A Correlation of

Physical Science Concepts in Action with Earth & Space Science
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To the

Nebraska Science Standards
Adopted 10/06/2010

Grades 9-12
Physical Science: Concepts in Action with Earth & Space Science ©2009
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Adopted 10/06/2010   Grades 9-12

Introduction

This document demonstrates how Physical Science: Concept in Action with Earth & Space Science © 2011 meets the objectives of the Nebraska Science Standards. Correlation page references are to the Student and Teacher's Editions and are cited at the page level.

Prentice Hall Physical Science: Concept in Action with Earth & Space Science helps students make the important connection between the science they read and what they experience every day. Relevant content, lively explorations, and a wealth of hands-on activities take students' understanding of science beyond the page and into the world around them. The program includes even more technology, tools and activities to support differentiated instruction!

Each chapter in Physical Science: Concept in Action with Earth & Space Science begins with an activity geared toward developing one or more 21st century skills. All of these activities ask students to capture what they are learning in biology class and apply the knowledge to solving real-life problems in order to encourage productive, thoughtful members of the 21st century world.

Additional Features and Benefits

- A proven formula for reading success before, during, and after every lesson enables students to fully understand key concepts.

- Virtual Physics Lab CD-ROM, a Pearson exclusive feature, (interactive whiteboard ready) allows students to perform and extend a variety of labs that correspond to the program. Teachers and students can use the simulated lab environment to do virtually any lab they could do in a real lab. Developed by Brigham Young University, a more robust virtual lab can't be found anywhere else.

- Exclusive partnership with Discovery Channel School™ brings exciting video content to every chapter.

- The Complete Interactive Textbook—available online and on CD-ROM. Audio of the full text read aloud supports English Language learners and reluctant readers.

- PresentationEXPRESS™ helps create dynamic presentation with slides, videos, and participatory activities.
<table>
<thead>
<tr>
<th>Nebraska Science Standards</th>
<th>Physical Science: Concepts in Action with Earth &amp; Space Science ©2009</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GRADES 9-12</strong></td>
<td></td>
</tr>
<tr>
<td>SC K-12.1 Comprehensive Science Standard – Inquiry, the Nature of Science, and Technology Students will combine scientific processes and knowledge with scientific reasoning and critical thinking to ask questions about phenomena and propose explanations based on gathered evidence.</td>
<td></td>
</tr>
<tr>
<td>1. Inquiry, the Nature of Science, and Technology</td>
<td></td>
</tr>
<tr>
<td>1. Abilities to do Scientific Inquiry</td>
<td></td>
</tr>
<tr>
<td>SC12.1.1 Students will design and conduct investigations that lead to the use of logic and evidence in the formulation of scientific explanations and models.</td>
<td></td>
</tr>
<tr>
<td>Scientific Questioning</td>
<td></td>
</tr>
<tr>
<td>SC12.1.1.a Formulate a testable hypothesis supported by prior knowledge to guide an investigation</td>
<td><strong>SE/TE</strong>: 79, 157, 220-221, 224, 285, 327, 355, 360, 389, 411, 499, 502, 745, 783 <strong>TE only</strong>: 399, 423</td>
</tr>
<tr>
<td>Scientific Investigations</td>
<td></td>
</tr>
<tr>
<td>SC12.1.1.b Design and conduct logical and sequential scientific investigations with repeated trials and apply findings to new investigations</td>
<td><strong>SE/TE</strong>: 383</td>
</tr>
<tr>
<td>Scientific Controls and Variables</td>
<td></td>
</tr>
<tr>
<td>SC12.1.1.c Identify and manage variables and constraints</td>
<td><strong>SE/TE</strong>: 46, 184-185, 214, 285, 383, 429, 454, 467, 473, 499, 571 <strong>TE only</strong>: 370</td>
</tr>
<tr>
<td>Scientific Tools</td>
<td></td>
</tr>
<tr>
<td>Scientific Observations</td>
<td></td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Nebraska Science Standards</th>
<th>Physical Science: Concepts in Action with Earth &amp; Space Science ©2009</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Scientific Data Collection</strong></td>
<td></td>
</tr>
</tbody>
</table>
**TE only:** 606 |
| **Scientific Interpretations, Reflections, and Applications** |                                                                 |
**TE only:** 208, 237, 255, 285, 370, 399, 423, 502, 522, 544, 548, 556, 587, 606, 612, 616, 632, 666, 688, 672, 686, 694, 739 |
| SC12.1.1.h Use results to verify or refute a hypothesis | **SE/TE:** 220-221, 285  
**TE only:** 399, 423 |
| SC12.1.1.i Propose and/or evaluate possible revisions and alternate explanations | **TE only:** 739 |
| **Scientific Communication** |                                                                 |
| SC12.1.1.j Share information, procedures, results, conclusions, and defend findings to a scientific community (peers, science fair audience, policy makers) | **SE/TE:** 1, 563  
**TE only:** 423 |
| SC12.1.1.k Evaluate scientific investigations and offer revisions and new ideas as appropriate | **SE/TE:** 285  
**TE only:** 739 |
| **Mathematics** |                                                                 |
| SC12.1.1.l Use appropriate mathematics in all aspects of scientific inquiry | **SE/TE:** 26-27, 150-151, 196, 316-317, 349, 360, 383, 405, 424, 429, 438-439, 454, 467, 493, 505, 593, 623, 793, 821, 832  
**TE only:** 666 |

