



Chemistry

CONCEPTS AND APPLICATIONS

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STANDARDS	PAGE REFERENCES
<p>I. HISTORY AND NATURE OF SCIENCE</p>	
<p>A. Scientific World View</p> <p>The student will understand the nature of scientific ways of thinking and that scientific knowledge changes and accumulates over time.</p>	
<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>Student Edition: 41-42, 54-55, 59, 198-199, 230-235, 342-345, 382-383, 391-398</p> <p><i>ChemLab</i> 56-57, 136-137, 384-385</p> <p><i>History Connection</i> 307</p> <p>Teacher Wraparound Edition: CD 54, 64, 144; CM 15, 59; DE 54-55, 386-387; DIN 263</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>Student Edition: 52-55, 61-65, 69-70, 77-79, 88-94, 111-113, 688-691, 756-760</p> <p><i>Art Connection</i> 759</p> <p><i>Biology Connection</i> 280, 772</p> <p><i>Chemistry and Technology</i> 216-217, 240-241, 728-729</p> <p><i>History Connection</i> 58, 307</p> <p>Teacher Wraparound Edition: AC 405; CD 15, 62; CM 70; DE 6-7; IS 144, 428; P 68</p>

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<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>Student Edition: 52-55, 59, 61-68, 404-413, 688-691 <i>Biology Connection</i> 772 <i>Chemistry and Society</i> 32, 146, 495 <i>Chemistry and Technology</i> 573, 754-755 <i>ChemLab</i> 8-9, 38-39, 56-57, 384-385, 650-652 <i>History Connection</i> 271 <i>How It Works</i> 569</p> <p>Teacher Wraparound Edition: CD 53; CM 59; DE 6-7</p>
<p>4. The student will explain how traditions of ethics, peer review, conflict and general consensus influence the conduct of science.</p>	<p>Student Edition: 52-55, 59, 77-79, 86-94, 198-199, 342-347 <i>Chemistry and Society</i> 495 <i>Chemistry and Technology</i> 216-217, 728-729 <i>History Connection</i> 58, 307 <i>Physics Connection</i> 232</p> <p>Teacher Wraparound Edition: AC 65, 395, 698; CD 53; CM 59; DE 6-7; DI 75; P 68</p>
<p>5. The student will recognize that some scientific ideas are incomplete, and opportunity exists in these areas for new advances.</p>	<p>Student Edition: 111-113, 345-347, 535, 613-615 <i>Chemistry and Society</i> 32, 146, 495, 537 <i>Chemistry and Technology</i> 424-425, 728-729 <i>Everyday Chemistry</i> 417 <i>How It Works</i> 614 <i>Physics Connection</i> 232</p> <p>Teacher Wraparound Edition: AC 24; CD 64, 331, 447; CM 70; DI 75; E 113; IS 438, 642</p>

STANDARDS	PAGE REFERENCES
<p>B. Scientific Inquiry The student will design and conduct a scientific investigation.</p>	
<p>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.</p>	<p>Student Edition: 59 <i>Chemistry and Technology</i> 216-217, 354-355, 754-755 <i>ChemLab</i> 56-57, 136-137, 206-207, 362-363, 422-423, 542-543, 650-652, 674-675</p> <p>Teacher Wraparound Edition: CD 11; DE 6-7</p>
<p>2. The student will distinguish between qualitative and quantitative data.</p>	<p>Student Edition: 4-7, 14, 36-37, 67-68, 74-75 <i>Appendix A</i> 785-794, D 844-852 <i>Chemistry and Technology</i> 108-109, 354-355, 424-425 <i>ChemLab</i> 16-17, 38-39, 172-173, 384-385, 650-652 <i>Everyday Chemistry</i> 76, 248-249, 466, 685</p> <p>Teacher Wraparound Edition: CM 75; DE 54-55, 58-59</p>
<p>3. The student will apply mathematics and models to analyze data and support conclusions.</p>	<p>Student Edition: 10-11, 36-37, 382-383, 391-392, 404-409, 414-421, 426-429, 539-541 <i>Appendix A</i> 791-808 <i>ChemLab</i> 38-39, 56-57, 384-385, 422-423, 542-543</p> <p>Teacher Wraparound Edition: CD 11; DE 36-37, 54-55; DI 383</p>
<p>4. The student will identify possible sources of error and their effects on results.</p>	<p>Student Edition: <i>Appendix A</i> 792-794 <i>ChemLab</i> 38-39, 56-57, 172-173, 206-207, 422-423, 542-543, 650-652, 722-723 <i>Mini LAB</i> 63</p> <p>Teacher Wraparound Edition: CE 23, 54, 65, 157, 159, 193, 199; CM 70</p>

