 110; CD 14; D 767</p>
<p>INDICATOR</p> <p>1.7.3 The student will describe the role of science in the development of literature, art, and music. (NTB)</p>	<p>Student Edition:</p> <p><i>Art Connection</i> 161, 344, 754</p> <p><i>Literature Connection</i> 26, 95</p>
<p>INDICATOR</p> <p>1.7.4 The student will recognize mathematics as an integral part of the scientific process. (NTB)</p>	<p>Student Edition:</p> <p>376-379, 384-385, 390-393, 404-410, 414-421, 539-542, 715-718</p> <p><i>Chemistry Handbook</i> 783-806</p> <p><i>Chemlab</i> 720-721</p> <p><i>MiniLab</i> 408</p> <p>Teacher Wraparound Edition:</p> <p>DIF 371; ICE 716; VL 405</p>
<p>INDICATOR</p> <p>1.7.5 The student will investigate career possibilities in the various areas of science. (NTB)</p>	<p>Student Edition:</p> <p><i>Career Connection</i> 13, 211, 317, 449, 491, 613, 635, 677</p> <p><i>In the Field</i> 12-13, 210-211, 316-317, 448-449, 490-491, 612-613, 634-635, 676-677</p>
<p>INDICATOR</p> <p>1.7.6 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><i>Chemistry and Technology</i> 106-107, 214-215, 286-289, 352-353, 388, 424-425, 485, 574, 606-608, 724-725, 750-751</p> <p>Teacher Wraparound Edition:</p> <p>CB 14</p>

STANDARDS	PAGE REFERENCES
<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</p> <p>4.1 The student will explain that atoms have structure and this structure serves as the basis for the properties of elements and the bonds that they form.</p>	
<p>INDICATOR</p> <p>4.1.1 The student will analyze the structure of the atom and describe the characteristics of the particles found there.</p> <p>Assessment limits:</p> <ul style="list-style-type: none"> • subatomic particles (protons, neutrons, & electrons –not to include quantum mechanical details of electron configurations) • nucleus & electron cloud (definition; no orbitals included) • atomic number, mass number, and isotopes (definitions; calculate numbers of protons, neutrons, and electrons; notations) • atomic mass (qualitative concept of weighted average only; atomic mass unit) • neutral atom • historical development and/or experimental evidence for the existence and structure of the atom (Democritus, Dalton, Thomson, Rutherford, Bohr, electron cloud model) 	<p>Student Edition:</p> <p>50-52, 59-66, 67-68, 75, 109-110, 228-233, 742-743</p> <p><i>MiniLab</i> 61</p> <p>Teacher Wraparound Edition:</p> <p>D 50; IM 63, 229; QD 60; VL 59</p>
<p>INDICATOR</p> <p>4.1.2 The student will demonstrate that the arrangement and number of electrons and the properties of elements repeat in a periodic manner illustrated by their arrangement in the periodic table.</p> <p>Assessment limits:</p> <ul style="list-style-type: none"> • groups/families and periods/series (groups 1-18; Alkali Metals, Alkaline Earth Metals, Transition Metals, Halogens, Noble Gases; Periods 1-7; Lanthanide Series, Actinide Series) • For the following assessment limits, use only elements in groups 1,2, & 13-18. how trends behave (valence electrons; atomic radius; ionization energy; relative chemical reactivity; metallic/nonmetallic properties) 	<p>Student Edition:</p> <p>84-92, 93-97, 100-103, 104-105, 241-245, 256-261, 262-263, 265, 268-272, 274-279, 280-293</p> <p><i>Appendix D</i> 846-847</p> <p><i>Chemlab</i> 98-99, 266-267</p> <p><i>Everyday Chemistry</i> 108</p> <p><i>MiniLab</i> 87</p> <p>Teacher Wraparound Edition:</p> <p>CB 89; CD 242, 243; D 90; DD 82-83; DE 104-105; VL 86</p>

