



# PHYSICS

Principles and Problems

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## STANDARDS

## PAGE REFERENCES

### 1. CONCEPTS AND PROCESSES

In the context of unifying concepts and processes, students develop an understanding of scientific content through inquiry. Science is a dynamic process; concepts and content are best learned through inquiry and investigation.

### EARTH, SPACE, AND PHYSICAL SYSTEMS

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| <p>7. <b>Geochemical Cycles:</b> Students describe the Earth as a closed system and demonstrate a conceptual understanding of the following systems: geosphere, hydrosphere, atmosphere, and biosphere. Students explain the role of energy in each of these systems, such as weather patterns, global climate, weathering, and plate tectonics.</p> | <p><b>Student Edition:</b><br/><i>Biology Connection</i> 442, 712<br/><i>Geology Connection</i> 355</p> <p><b>Teacher Wraparound Edition:</b><br/>RLP 442</p> <p>Also see Glencoe's <i>Physical Science with Earth Science</i> © 2006 pages 518-539.</p> |
| <p>8. <b>Origin and Evolution of the Earth System:</b> Students investigate geologic time through comparing rock sequences, the fossil record, and decay rates of radioactive isotopes.</p>  | <p><b>Student Edition:</b><br/>11, 651, 806-810</p> <p><b>Teacher Wraparound Edition:</b><br/>CB 809</p> <p>Also see Glencoe's <i>Physical Science With Earth Science</i> © 2006 pages 670-677.</p>  |

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| <p>9. <b>Origin and Evolution of the Universe:</b> Students examine evidence for the Big Bang Theory and recognize the immense time scale involved in comparison to human-perceived time. They describe the process of star and planet formation, planetary and stellar evolution including the fusion process, element formation, and dispersion.</p>   | <p><b>Student Edition:</b><br/>           9, 446-447, 725, 813-814, 823<br/> <i>Astronomy Connection</i> 447<br/> <i>Future Technology</i> 826<br/> <b>Teacher Wraparound Edition:</b><br/>           RLP 813</p>  |
| <p>10. <b>Structure and Properties of Matter:</b> Students describe the atomic structure of matter including subatomic particles, their properties, and interactions. They recognize that elements are organized into groups in the periodic table based on their outermost electrons and these groups have similar properties. They explain chemical bonding in terms of the transfer or sharing of electrons between atoms. Students describe physical states of matter and phase changes. Students differentiate between chemical and physical properties, and chemical and physical changes.</p> | <p><b>Student Edition:</b><br/>           323-324, 342-343, 747-756, 760-761, 800-803, 815-820<br/> <i>Appendix D</i> 916<br/> <i>Extreme Physics</i> 366<br/> <i>Physics Lab</i> 332-333<br/> <b>Teacher Wraparound Edition:</b><br/>           CD 807; R 801</p> |
| <p>11. <b>Chemical Reactions:</b> Students recognize that chemical reactions take place all around us. They realize that chemical reactions may release or consume energy, occur at different rates, and result in the formation of different substances. They identify the factors that affect reaction rates.</p>  | <p><b>Student Edition:</b><br/> <i>Chemistry Connection</i> 442<br/> <b>Teacher Wraparound Edition:</b><br/>           RLP 442<br/>           Also see Glencoe's <i>Physical Science with Earth Science</i> © 2006 pages 688-778.</p>                              |
| <p>12. <b>Conservation of Energy and Increase in Disorder:</b> Students demonstrate an understanding of the laws of conservation of mass and energy within the context of physical and chemical changes. They realize the tendency for systems to increase in disorder.</p>  | <p><b>Student Edition:</b><br/>           293-295, 328-331<br/> <i>Example Problem</i> 296<br/> <i>Physics Lab</i> 302-303<br/> <i>Problem-Solving Skills</i> 295<br/> <b>Teacher Wraparound Edition:</b><br/>           A 330; CD 294; QD 295; R 734; TPK 293</p> |
| <p>13. <b>Energy and Matter:</b> Students demonstrate an understanding of types of energy, energy transfer and transformations, and the relationship between energy and matter.</p>  | <p><b>Student Edition:</b><br/>           258, 286-292, 314, 802-805<br/> <b>Teacher Wraparound Edition:</b><br/>           C 294; CD 803; HSS 296; QD 297; TPK 314; UA 286</p>  |

