



# CHEMISTRY

## MATTER AND CHANGE

© 2005

STANDARDS	PAGE REFERENCES
<b>I. HISTORY AND NATURE OF SCIENCE</b>	
<b>A. Scientific World View</b> <b>The student will understand the nature of scientific ways of thinking and that scientific knowledge changes and accumulates over time.</b>	
<p>1. The student will be able to distinguish among hypothesis, theory and law as scientific terms and how they are used to answer a specific question.</p>	<p><b>Student Edition:</b> 11, 13 <i>Chapter Assessment 22 #33 &amp; #35</i> <i>Section Assessment 13 #14</i></p> <p><b>Teacher Wraparound Edition:</b> CU 13; IM 12; R 13</p>
<p>2. The student will be able to explain how scientific and technological innovations as well as new evidence can challenge portions of or entire accepted theories and models including but not limited to cell theory, atomic theory, theory of evolution, plate tectonic theory, germ theory of disease and big bang theory.</p>	<p><b>Student Edition:</b> 87-97, 117-118, 122-132, 151-153 <i>Biology Connection 701</i></p> <p><b>Teacher Wraparound Edition:</b> A 156; E 93, 97, 99; P 133</p>
<p>3. The student will recognize that in order to be valid, scientific knowledge must meet certain criteria including that it: be consistent with experimental, observational and inferential evidence about nature; follow rules of logic and reporting both methods and procedures; and be falsifiable and open to criticism.</p>	<p><b>Student Edition:</b> 10-13, 87-91 <i>Biology Connection 701</i> <i>Section Assessment 91 #4</i></p> <p><b>Teacher Wraparound Edition:</b> A 791; CB 792; E 89, 97</p>

STANDARDS	PAGE REFERENCES
4. The student will explain how traditions of ethics, peer review, conflict and general consensus influence the conduct of science.	<b>Student Edition:</b> <i>Chemistry and Society</i> 20, 110, 482
5. The student will recognize that some scientific ideas are incomplete, and opportunity exists in these areas for new advances.	<b>Student Edition:</b> 97, 815-816, 826 <i>Chemistry and Society</i> 20, 110 <i>Chemistry and Technology</i> 344, 690 <i>Problem-Solving Lab</i> 860
<b>B. Scientific Inquiry</b> <b>The student will design and conduct a scientific investigation.</b>	
1. The student will design and complete a scientific experiment using scientific methods by determining a testable question, making a hypothesis, designing a scientific investigation with appropriate controls, analyzing data, making conclusions based on evidence and comparing conclusions to the original hypothesis and prior knowledge.	<b>Student Edition:</b> <i>ChemLab</i> 18-19, 550-551, 862-863 <i>Problem-Solving Lab</i> 372, 478 <b>Teacher Wraparound Edition:</b> A 409, 542, 618; E 11; P 364
2. The student will distinguish between qualitative and quantitative data.	<b>Student Edition:</b> 10-11 <i>Chapter Assessment</i> 22 #31 & #39 <b>Teacher Wraparound Edition:</b> CJ 12
3. The student will apply mathematics and models to analyze data and support conclusions.	<b>Student Edition:</b> <i>ChemLab</i> 480-481, 862-863 <i>MiniLab</i> 102 <i>Problem-Solving Lab</i> 390, 503 <b>Teacher Wraparound Edition:</b> A 517, 820; BM 426; MC 167, 315
4. The student will identify possible sources of error and their effects on results.	<b>Student Edition:</b> <i>ChemLab (Error Analysis)</i> 47, 109, 343, 375, 411, 521, 833 <i>Problem-Solving Lab</i> 155, 372 <b>Teacher Wraparound Edition:</b> A 504