STANDARDS	PAGE REFERENCES
<p>INDICATOR</p> <p>4.1.3 The student will explain how atoms interact with other atoms through the transfer and sharing of electrons in the formation of chemical bonds.</p> <p>Assessment limits:</p> <ul style="list-style-type: none"> • formation of ions (relate charge of ions to number of electrons gained or lost as determined by valence electrons / location of elements on Periodic Table; cation; anion) • bond (definition) • formation of ionic bond (definition; metal-nonmetal; based on valence electrons/location of elements on the Periodic Table) • formation of covalent bond (definition; nonmetal-nonmetal; based on valence electrons / location of elements on the Periodic Table; formation of single, double, and triple bonds) • bond polarity (concept only, no electronegativity calculations; common examples) • metallic bond (definition) • bond energy (compare ionic and covalent) • metallic, ionic, and molecular substances (melting point, boiling point, electrical conductivity) 	<p>Student Edition:</p> <p>128-133, 136-139, 141-145, 152-160, 168-169, 300-309, 311-312</p> <p><i>Chemlab</i> 134-135, 170-171, 266-267</p> <p><i>MiniLab</i> 133</p> <p>Teacher Wraparound Edition:</p> <p>CB 129; CD 300; DD 298-299; R 159</p>

STANDARDS	PAGE REFERENCES
<p>EXPECTATION</p> <p>4.2 The student will explain how the properties of compounds are related to the arrangement and type of atoms they contain.</p>	
<p>INDICATOR</p> <p>4.2.1 The student will explain how the properties of a molecule are determined by the atoms it contains and their arrangement.</p> <p>Assessment limits:</p> <ul style="list-style-type: none"> • polar and nonpolar molecules (“like dissolves like” and why; not to include prediction of polarity from shape) • shapes of molecules (limited to linear, bent/angular, tetrahedral) • water (definition and explanation of shape and polarity of molecule, observed changes in density as phases change, use as a “universal” solvent; conceptual understanding of hydrogen bonding, high surface tension, high specific heat) 	<p>Student Edition:</p> <p>313-323, 328-331, 362-363, 436-446, 450-454</p> <p><i>Launch Lab</i> 299</p> <p><i>MiniLab</i> 323</p> <p>Teacher Wraparound Edition:</p> <p>CD 320; CJ 346; QD 331, 439; VL 329, 440, 445</p>
<p>INDICATOR</p> <p>4.2.2 The student will explain why organic compounds are so numerous and diverse.</p> <p>Assessment limits:</p> <ul style="list-style-type: none"> • inorganic and organic compounds (define in terms of carbon content; do not include CO, CO₂, or carbonates as organic compounds; definition of hydrocarbons) • ability of carbon to form chains and make rings (recognize, but not produce structural formulas) 	<p>Student Edition:</p> <p>178, 180, 622-628, 636-639, 640-646, 647-659, 666-688</p> <p><i>Biology Connection</i> 632</p> <p><i>Chemistry and Society</i> 657</p> <p><i>Chemistry and Technology</i> 174-176</p> <p><i>Chemlab</i> 649-651</p> <p><i>Fact of the Matter</i> 636</p> <p><i>Launch Lab</i> 621</p> <p>Teacher Wraparound Edition:</p> <p>CD 668; CJ 630; CU 180; DE 624-625; IM 642; QD 623</p>