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5. The student will know that professional scientists and engineers have ethical codes.	<p>Student Edition: 59 <i>Chemistry and Society</i> 495, 659 <i>Chemistry and Technology</i> 216-217, 728-729 <i>History Connection</i> 58, 307 <i>People in Chemistry</i> 12-13 <i>Physics Connection</i> 232</p> <p>Teacher Wraparound Edition: AC 65, 698; CD 53; DI 75</p>
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.	<p>Student Edition: 63-65, 668-673, 676-682, 692-700 <i>Biology Connection</i> 280, 632, 772 <i>Chemistry and Society</i> 146, 537 <i>Earth Science Connection</i> 387, 524, 727 <i>Health Connection</i> 693 <i>Physics Connection</i> 73, 566</p> <p>Teacher Wraparound Edition: IS 76, 91, 203, 246, 321, 671, 684</p>
<p>C. Scientific Enterprise The student will understand the relationship between science and technology and how both are used.</p>	
1. The student will compare and contrast the purposes and career opportunities of engineering, technology and science.	<p>Student Edition: <i>Chemistry and Society</i> 32, 146, 447, 537 <i>Chemistry and Technology</i> 240-241, 288-291, 424-425, 484, 573, 590-592, 754-755 <i>People in Chemistry</i> 12-13, 212-213, 316-317, 448-449, 490-491, 596-597, 650-651, 678-679</p>
2. The student will provide an example of a need or problem identified by science and solved by engineering or technology.	<p>Student Edition: <i>Biology Connection</i> 203, 487, 772 <i>Chemistry and Technology</i> 108-109, 216-217, 288-291, 424-425, 484, 728-729, 754-755 <i>How It Works</i> 468, 569, 612, 614, 748 <i>Physics Connection</i> 566</p>

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<p>3. The student will provide an example of how technology facilitates new discoveries and the development of scientific knowledge.</p>	<p>Student Edition: <i>Biology Connection</i> 203, 772 <i>Chemistry and Technology</i> 326, 728-729, 754-755 <i>Earth Science Connection</i> 387, 727 <i>Health Connection</i> 610, 693 <i>How It Works</i> 468, 612, 614 <i>Physics Connection</i> 232, 566</p>
<p>4. The student will know that technological changes and scientific advances are often accompanied by social, political, environmental and economic changes.</p>	<p>Student Edition: 563-565, 570, 589, 613-615, 637-639 <i>Art Connection</i> 163 <i>Biology Connection</i> 280 <i>Chemistry and Society</i> 146, 495 <i>Chemistry and Technology</i> 590-592, 728-729 <i>Earth Science Connection</i> 727 <i>History Connection</i> 58, 141, 271, 307 <i>How It Works</i> 569, 612 <i>Physics Connection</i> 232 Teacher Wraparound Edition: E 564; IS 573; WAC 576</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>Student Edition: 111-113, 598, 605-615 <i>Biology Connection</i> 487 <i>Chemistry and Society</i> 32 <i>Chemistry and Technology</i> 108-109 <i>Everyday Chemistry</i> 417, 466, 683 <i>How It Works</i> 468, 569, 614 Teacher Wraparound Edition: CD 613; CJ 766; D 615; IS 483, 610, 611</p>

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D. Historic Perspectives

The student will recognize the historical and cultural context of scientific endeavors and how they influence each other.

<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>Student Edition: 531-533, 536, 563-565, 585-589, 599-605, 608-609, 611-615, 726, 730-732</p> <p><i>Chemistry and Technology</i> 288-291, 590-592, 728-729</p> <p><i>ChemLab</i> 606-607</p> <p><i>Health Connection</i> 610</p> <p><i>How It Works</i> 569</p> <p><i>Mini LAB</i> 568</p> <p>Teacher Wraparound Edition: AC 613; CB 599; CD 520; D 538, 615, 730; DE 590-591, 602-603; E 564; QD 533, 565; VL 588</p>
<p>2. The student will provide examples of scientific advancements contributed by other civilizations and cultures.</p>	<p>Student Edition: 52-55, 61-65, 69-70, 86-94, 376, 382-383, 391-392, 744-746</p> <p><i>Art Connection</i> 163, 411</p> <p><i>Chemistry and Society</i> 146</p> <p><i>Chemistry and Technology</i> 216-217, 288-291, 354-355</p> <p><i>History Connection</i> 58, 141</p> <p>Teacher Wraparound Edition: AC 65, 92; CB 91; CD 53, 62, 592; IS 376</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>Student Edition: 54-55, 59</p> <p><i>History Connection</i> 58, 307</p> <p><i>Physics Connection</i> 232</p> <p>Teacher Wraparound Edition: CD 11, 53; CJ 10; E 54</p>