STANDARDS	PAGE REFERENCES
5. The student will know that professional scientists and engineers have ethical codes.	<b>Student Edition:</b> <i>Chemistry and Society</i> 20, 482
6. The student will give examples of how different domains of science use different bodies of scientific knowledge and employ different methods to investigate questions.	<b>Student Edition:</b> 9, 14 <i>Chapter Assessment 22 #40</i> <b>Teacher Wraparound Edition:</b> CJ 14; R 17
<b>C. Scientific Enterprise</b> <b>The student will understand the relationship between science and technology and how both are used.</b>	
1. The student will compare and contrast the purposes and career opportunities of engineering, technology and science.	<b>Student Edition:</b> 17 <i>Careers Using Chemistry</i> 136, 250, 403, 421, 548 <i>Chemistry and Society</i> 80 <b>Teacher Wraparound Edition:</b> A 401; AC 161; E 829
2. The student will provide an example of a need or problem identified by science and solved by engineering or technology.	<b>Student Edition:</b> 846-847 <i>Chapter Assessment 22 #43</i> <i>Chemistry and Society</i> 80 <i>Everyday Chemistry</i> 412 <i>How It Works</i> 144, 552 <b>Teacher Wraparound Edition:</b> AC 698; CD 678; E 17; TS 834
3. The student will provide an example of how technology facilitates new discoveries and the development of scientific knowledge.	<b>Student Edition:</b> 91, 815, 819-820 <i>Astronomy Connection</i> 152 <i>Problem-Solving Lab</i> 96 <b>Teacher Wraparound Edition:</b> E 91, 103; TS 110

STANDARDS	PAGE REFERENCES
<p>4. The student will know that technological changes and scientific advances are often accompanied by social, political, environmental and economic changes.</p>	<p><b>Student Edition:</b>  <i>Chapter Assessment 772 #74</i>  <i>Chemistry and Society 20, 110, 834</i>  <i>Earth Science Connection 726</i>  <i>Everyday Chemistry 730</i></p> <p><b>Teacher Wraparound Edition:</b>  A 679; CD 651, 852-853; TS 110</p>
<p>5. The student will recognize that science and technology are influenced by cultural backgrounds and beliefs and by social needs, attitudes, values and limitations.</p>	<p><b>Student Edition:</b>  <i>Chemistry and Society 20, 110, 482</i>  <i>Chemistry and Technology 446, 690</i>  <i>Everyday Chemistry 730</i>  <i>How It Works 552</i></p> <p><b>Teacher Wraparound Edition:</b>  CJ 816, 825</p>
<p><b>D. Historic Perspectives</b></p> <p><b>The student will recognize the historical and cultural context of scientific endeavors and how they influence each other.</b></p>	
<p>1. The student will be able to trace the development of a scientific advancement, invention or theory and its impact on society.</p>	<p><b>Student Edition:</b>  <i>Chemistry and Society 20</i>  <i>Chemistry and Technology 588, 768</i>  <i>Earth Science Connection 726</i>  <i>History Connection 264</i></p> <p><b>Teacher Wraparound Edition:</b>  B 552; CB 823</p>
<p>2. The student will provide examples of scientific advancements contributed by other civilizations and cultures.</p>	<p><b>Student Edition:</b>  87-89  <i>History Connection 90</i></p> <p><b>Teacher Wraparound Edition:</b>  CD 26, 72-73, 197, 266, 360-361, 651, 725</p>
<p>3. The student will compare and contrast the differences between scientific theories and theories from other bodies of knowledge, and the importance of each in a science discussion.</p>	<p><b>Student Edition:</b>  13</p> <p><b>Teacher Wraparound Edition:</b>  CU 91; E 88; IM 12</p>

