



Physical Science

with **Earth Science**

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STANDARDS	PAGE REFERENCES
<p>A. CLASSIFYING LIFE FORMS</p> <p>Students will understand that there are similarities within the diversity of all living things. Students will be able to:</p>	
<p>1. Explain the role of DNA in resolving questions of relationship and evolutionary change.</p>	<p>Student Edition: 45</p> <p>Also see Glencoe's <i>Science Level Blue</i> © 2005 pages 39, 67.</p>
<p>2. Describe similarities and differences among organisms within each level of the taxonomic system for classifying organisms (kingdom through species).</p>	<p>See Glencoe's <i>Science Level Red</i> © 2005 pages 726-729.</p>
<p>3. Analyze the basic characteristics of living things, including their need for food, water, and gases and the ability to reproduce.</p>	<p>Student Edition: 42</p> <p>Also see Glencoe's <i>Science Level Blue</i> © 2005 pages 92-114.</p>
<p>B. ECOLOGY</p> <p>Students will understand how living things depend on one another and on non-living aspects of the environment. Students will be able to:</p>	
<p>1. Illustrate the cycles of matter in the environment and explain their interrelationships.</p>	<p>Student Edition: 522, 536-537, 634-635, 663-668</p> <p>Teacher Wraparound Edition: FYI 537; LD 634; PR 668</p>

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2. Compare the process of photosynthesis and respiration, and describe the factors that effect them.	Student Edition: 518-519 <i>Integrate Life Science</i> 342, 522, 827
3. Analyze the factors that affect population size (e.g., reproductive and survival rates).	See Glencoe's <i>Science Level Blue</i> © 2005 pages 99-105.
4. Analyze the impact of human and other activities on the type and pace of change in ecosystems.	See Glencoe's <i>Science Level Blue</i> © 2005 pages 150-153, 159, 164-165.
C. CELLS Students will understand that cells are the basic units of life. Students will be able to:	
1. Relate the parts of a cell to its function.	See Glencoe's <i>Science Level Blue</i> © 2005 pages 68-69.
2. Illustrate how cells replicate and transmit information, including the roles of DNA and RNA.	See Glencoe's <i>Science Level Blue</i> © 2005 page 67.
3. Discuss the function of the important "molecules of life" - proteins (including enzymes and hormones), carbohydrates, lipids, and nucleic acids.	See Glencoe's <i>Chemistry: Matter and Change</i> © 2005 pages 775-791.
4. Explain how the human body protects itself against disease and how the body might lose that ability.	See Glencoe's <i>Science Level Red</i> © 2005 page 570.
5. Analyze and debate basic principles of genetic engineering: how it is done, its uses, and some ethical implications.	See Glencoe's <i>Science Level Blue</i> © 2005 pages 45-48.
D. CONTINUITY AND CHANGE Students will understand the basis for all life and that all living things change over time. Students will be able to:	
1. Explain how mutations can be caused by gene mutation or chromosomal alteration and describe the possible results of such mutations on individuals or populations.	See Glencoe's <i>Science Level Blue</i> © 2005 pages 51-53.
2. Describe why the offspring of sexually reproducing species have different survival rates than those of asexually reproducing species under a variety of conditions. Describe the advantages and disadvantages of each.	See Glencoe's <i>Science Level Red</i> © 2005 pages 590-595.
3. Explain and document the importance of relatively short-term changes (e.g., one generation) on a species' survival.	See Glencoe's <i>Science Level Blue</i> © 2005 pages 53, 286.
4. Describe how genetic manipulation can cause unusually rapid changes in species.	See Glencoe's <i>Science Level Blue</i> © 2005 pages 49-53.