STANDARDS	PAGE REFERENCES
<p>INDICATOR</p> <p>4.2.3 The student will describe the properties of solutions and explain how they form.</p> <p>Assessment limits:</p> <ul style="list-style-type: none"> • solute, solvent, and solubility • suspensions and colloids • alloys and gaseous solutions • concentration (relative: dilute, concentrated, unsaturated, saturated, supersaturated; molarity – conceptual only; interpretation of solubility curves) • dissociation/ionization (basic description; factors that influence rate: surface area of solute, temperature, agitation) • electrolytes (definition in terms of composition and properties) 	<p>Student Edition:</p> <p>20-23, 436-439, 450-454, 458-461, 467-469, 472-473, 488, 492, 497-500, 535</p> <p><i>Appendix D</i> 856</p> <p><i>Chemistry and Society</i> 447</p> <p><i>Chemistry and Technology</i> 352-353, 470-471</p> <p><i>Chemlab</i> 456-457</p> <p><i>How It Works</i> 468</p> <p><i>Launch Lab</i> 435</p> <p><i>MiniLab</i> 25, 452, 722</p> <p>Teacher Wraparound Edition:</p> <p>AC 469; CD 453, 461; CJ 23, 459; D 458</p>
<p>INDICATOR</p> <p>4.2.4 The student will differentiate among acids, bases, and salts based on their properties.</p> <p>Assessment limits:</p> <ul style="list-style-type: none"> • Arrhenius definition (H⁺ and OH⁻) • ability of water to act as either an acid or a base • neutralization (definition) • salts (definition) • indicators (phenolphthalein) • function of buffers (conceptual only) 	<p>Student Edition:</p> <p>480-488, 489-492, 493-496, 501-504, 516-518, 531-533, 539-541</p> <p><i>Chemlab</i> 506-507, 544-545</p> <p><i>Earth Science Connection</i> 525</p> <p><i>Everyday Chemistry</i> 505</p> <p><i>How It Works</i> 543</p> <p><i>MiniLab</i> 504, 518, 533</p> <p>Teacher Wraparound Edition:</p> <p>AC 542; CB 501, 526; CD 486, 517; DE 538-539; TPK 520</p>

STANDARDS	PAGE REFERENCES
<p>EXPECTATION</p> <p>4.3 The student will apply the basic concepts of thermodynamics (thermochemistry) to phases of matter and phase and chemical changes.</p>	
<p>INDICATOR</p> <p>4.3.1 The student will explain that thermal energy in a material consists of the ordered and disordered motions of its colliding particles.</p> <p>Assessment limits:</p> <ul style="list-style-type: none"> • thermal energy (differentiate between thermal energy and temperature) • phase changes • heating / cooling (temperature vs. time) curve (interpret the different parts of the curve in terms of motion / kinetic energy and organization of the particles; changes in particle motion and organization between phase changes; identify melting/freezing and boiling point; not to include potential energy or calculations of Q) 	<p>Student Edition:</p> <p>33, 338-342, 346-350, 362-363, 389-390, 439-441</p> <p><i>Chemlab</i> 360-361</p> <p><i>Everyday Chemistry</i> 318</p> <p><i>How It Works</i> 706</p> <p><i>Launch Lab</i> 337</p> <p>Teacher Wraparound Edition:</p> <p>CB 33; CD 338; D 439; VL 346</p>
<p>INDICATOR</p> <p>4.3.2 The student will describe observed changes in pressure, volume, or temperature of a sample in terms of macroscopic changes and the behavior of particles.</p> <p>Assessment limits:</p> <ul style="list-style-type: none"> • constant temperature (effect of pressure or volume change to sample of solid, liquid, or gas) • constant volume (effect of pressure or temperature change to sample of solid, liquid, or gas) • constant pressure (effect of temperature or volume change to sample of solid, liquid, or gas) 	<p>Student Edition:</p> <p>340-343, 348-349, 354-356, 370-373, 380-385, 389-396</p> <p><i>Chemistry and Technology</i> 388</p> <p><i>Chemlab</i> 386-387</p> <p><i>How It Works</i> 357</p> <p><i>Launch Lab</i> 369</p> <p>Teacher Wraparound Edition:</p> <p>CB 33; CU 345; D 380, 390; DE 356-357, 382-383; E 396; IM 393; QD 391; VL 346</p>