STANDARDS	PAGE REFERENCES
<b>II. PHYSICAL SCIENCE</b>	
<b>A. Structure of Matter</b> <b>The student will understand the nature of matter including its forms, properties and interactions.</b>	
1. The student will identify protons, neutrons and electrons as the major components of the atom, their mass relative to one another, their arrangement and their charge.	<b>Student Edition:</b> 92-97, 102 <i>Chapter Assessment 112 #36 &amp; #38</i> <i>Section Assessment 97 #7 &amp; #8</i> <b>Teacher Wraparound Edition:</b> A 97; CJ 94
2. The student will be able to explain the relationship of an element's position on the periodic table to its atomic number and atomic mass.	<b>Student Edition:</b> 98-99, 102-104, 154
3. The student will compare and contrast the properties of an element and its isotopes, and describe how isotopes can be used in research, medicine and industry.	<b>Student Edition:</b> 100-101, 180, 819-820, 828-829 <i>Chapter Assessment 112 #48</i> <b>Teacher Wraparound Edition:</b> AC 818; CJ 100; E 107; IM 100
4. The student will use the periodic table to identify regions, families, groups and periods.	<b>Student Edition:</b> 154-158 <i>Chapter Assessment 174 #35</i> <i>Section Assessment 158 #2</i> <b>Teacher Wraparound Edition:</b> A 158; CU 161
5. The student will explain how neutral atoms become ions.	<b>Student Edition:</b> 212-214 <i>Chapter Assessment 236 #48</i> <b>Teacher Wraparound Edition:</b> A 214; CD 212; CJ 213; CU 214
6. The student will be able to explain how atoms form compounds through bonding.	<b>Student Edition:</b> 215-220, 228-229, 241-247 <i>ChemLab 232-233</i> <b>Teacher Wraparound Edition:</b> A 231; CJ 217, 243; D 248-249; P 215; VL 228

STANDARDS	PAGE REFERENCES
7. The student will compare and contrast the states of matter in terms of interactions between particles.	<b>Student Edition:</b> 58-59, 386-387, 396-400, 419-420 <b>Teacher Wraparound Edition:</b> CJ 397; E 59; R 59
8. The student will differentiate between an atom and a molecule.	<b>Student Edition:</b> 90, 242 <b>Teacher Wraparound Edition:</b> A 245
9. The student will differentiate between an element and a compound.	<b>Student Edition:</b> 70-71, 74-77 <i>Chapter Study Guide</i> 81 <i>ChemLab</i> 78-79 <i>Section Assessment</i> 77 #25 <b>Teacher Wraparound Edition:</b> CJ 76; QD 75
<b>B. Chemical Reactions</b> <b>The student will describe chemical reactions and the factors that influence them.</b>	
1. The student will describe chemical reactions using words and symbolic equations.	<b>Student Edition:</b> 277-283 <i>Chapter Assessment</i> 304-305 #58 & #71-#79 <i>ChemLab</i> 301 #4 <i>Discovery Lab</i> 489 <b>Teacher Wraparound Edition:</b> A 283; CJ 287; P 279; R 283
2. The student will explain the influence of temperature, surface area, agitation and catalysts on the rate of a reaction.	<b>Student Edition:</b> 536-541 <i>ChemLab</i> 550-551 <i>Discovery Lab</i> 529 <i>MiniLab</i> 539 <i>Problem-Solving Lab</i> 533 <b>Teacher Wraparound Edition:</b> A 541, 542; CJ 538; D 536-537; QD 537

STANDARDS	PAGE REFERENCES
3. The student will distinguish between a chemical reaction and a nuclear reaction.	<b>Student Edition:</b> 105, 805 <i>Section Assessment 107 #26, 809 #2 &amp; #4</i> <b>Teacher Wraparound Edition:</b> CD 105; IM 806
4. The student will explain how the rearrangement of atoms and molecules in a chemical reaction illustrates conservation of mass.	<b>Student Edition:</b> 63-65, 354-356 <b>Teacher Wraparound Edition:</b> CJ 355; QD 64
5. The student will describe how combining acids and bases produce a neutral solution.	<b>Student Edition:</b> 617-618 <i>Chapter Assessment 632 #93</i> <i>ChemLab 626-627</i> <i>How It Works 628</i> <b>Teacher Wraparound Edition:</b> CJ 618
<b>C. Energy Transformations</b> <b>The student will understand energy forms, transformations and transfers.</b>	
1. The student will know that potential energy is stored energy and is associated with gravitational or electrical force, mechanical position or chemical composition.	<b>Student Edition:</b> 489-491, 665-666 <i>Section Assessment 495 #8</i> <b>Teacher Wraparound Edition:</b> VL 666
2. The student will differentiate between kinetic and potential energy and identify situations where kinetic energy is converted into potential energy and vice versa.	<b>Student Edition:</b> 489-491 <i>Chapter Assessment 524 #50</i> <i>Section Assessment 495 #8</i>
3. The student will differentiate between AC and DC current.	See Glencoe's <i>Physics: Principles and Problems</i> © 2005 <b>Student Edition:</b> 592, 675-678, 682-685 <i>Physics Lab 686-687</i>