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5. Compare and contrast fertilization, zygote formation, and embryo development in humans and other species.	See Glencoe's <i>Science Level Red</i> © 2005 pages 577-578, 596.
6. Analyze a theory scientists use to explain the origin of life.	Student Edition: See Glencoe's <i>Science Level Blue</i> © 2005 pages 56, 281.
7. Explain both the evidence used to develop the geologic time scale and why an awareness of geologic time is important to an understanding of the process of change in the universe as well as on earth.	Student Edition: 669-675 <i>Launch Lab</i> 645 <i>Lab</i> 676-677 Teacher Wraparound Edition: CU 675; VL 672
E. STRUCTURE OF MATTER Students will understand the structure of matter and the changes it can undergo. Students will be able to:	
1. Trace the development of models of the atom to the present and describe how each model reflects the scientific understanding of their time.	Student Edition: 579, 581-583, 592-594, 786-789 Teacher Wraparound Edition: A 582; MM 787; QD 585; VL 581
2. Analyze how matter is affected by changes in temperature, pressure, and volume.	Student Edition: 258, 261-265, 524-525, 738-739, 761 <i>Launch Lab</i> 253 <i>Science and Society</i> 638 Teacher Wraparound Edition: FF 256; FYI 263; UA 619
3. Describe the characteristics and behavior of acids and bases.	Student Edition: 764-770, 771-774 <i>Lab</i> 775 <i>Science and Society</i> 778 Teacher Wraparound Edition: FF 772; FYI 766; IM 767; QD 769, 773; VL 765

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4. Describe an application of the Law of Conservation of Matter.	<p>Student Edition: 567, 634-635, 721-722, 726-729 <i>Design Your Own Lab</i> 568-569</p> <p>Teacher Wraparound Edition: IM 566, 728; QD 722; R 567; TC 606</p>
5. Describe how atoms are joined by chemical bonding.	<p>Student Edition: 688-692, 694-702, 703-709 <i>Lab</i> 693 <i>Model and Invent Lab</i> 710-711</p> <p>Teacher Wraparound Edition: A 696, 697, 702; DI 698; UA 700</p>
6. Compare the physical and chemical characteristics of elements.	<p>Student Edition: 581-583, 584-587, 588-596, 703-704 <i>National Geographic</i> 553 <i>Reference Handbook</i> 896-897</p> <p>Teacher Wraparound Edition: DI 593; FF 594; RC 595; VL 586</p>
7. Describe nuclear reactions, including fusion, fission, and decay, their occurrences in nature, and how they can be used by humans.	<p>Student Edition: 791-795, 801-806 <i>National Geographic</i> 805 <i>Lab</i> 807 <i>Model and Invent Lab</i> 808-809 <i>Science and History</i> 810</p> <p>Teacher Wraparound Edition: A 806; D 804; FYI 792, 803; QD 802; TPK 801</p>
<p>F. THE EARTH</p> <p>Students will gain knowledge about the earth and the processes that change it. Students will be able to:</p>	
1. Describe how air pressure, temperature, and moisture interact to cause changes in the weather.	<p>Student Edition: 520-522, 524-528, 532-533 <i>Launch Lab</i> 517 <i>Lab</i> 523</p> <p>Teacher Wraparound Edition: FYI 519, 526; QD 520; TC 516; UA 530</p>

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2. Analyze potential effects of changes in the earth's oceans and atmosphere.	Student Edition: 518-519, 522-533, 535-539 <i>Design Your Own Lab</i> 540-541 Teacher Wraparound Edition: CU 539; D 532; FYI 537, 538; IL 521; MM 530
3. Describe the impact of plate movement and erosion on the rock cycle.	Student Edition: 358-361, 371-372, 376-377, 634-635 Teacher Wraparound Edition: CU 361; FYI 360, 634; R 635
4. Describe ways that scientists measure long periods of time and determine the age of very old objects.	Student Edition: 669-675 <i>Lab</i> 676-677 Teacher Wraparound Edition: CB 673; CU 675; D 670; MM 674; TPK 669, VL 671, 672
5. Demonstrate how rocks and minerals are used to determine geologic history.	Student Edition: 669-675 <i>Lab</i> 676-677 Teacher Wraparound Edition: CB 673; CU 675; IH 670; MM 674; VL 671, 672
6. Analyze the changes in continental position and the evidence that supports the concept of tectonic plates.	Student Edition: 354-361, 370-372, 376 <i>Launch Lab</i> 353 <i>Lab</i> 379, 380-381 Teacher Wraparound Edition: A 355; CU 378; FYI 359, 360; VL 356
G. THE UNIVERSE Students will gain knowledge about the universe and how humans have learned about it, and about the principles upon which it operates. Students will be able to:	
1. Describe how scientists gather data about the universe.	Student Edition: 222, 818-822, 824-829, 833-835, 836-839 <i>Launch Lab</i> 817 Teacher Wraparound Edition: A 839; FF 837; FYI 820; SJ 821