STANDARDS	PAGE REFERENCES
II. PHYSICAL SCIENCE	
A. Structure of Matter	
The student will understand the nature of matter including its forms, properties and interactions.	
<p>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.</p>	<p>Student Edition: 61-65, 69-70, 77-79, 88-94, 96-99, 138-147, 230-235, 238-242, 244-251, 746-747, 762-767</p> <p>Teacher Wraparound Edition: AC 292; CE 65; CM 70, 132, 230, 246, 247; D 79</p>
<p>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.</p>	<p>Student Edition: 66-67, 86-94, 98-99, 102-105, 244-247, 250-251, 258-259, 285, 294-295</p> <p><i>Appendix D 842-843</i></p> <p>Teacher Wraparound Edition: CB 91; D 92; DD 84-85; KC 95; VL 88, 247</p>
<p>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.</p>	<p>Student Edition: 62, 66-68, 756-760, 768-771</p> <p><i>Art Connection 759</i></p> <p><i>Biology Connection 772</i></p> <p><i>Chemistry and Technology 754-755</i></p> <p><i>Mini LAB 63</i></p> <p>Teacher Wraparound Edition: CB 67; CE 65; CM 66; DI 759; E 769</p>
<p>4. The student will use the periodic table to identify regions, families, groups and periods.</p>	<p>Student Edition: 87-94, 95-99, 102-107, 243-247, 263-281, 282-283, 292-295</p> <p><i>ChemLab 100-101</i></p> <p>Teacher Wraparound Edition: AC 130; CM 104, 293; D 92; DD 84-85; DE 270-271; KC 95; R 106</p>
<p>5. The student will explain how neutral atoms become ions.</p>	<p>Student Edition: 132-134, 485-486, 488-489, 499-500, 774-776</p> <p><i>ChemLab 136-137</i></p> <p><i>Mini LAB 135</i></p> <p>Teacher Wraparound Edition: CB 485; CD 486; QD 147; TPK 486, 517</p>

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6. The student will be able to explain how atoms form compounds through bonding.	<p>Student Edition: 129, 130-135, 138-142, 243-246, 302-314, 623-624, 629-636, 680-681</p> <p><i>ChemLab</i> 136-137, 172-173</p> <p><i>Everyday Chemistry</i> 571</p> <p>Teacher Wraparound Edition: DD 300-301; DE 124-125, 138-139, 624-625</p>
7. The student will compare and contrast the states of matter in terms of interactions between particles.	<p>Student Edition: 34-35, 340-347, 348-349, 352-361, 372-375, 386, 392</p> <p><i>ChemLab</i> 362-363</p> <p>Teacher Wraparound Edition: A 341; CB 35, 372; CD 144; CM 34; DE 378-379; E 347; QD 391</p>
8. The student will differentiate between an atom and a molecule.	<p>Student Edition: 52-55, 66-68, 86-89, 140, 170, 174-175</p> <p>Teacher Wraparound Edition: CD 126; CE 54</p>
9. The student will differentiate between an element and a compound.	<p>Student Edition: 30-31, 134-135, 174-175</p> <p><i>Launch Lab</i> 153</p> <p>Teacher Wraparound Edition: D 31; DE 28-29, 138-139</p>
<p>B. Chemical Reactions</p> <p>The student will describe chemical reactions and the factors that influence them.</p>	
1. The student will describe chemical reactions using words and symbolic equations.	<p>Student Edition: 190-196, 198-199, 203-205, 208-209, 708-714, 734-735</p> <p><i>Chemistry and Technology</i> 216-217, 424-425</p> <p><i>ChemLab</i> 206-207, 560-561</p> <p><i>How It Works</i> 197, 614, 569</p> <p><i>Launch Lab</i> 189</p> <p>Teacher Wraparound Edition: CD 193; CJ 191; CM 198; DE 194-195</p>