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| <p><b>14. Force and Motion:</b> Students develop a conceptual understanding of Newton's Laws of Motion, gravity, electricity, and magnetism.</p>  | <p><b>Student Edition:</b><br/>87-95, 96-98, 154-155, 175-176, 179-185, 546-551, 652-657<br/><i>Internet Physics Lab</i> 108-109</p> <p><b>Teacher Wraparound Edition:</b><br/>HSS 104; QD 175</p>   |
| <p><b><u>2. SCIENCE AS INQUIRY</u></b></p> <p>Students demonstrate knowledge, skills, and habits of mind necessary to safely perform scientific inquiry. Inquiry is the foundation for the development of content, teaching students the use of processes of science that enable them to construct and develop their own knowledge. Inquiry requires appropriate field, classroom, and laboratory experiences with suitable facilities and equipment.</p>                                   |  |
| <p><b>1. Students research scientific information and present findings through appropriate means.</b></p>   | <p><b>Student Edition:</b><br/>8-10, 15-19<br/><i>Extreme Physics</i> 662<br/><i>Future Technology</i> 556, 826<br/><i>Technology and Society</i> 220, 394, 608</p> <p><b>Teacher Wraparound Edition:</b><br/>E 10; PP 16</p>                |
| <p><b>2. Students use inquiry to conduct scientific investigations.</b></p> <ul style="list-style-type: none"> <li>• Pose problems and identify questions and concepts to design and conduct an investigation.</li> <li>• Collect, organize, analyze and appropriately represent data.</li> <li>• Give priority to evidence in drawing conclusions and making connections to scientific concepts.</li> <li>• Clearly and accurately communicate the result of the investigation.</li> </ul> | <p><b>Student Edition:</b><br/>8-10, 11-14, 15-19<br/><i>Physics Lab</i> 136-137, 218-219, 332-333, 580-581, 790-791</p> <p><b>Teacher Wraparound Edition:</b><br/>CB 39; HSS 8</p>  |
| <p><b>3. Students clearly and accurately communicate the result of their own work as well as information from other sources.</b></p>  | <p><b>Student Edition:</b><br/>8-10, 15-18<br/><i>Design Your Own Physics Lab</i> 392-393, 660-661<br/><i>Problem-Solving Skills</i> 123, 466, 728<br/><i>Share Your Data</i> 21, 77</p> <p><b>Teacher Wraparound Edition:</b><br/>PP 16</p> |

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| <p>4. Students investigate the relationships between science and technology and the role of technological design in meeting human needs.</p>  | <p><b>Student Edition:</b><br/> 363, 502-503, 705-708, 782-783<br/> <i>Extreme Physics</i> 662, 792<br/> <i>How It Works</i> 334, 634, 688, 740<br/> <i>Technology and Society</i> 450, 716</p> <p><b>Teacher Wraparound Edition:</b><br/> C 785; RLP 5</p>  |
| <p>5. Students properly use appropriate scientific and safety equipment, recognize hazards and safety symbols, and observe standard safety procedures.</p>  | <p><b>Student Edition:</b><br/> <i>Appendix D</i> 918<br/> <i>How It Works</i> 582, 634<br/> <i>Physics Lab</i> 332-333, 580-581, 606-607, 632-633, 790-791<br/> <i>Technology and Society</i> 220</p> <p><b>Teacher Wraparound Edition:</b><br/> PP 232</p> |
| <p><b>3. HISTORY AND NATURE OF SCIENCE IN PERSONAL AND SOCIAL DECISIONS</b></p> <p>Students recognize the nature of science, its history, and its connections to personal, social, economic, and political decisions. Historically, scientific events have had significant impacts on our cultural heritage.</p>  |  |
| <p>1. Students examine the nature and history of science.</p> <ul style="list-style-type: none"> <li>As scientific knowledge evolves, it impacts personal, social, economic, and political decisions.</li> <li>The historical misuse of scientific information to make personal, social, economic, and political decisions.</li> </ul>  | <p><b>Student Edition:</b><br/> 8-10<br/> <i>Extreme Physics</i> 792<br/> <i>Future Technology</i> 22, 556<br/> <i>Technology and Society</i> 220, 394</p> <p><b>Teacher Wraparound Edition:</b><br/> CB 7, 9; CT 18; PP 6</p>                               |
| <p>2. Students examine how scientific information is used to make decisions.</p> <ul style="list-style-type: none"> <li>Interdisciplinary connections of the sciences and connections to other subject areas and career opportunities.</li> <li>The role of science in solving personal, local, national, and global problems.</li> <li>The origins, limitations, and conservation of natural resources, including Wyoming examples.</li> </ul> | <p><b>Student Edition:</b><br/> 179-180, 812-813<br/> <i>Biology Connection</i> 159, 500<br/> <i>Technology and Society</i> 220, 394, 608</p> <p><b>Teacher Wraparound Edition:</b><br/> PP 213; RLC 180, 319; RLP 816</p>                                   |