STANDARDS	PAGE REFERENCES
<p>INDICATOR</p> <p>4.3.3 The student will explain why the interactions among particles involve a change in the energy system.</p> <p>Assessment limits:</p> <ul style="list-style-type: none"> • exothermic change (bond formation; dissociation; thermal energy released; no predictions/calculations of ΔH) • endothermic change (bond breaking; dissociation; thermal energy absorbed; no predictions/calculations of ΔH) 	<p>Student Edition:</p> <p>40-41, 193-194, 216, 584-591, 690-693, 704-710, 722</p> <p><i>Chemistry and Technology</i> 724-725</p> <p><i>Chemlab</i> 592-593</p> <p><i>Everyday Chemistry</i> 219</p> <p><i>How It Works</i> 195, 598, 706</p> <p><i>MiniLab</i> 194, 708, 722</p> <p>Teacher Wraparound Edition:</p> <p>DE 202-203; IM 693; R 42; TPK 596</p>
<p>EXPECTATION</p> <p>4.4 The student will explain how and why substances are represented by formulas.</p>	
<p>INDICATOR</p> <p>4.4.1 The student will illustrate that substances can be represented by formulas.</p> <p>Assessment limits:</p> <ul style="list-style-type: none"> • subscripts (determine the numbers of atoms represented by a given formula; describe the function of subscripts in a chemical formula) • use symbols to represent elements and polyatomic ions (limited to NH_4^+, OH^-, NO_3^-, NO_2^-, ClO_3^-, ClO_2^-, HCO_3^-, CO_3^{2-}, SO_4^{2-}, SO_3^{2-}, PO_4^{3-}, PO_3^{3-}; including diatomics – H_2, O_2, N_2, Cl_2, Br_2, I_2, F_2; given periodic table and ion chart) • acids (binary naming system; ternary/oxyacid naming system limited to polyatomic ions given above) • write formulas for compounds (given Periodic Table, ion chart of polyatomic ions and transition metals, and compound name; Stock System/Roman Numerals for ionic compounds; prefixes (up through hexa) for molecular compounds; no hydrates) • name compounds (given formula, Periodic Table, and ion chart of polyatomic ions and transition metals; Stock System/Roman Numerals for ionic compounds; prefixes (up through hexa) for molecular compounds; no hydrates) 	<p>Student Edition:</p> <p>30-31, 90-91, 136-139, 152-157, 162-167, 177-180, 426-428, 483-486, 622-631, 633, 640-645</p> <p><i>Biology Connection</i> 632, 694</p> <p><i>Everyday Chemistry</i> 273, 571</p> <p>Teacher Wraparound Edition:</p> <p>CB 484, 627; CD 162, 178, 426; DE 136-137, 140-141; IM 155; T 191</p>

STANDARDS	PAGE REFERENCES
<p>INDICATOR</p> <p>4.4.2 The student will show that chemical reactions can be represented by symbolic or word equations that specify all reactants and products involved.</p> <p>Assessment limits:</p> <ul style="list-style-type: none"> • convert word equations to symbolic equations • convert symbolic equations to word equations 	<p>Student Edition:</p> <p>190-194, 196-198, 208-213, 486, 516-523, 531-535</p> <p><i>Biology Connection</i> 201</p> <p><i>Chemistry and Technology</i> 424-425, 485</p> <p><i>Earth Science Connection</i> 525</p> <p><i>Everyday Chemistry</i> 275, 417, 571</p> <p><i>How It Works</i> 598</p> <p>Teacher Wraparound Edition:</p> <p>IM 197; TPK 517; VL 190, 516</p>
<p>INDICATOR</p> <p>4.4.3 The student will use mole relationships.</p> <p>Assessment limits:</p> <ul style="list-style-type: none"> • mole and Avogadro's Number (definitions) • relationship between moles and mass • relationship between moles and particles • formula mass (calculate the formula mass of a compound given the periodic table; no hydrates) • mass percent composition (calculate the mass percent composition of a compound given the formula, formula mass, and periodic table; no hydrates) 	<p>Student Edition:</p> <p>404-408, 413-416, 418-419, 421-428, 460-461, 541-542</p> <p><i>Chemlab</i> 544-545</p> <p><i>Fact of the Matter</i> 406</p> <p><i>Launch Lab</i> 403</p> <p><i>MiniLab</i> 408</p> <p>Teacher Wraparound Edition:</p> <p>CD 405; D 421; DE 426-427; IM 407; T 415, 461</p>