STANDARDS	PAGE REFERENCES
4. The student will describe the production, storage and transmission of electricity.	<p><b>Student Edition:</b> 673-679, 824-825 <i>Chemistry and Technology</i> 690 <i>Problem-Solving Lab</i> 679 <i>Section Assessment</i> 826 #27</p> <p><b>Teacher Wraparound Edition:</b> CU 682; E 500, 701; P 675; TS 690</p>
5. The student will be able to describe physical and chemical changes in terms of the law of conservation of energy.	<p><b>Student Edition:</b> 490</p> <p><b>Teacher Wraparound Edition:</b> CJ 64</p>
6. The student will compare and contrast the amount of energy released through chemical reactions and nuclear fission and fusion.	<p><b>Student Edition:</b> 821-823, 826</p> <p><i>Chapter Assessment</i> 836 #37</p>
7. The student will describe the risks and benefits of fossil fuels, renewable sources and nuclear power as sources of usable energy.	<p><b>Student Edition:</b> 495, 824-825, 846-849 <i>ChemLab</i> 862-863 <i>Everyday Chemistry</i> 730</p> <p><b>Teacher Wraparound Edition:</b> A 510; CJ 825; DI 824; TS 690, 730</p>
8. The student will describe applications of the different wavelengths of the electromagnetic spectrum.	<p><b>Student Edition:</b> 118</p> <p><b>Teacher Wraparound Edition:</b> P 120</p>
9. The student will describe energy, work and power both conceptually and quantitatively.	<p>Energy is described both conceptually and quantitatively on:</p> <p><b>Student Edition:</b> 489-495, 498-504 <i>ChemLab</i> 520-521 <i>MiniLab</i> 505 <i>Problem-Solving Lab</i> 503</p> <p><b>Teacher Wraparound Edition:</b> E 505; P 499; R 494, 500</p>

STANDARDS	PAGE REFERENCES
<p><b>D. Motion</b></p>	
<p><b>The student will understand the nature of force and motion.</b></p>	
<p>1. The student will use Newton's three laws of motion to qualitatively and quantitatively describe the interaction of objects.</p>	<p>See Glencoe's <i>Physics: Principles and Problems</i> © 2005</p> <p><b>Student Edition:</b> 93-95, 96-99, 102-103, 150-152, 153-155, 157-159 <i>Design Your Own Physics Lab</i> 160-161 <i>Internet Physics Lab</i> 108-109</p>
<p>2. The student will describe the effect of friction and gravity on the motion of an object.</p>	<p>See Glencoe's <i>Physics: Principles and Problems</i> © 2005</p> <p><b>Student Edition:</b> 72-75, 126-130, 175-176, 179-185 <i>Extreme Physics</i> 506 <i>Internet Physics Lab</i> 76-77 <i>Physics Lab</i> 136-137</p>
<p><b>E. Forces of Nature</b></p>	
<p><b>The student will understand the forces of nature and their application.</b></p>	
<p>1. The student will recognize the factors that affect the presence and magnitude of gravitational, electromagnetic, weak and strong nuclear forces.</p>	<p><b>Student Edition:</b> 199, 810 <i>Chapter Assessment</i> 836 #42 <i>Discovery Lab</i> 87, 179 <i>Section Assessment</i> 814 #14</p> <p><b>Teacher Wraparound Edition:</b> QD 118, 199; TS 130</p>
<p>2. The student will identify the dominant force or forces in a variety of interactions.</p>	<p><b>Student Edition:</b> 266, 393-395, 399 <i>ChemLab</i> 410-411 <i>Problem-Solving Lab</i> 267</p> <p><b>Teacher Wraparound Edition:</b> A 394; R 392, 395</p>