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<p>2. The student will explain the influence of temperature, surface area, agitation and catalysts on the rate of a reaction.</p>	<p>Student Edition: 218-223, 676-677, 692-694, 713-714, 730 <i>Chemistry and Technology</i> 216-217, 424-425 <i>ChemLab</i> 674-675 <i>Everyday Chemistry</i> 715 Teacher Wraparound Edition: D 714; DE 188-189, 218-219, 730-731; E 223; QD 222</p>
<p>3. The student will distinguish between a chemical reaction and a nuclear reaction.</p>	<p>Student Edition: 190-191, 198-199, 208-209, 210-215, 218-223, 747-750, 756-757, 761-767 <i>Chemistry and Technology</i> 754-755 <i>ChemLab</i> 206-207 Teacher Wraparound Edition: CE 751; D 765; DE 214-215; QD 198</p>
<p>4. The student will explain how the rearrangement of atoms and molecules in a chemical reaction illustrates conservation of mass.</p>	<p>Student Edition: 41-42, 53, 55, 59, 198-199 <i>ChemLab</i> 56-57 <i>History Connection</i> 58 Teacher Wraparound Edition: CD 54; CM 59; QD 53, 198</p>
<p>5. The student will describe how combining acids and bases produce a neutral solution.</p>	<p>Student Edition: 516-518, 535, 539-541 <i>ChemLab</i> 542-543 <i>How It Works</i> 545 <i>Mini LAB</i> 503, 518 Teacher Wraparound Edition: CD 540, 541; CJ 517; CM 522; DE 518-519</p>
<p>C. Energy Transformations The student will understand energy forms, transformations and transfers.</p>	
<p>1. The student will know that potential energy is stored energy and is associated with gravitational or electrical force, mechanical position or chemical composition.</p>	<p>Student Edition: 696 Also see Glencoe's <i>Physics: Principles and Problems</i> © 2005 pages 287-292.</p>

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2. The student will differentiate between kinetic and potential energy and identify situations where kinetic energy is converted into potential energy and vice versa.	<p>Student Edition: 348-352</p> <p>Teacher Wraparound Edition: D 351</p> <p>Also see Glencoe's <i>Physics: Principles and Problems</i> © 2005 pages 287-292.</p>
3. The student will differentiate between AC and DC current.	<p>See Glencoe's <i>Physics: Principles and Problems</i> © 2005</p> <p>Student Edition: 677-678</p>
4. The student will describe the production, storage and transmission of electricity.	<p>Student Edition: 726, 764-765</p> <p><i>Chemistry and Technology</i> 728-729</p>
5. The student will be able to describe physical and chemical changes in terms of the law of conservation of energy.	<p>Student Edition: 711-712</p> <p>Teacher Wraparound Edition: CB 708</p> <p>Also see Glencoe's <i>Physics: Principles and Problems</i> © 2005 pages 293-297.</p>
6. The student will compare and contrast the amount of energy released through chemical reactions and nuclear fission and fusion.	<p>Student Edition: 761-767</p> <p>Teacher Wraparound Edition: D 765</p> <p>Also see Glencoe's <i>Physics: Principles and Problems</i> © 2005 page 804.</p>
7. The student will describe the risks and benefits of fossil fuels, renewable sources and nuclear power as sources of usable energy.	<p>Student Edition: 726, 730-732, 761-767</p> <p><i>Chemistry and Technology</i> 728-729</p> <p>Teacher Wraparound Edition: D 765</p>

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8. The student will describe applications of the different wavelengths of the electromagnetic spectrum.	<p>Student Edition: 70-72, 744-745, 778 <i>Chemistry and Technology</i> 240-241 <i>Everyday Chemistry</i> 76, 320 <i>Mini LAB</i> 234</p> <p>Teacher Wraparound Edition: IS 76</p>
9. The student will describe energy, work and power both conceptually and quantitatively.	<p>Student Edition: 42-43</p> <p>Also see Glencoe's <i>Physics Principles and Problems</i> © 2005 pages 258-265.</p>
<p>D. Motion The student will understand the nature of force and motion.</p>	
1. The student will use Newton's three laws of motion to qualitatively and quantitatively describe the interaction of objects.	<p>Student Edition: 69-70, 231 <i>Physics Connection</i> 232</p> <p>Teacher Wraparound Edition: CM 70, 230</p>
2. The student will describe the effect of friction and gravity on the motion of an object.	<p>See Glencoe's <i>Physics: Principles and Problems</i> © 2005</p> <p>Student Edition: 72-75, 126-127, 288-289.</p>
<p>E. Forces of Nature The student will understand the forces of nature and their application.</p>	
1. The student will recognize the factors that affect the presence and magnitude of gravitational, electromagnetic, weak and strong nuclear forces.	<p>Teacher Wraparound Edition: DI 263</p> <p>Also see Glencoe's <i>Physics: Principles and Problems</i> © 2005 pages 175, 546-548, 802-803, 822-823.</p>
2. The student will identify the dominant force or forces in a variety of interactions.	<p>See Glencoe's <i>Physics: Principles and Problems</i> © 2005</p> <p>Student Edition: 802-803, 822-823.</p>