STANDARDS	PAGE REFERENCES
<p>EXPECTATION</p> <p>4.5 The student will explain that matter undergoes transformations, resulting in products that are different from the reactants.</p>	
<p>INDICATOR</p> <p>4.5.1 The student will describe the general types of chemical reactions.</p> <p>Assessment limits:</p> <ul style="list-style-type: none"> • synthesis and decomposition (definition; identify type given balanced formula equation or written description) • combustion (definition; identify type given balanced formula equation or written description) • single displacement (definition; identify type given balanced formula equation or written description; apply activity series to determine if reaction will occur) • double displacement (definition; identify type given balanced formula equation or written description; apply solubility rules to predict if a precipitate will form) 	<p>Student Edition:</p> <p>202-206, 208-209, 546, 709</p> <p><i>Chemistry and Technology</i> 214-215</p> <p><i>Chemlab</i> 204-205</p> <p><i>Everyday Chemistry</i> 273</p> <p><i>MiniLab</i> 203</p> <p>Teacher Wraparound Edition:</p> <p>CD 202; QD 206</p>
<p>INDICATOR</p> <p>4.5.2 The student will balance simple equations (not to include redox reactions).</p> <p>Assessment limits:</p> <ul style="list-style-type: none"> • Law of Conservation of Mass (apply to reactions to account for the same number of atoms of each type appearing in both the reactants and products) • coefficients (define; use to balance symbolic equations; explain meaning in symbolic equations; differentiate between the use and meaning of coefficients and subscripts) 	<p>Student Edition:</p> <p>40, 53, 196-197</p> <p><i>Chemlab</i> 54-55</p> <p><i>History Connection</i> 56</p> <p>Teacher Wraparound Edition:</p> <p>CD 52; D 42; E 198; IM 197; R 53</p>

STANDARDS	PAGE REFERENCES
<p>INDICATOR</p> <p>4.5.3 The student will demonstrate that adjusting quantities of reactants may affect the amounts of products formed.</p> <p>Assessment limits:</p> <ul style="list-style-type: none"> • use of coefficients in a balanced equation to predict amounts of reactants and products (at the molecular/mole level – no mass-mass calculations) • changing the amount of reactant(s) may change the amount of product(s) formed (no calculations) 	<p>Student Edition:</p> <p>198-199, 212-213, 218</p> <p><i>Biology Connection</i> 278</p> <p><i>Chemistry and Technology</i> 214-215, 286-289, 424-425</p> <p>Teacher Wraparound Edition:</p> <p>CD 196; DE 192-193, 196-197</p>
<p>INDICATOR</p> <p>4.5.4 The student will recognize that chemical reactions occur at different speeds.</p> <p>Assessment limits:</p> <ul style="list-style-type: none"> • reaction rate (in order for atoms to react they must collide with sufficient energy; reaction rate increases as frequency of molecular collisions increases) • effects of surface area, temperature, and concentration on the frequency and energy of molecular collisions (no calculations or specific concentration units) • catalysts (definition; conceptual understanding of behavior) 	<p>Student Edition:</p> <p>216-218, 220-221, 672, 709-710</p> <p><i>Chemistry and Technology</i> 214-215</p> <p><i>Chemlab</i> 674-675</p> <p><i>MiniLab</i> 696</p> <p>Teacher Wraparound Edition:</p> <p>DE 216-217; E 221; QD 217, 220; VL 672, 710</p>