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2. Research current explanations for phenomena such as black holes and quasars.	Student Edition: 824-825, 835 Teacher Wraparound Edition: FYI 825
3. Explain how astronomers measure interstellar distances.	Student Edition: 220, 821 Teacher Wraparound Edition: R 822
H. ENERGY Students will understand concepts of energy. Students will be able to:	
1. Analyze the evidence that leads scientists to conclude that light behaves somewhat like a wave and somewhat like a particle.	Student Edition: 460-461 Teacher Wraparound Edition: CC 307; FYI 460; PR 461
2. Examine and describe how light is reflected and refracted (deflected) by mirrors and lenses.	Student Edition: 301-303, 327-330, 331-337 <i>Lab 338</i> Teacher Wraparound Edition: FF 329; FYI 303; LD 333; MM 328; TPK 331; VL 332
3. Explain or demonstrate how sound waves travel.	Student Edition: 320-325 <i>Design Your Own Lab 344-345</i> Teacher Wraparound Edition: CC 324; CU 326; IM 321; TC 318
4. Analyze the relationship between the kinetic and potential energy of a falling object.	Student Edition: 130-133, 136-137, 139 <i>Lab 134</i> <i>National Geographic 138</i> <i>Design Your Own Lab 144-145</i> Teacher Wraparound Edition: IM 137; QD 136; USW 130

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5. Use mathematics to describe the work and power in a system.	Student Edition: 156-159, 163-165 <i>Model and Invent Lab</i> 176-177 Teacher Wraparound Edition: CC 158; DI 155; QD 156; VL 163
6. Describe the relationship between matter and energy and how matter releases energy through the processes of nuclear fission and fusion.	Student Edition: 141, 494-496, 500, 789, 801-803 Teacher Wraparound Edition: CU 500; FYI 803; USW 141
7. Use mathematics to describe and predict electrical and magnetic activity (e.g., current, resistance, voltage).	Student Edition: 404-405, 410-413 <i>Applying Math</i> 411, 412 Teacher Wraparound Edition: AIL 414; FYI 409; R 405; SJ 411
8. Compare and contrast how conductors, semiconductors, and superconductors work and describe their present and potential uses.	Student Edition: 395, 403-404 <i>Lab</i> 406 Teacher Wraparound Edition: A 406; DI 395; FYI 404; USW 394
9. Demonstrate an understanding that energy can be found in chemical bonds and can be used when it is released from those bonds.	Student Edition: 129, 131, 486-491, 734-736 <i>National Geographic</i> 737 Teacher Wraparound Edition: FF 129; LD 736; TC 718; TPK 734; VL 136
I. MOTION Students will understand the motion of objects and how forces can change that motion. Students will be able to:	
1. Use mathematics to describe the law of conservation of momentum.	Student Edition: 116-117 Teacher Wraparound Edition: VL 117

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2. Explain some current theories of gravitational force.	Student Edition: 104-107, 187 <i>Science and History</i> 120 Teacher Wraparound Edition: FF 105; FYI 107
3. Use Newton's Laws to qualitatively and quantitatively describe the motion of objects.	Student Edition: 98-103, 105-111, 113-117 <i>Lab</i> 118-119 <i>Science and History</i> 120 Teacher Wraparound Edition: A 101; LD 102; SJ 114; TPK 104; VL 99
4. Describe how forces affect fluids (e.g., air and water).	Student Edition: 85-86, 504, 667 Teacher Wraparound Edition: A 85; IM 527
5. Explain the relationship between temperature, heat, and molecular motion.	Student Edition: 254-258, 260-265, 266-267 Teacher Wraparound Edition: PR 270; TC 252; VL 267
6. Describe how forces within and between atoms affect their behavior and the properties of matter.	Student Edition: 262-263, 690-692, 694-705, 787-788 Teacher Wraparound Edition: FYI 696, 787

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<p>J. INQUIRY AND PROBLEM SOLVING</p> <p>Students will apply inquiry and problem-solving approaches in science and technology. Students will be able to:</p>	
<p>1. Make accurate observations using appropriate tools and units of measure.</p>	<p>Student Edition: 14-21 <i>Design Your Own Lab</i> 28-29 <i>Mini LAB</i> 71 <i>Integrate Astronomy</i> 74 <i>Lab</i> 118-119, 196, 310-311 <i>Math Skill Handbook</i> 872</p> <p>Teacher Wraparound Edition: IM 15; QD 17; TPK 14</p>
<p>2. Verify, evaluate, and use results in a purposeful way. This includes analyzing and interpreting data, making predictions based on observed patterns, testing solutions against the original problem conditions, and formulating additional questions.</p>	<p>Student Edition: 10, 22-26, 38-39, 54-57 <i>Lab</i> 27, 51 <i>Science Skill Handbook</i> 857-858 <i>Math Skill Handbook</i> 868</p> <p>Teacher Wraparound Edition: CC 39; DI 10</p>
<p>3. Demonstrate the ability to use scientific inquiry and technological method with short term and long term investigations, recognizing that there is more than one way to solve a problem. Demonstrate knowledge of when to try different strategies.</p>	<p>Student Edition: 6-13, 38-45 <i>Science and Society</i> 178 <i>Accidents in Science</i> 210 <i>Science Skill Handbook</i> 850-854</p> <p>Teacher Wraparound Edition: A 11; FF 8; QD 10, 17, 41</p>
<p>4. Design and construct a device to perform a specific function, then redesign for improvement (e.g., performance, cost).</p>	<p>Student Edition: <i>Integrate Earth Science</i> 11 <i>National Geographic</i> 66-67, 737 <i>Science and History</i> 312, 448 <i>Lab</i> 445, 507 <i>Design Your Own Lab</i> 446-447 <i>Mini LAB</i> 819</p> <p>Teacher Wraparound Edition: A 821; QD 820</p>

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<p>K. SCIENTIFIC REASONING</p> <p>Students will learn to formulate and justify ideas and to make informed decisions. Students will be able to:</p>	
<p>1. Judge the accuracy of alternative explanations by identifying the evidence necessary to support them.</p>	<p>Student Edition: 6-10, 39-45, 48-50 <i>Lab 51</i></p> <p>Teacher Wraparound Edition: A 9; D 39; FF 8; IL 12; PR 50; SJ 11</p>
<p>2. Explain why agreement among people does not make an argument valid.</p>	<p>Student Edition: 6-7, 10, 12, 218-220, 497-499, 501-505, 837-839 <i>Accidents in Science 210</i></p> <p>Teacher Wraparound Edition: CC 10; DI 7</p>
<p>3. Develop generalizations based on observations.</p>	<p>Student Edition: 12, 38-39, 721-722, 823-829, 836-838 <i>Lab 51</i> <i>Science and History 120, 600</i> <i>Science and Society 510</i></p> <p>Teacher Wraparound Edition: TPK 836</p>
<p>4. Determine when there is a need to revise studies in order to improve their validity through better sampling, controls or data analysis techniques.</p>	<p>Student Edition: 8-10, 23, 54-57 <i>Lab 51, 230</i> <i>Science and History 120, 478</i> <i>Design Your Own Lab 344-345, 568-569</i></p> <p>Teacher Wraparound Edition: D 23</p>
<p>5. Produce inductive and deductive arguments to support conjecture.</p>	<p>Student Edition: 38-39, 52-56, 98-103, 588-596, 721-722 <i>Science and History 312, 382, 600</i> <i>Lab 830</i></p> <p>Teacher Wraparound Edition: CC 39</p>

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6. Analyze situations where more than one logical conclusion can be drawn.	<p>Student Edition: 7, 45, 48-49, 589-591 <i>Science Skill Handbook</i> 858</p> <p>Teacher Wraparound Edition: FYI 48; IM 256</p>
<p>L. COMMUNICATION</p> <p>Students will communicate effectively in the application of science and technology.</p> <p>Students will be able to:</p>	
1. Analyze research or other literature for accuracy in the design and findings of experiments.	<p>Student Edition: <i>Communicating Your Data</i> 89, 177, 243, 415, 569 <i>Science and History</i> 146, 600 <i>Science Skill Handbook</i> 850</p> <p>Teacher Wraparound Edition: CC 257; DI 23</p>
2. Use journals and self-assessment to describe and analyze scientific and technological experiences and to reflect on problem-solving processes.	<p>Student Edition: <i>Lab</i> 27 <i>Mini LAB</i> 47 <i>Communicating Your Data</i> 59, 112</p> <p>Teacher Wraparound Edition: RS 99; SJ 139, 155, 302, 704, 723</p>
3. Make and use appropriate symbols, pictures, diagrams, scale drawings, and models to represent and simplify real-life situations and to solve problems.	<p>Student Edition: 11, 331-335 <i>Model and Invent Lab</i> 58-59 <i>Launch Lab</i> 185, 353 <i>Lab</i> 380-381, 468, 676-677, 830</p> <p>Teacher Wraparound Edition: FYI 74</p>
4. Employ graphs, tables, and maps in making arguments and drawing conclusions.	<p>Student Edition: 22-26, 74-75 <i>Lab</i> 27, 380-381, 830 <i>Launch Lab</i> 353 <i>Math Skill Handbook</i> 875-876</p> <p>Teacher Wraparound Edition: DI 23; FYI 24; LD 25</p>

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5. Critique models, stating how they do and do not effectively represent the real phenomenon.	<p>Student Edition: 11, 56 <i>Mini LAB</i> 195, 581, 802 <i>Lab</i> 468 <i>Model and Invent Lab</i> 710-711, 808-809</p> <p>Teacher Wraparound Edition: A 11; MM 56</p>
6. Evaluate the communication capabilities of new kinds of media (e.g., cameras with computer disks instead of film).	<p>Student Edition: 40-41</p> <p>Teacher Wraparound Edition: QD 41; VL 55</p>
7. Use computers to organize data, generate models, and do research for problem solving.	<p>Student Edition: 41 <i>Integrate Earth Science</i> 11 <i>Use the Internet Lab</i> 476-477, 508-509, 598-599 <i>Science Skill Handbook</i> 850</p> <p>Teacher Wraparound Edition: CYD 89, 415; QD 41</p>
8. Engage in a debate, on a scientific issue, where both points of view are based on the same set of information.	<p>Student Edition: 45, 48-50, 206-207, 239-241 <i>Lab</i> 51 <i>Science and Society</i> 510</p> <p>Teacher Wraparound Edition: A 48; CC 495; FYI 442; PR 207, 539; SJ 667</p>
<p>M. IMPLICATIONS OF SCIENCE AND TECHNOLOGY</p> <p>Students will understand the historical, social, economic, environmental, and ethical implications of science and technology. Students will be able to:</p>	
1. Examine the impact of political decisions on science and technology.	<p>Student Edition: 42-45, 47-49 <i>Applying Science</i> 499 <i>Science and Society</i> 510, 778</p> <p>Teacher Wraparound Edition: CC 489; D 506; FYI 48, 488; VL 55</p>

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2. Demonstrate the importance of resource management, controlling environmental impacts, and maintaining natural ecosystems.	<p>Student Edition: 48-49, 139, 492-493, 522, 652, 668</p> <p>Teacher Wraparound Edition: A 492, 668; CC 489; IL 490</p>
3. Evaluate the ethical use or introduction of new scientific or technological developments.	<p>Student Edition: 50</p> <p><i>Science and Society</i> 510, 778</p> <p>Teacher Wraparound Edition: CU 50; DI 7</p>
4. Analyze the impacts of various scientific and technological developments.	<p>Student Edition: 48-49, 463-467, 469-475, 486-493, 497-499, 804-806</p> <p><i>National Geographic</i> 115</p> <p><i>Science and Society</i> 510, 778</p> <p>Teacher Wraparound Edition: A 498</p>
5. Examine the historical relationships between prevailing cultural beliefs and breakthroughs in science and technology.	<p>Student Edition: 186-187, 358-361, 524-528, 535-539</p> <p><i>Integrate History</i> 218</p> <p><i>Science and History</i> 478</p> <p>Teacher Wraparound Edition: D 478; FYI 537; IP 358; TPK 218</p>
6. Research issues that illustrate the effects of technological imbalances and suggest some solutions.	<p>Student Edition: 48-49, 492-493, 498-499</p> <p><i>Lab</i> 51</p> <p><i>Integrate Environment</i> 466</p> <p><i>Applying Science</i> 499</p> <p><i>Science and Society</i> 778</p> <p>Teacher Wraparound Edition: FYI 48; PR 50</p>