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</tr>
</thead>
<tbody>
<tr>
<td><strong>2. Nature of Science</strong></td>
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<tr>
<td>SC12.1.2 Students will apply the nature of scientific knowledge to their own investigations and in the evaluation of scientific explanations.</td>
<td></td>
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<tr>
<td><strong>Scientific Knowledge</strong></td>
<td></td>
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</tbody>
</table>
| SC12.1.2.a Recognize that scientific explanations must be open to questions, possible modifications, and must be based upon historical and current scientific knowledge | SE/TE: 9-10, 70, 100-105, 113-116, 118, 121, 474, 482, 534, 536-537, 677-681, 790-791  
**TE only:** 363 |
| **Science and Society**    |                                                                     |
**TE only:** 730 |
| **Science as a Human Endeavor** |                                                                     |
| SC12.1.2.c Recognize that the work of science results in incremental advances, almost always building on prior knowledge, in our understanding of the world | SE/TE: 70, 100-105, 113-116, 118, 121, 474, 482, 534, 536-537, 677-681, 790-791  
**TE only:** 105, 115, 118, 363, 791 |
| SC12.1.2.d Research and describe the difficulties experienced by scientific innovators who had to overcome commonly held beliefs of their times to reach conclusions that we now take for granted | *Opportunities to address this standard can be found on the following pages:*  
SE/TE: 791 |
| **3. Technology**          |                                                                     |
| SC12.1.3 Students will solve a complex design problem. |
| **Abilities to do Technical Design** |                                                                     |
| SC12.1.3.a Propose designs and choose between alternative solutions of a problem | SE/TE: 218, 238, 408, 442, 646  
**TE only:** 402 |
| SC12.1.3.b Assess the limits of a technological design | SE/TE: 408 |
| SC12.1.3.c Implement the selected solution | SE/TE: 408, 442  
**TE only:** 402 |
| SC12.1.3.d Evaluate the solution and its consequences | SE/TE: 218, 238, 408, 442, 646 |

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</tr>
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<tr>
<td>SC12.1.3.e Communicate the problem, process, and solution</td>
<td><strong>SE/TE:</strong> 218, 238, 408, 442, 646</td>
</tr>
<tr>
<td>Understanding of Technical Design</td>
<td></td>
</tr>
<tr>
<td>SC12.1.3.f Compare and contrast the reasons for the pursuit of science and the pursuit of technology</td>
<td><strong>SE/TE:</strong> 3, 29</td>
</tr>
<tr>
<td></td>
<td><strong>TE only:</strong> 6</td>
</tr>
<tr>
<td>SC12.1.3.g Explain how science advances with the introduction of new technology</td>
<td><strong>SE/TE:</strong> 3, 6, 28, 122</td>
</tr>
<tr>
<td>SC12.1.3.h Recognize creativity, imagination, and a good knowledge base are all needed to advance the work of science and engineering</td>
<td><strong>SE/TE:</strong> 2-3</td>
</tr>
<tr>
<td>SC K-12.2 Comprehensive Science Standard – Physical Science Students will integrate and communicate the information, concepts, principles, processes, theories, and models of the Physical Sciences to make connections with the natural and engineered world.</td>
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</tbody>
</table>

2. Physical Science

1. Matter

SC12.2.1 Students will investigate and describe matter in terms of its structure, composition and conservation.

Properties and Structure of Matter

SC12.2.1.a Recognize bonding occurs when outer electrons are transferred (ionic) or shared (covalent) | **SE/TE:** 159-160, 164, 165-167, 169, 186-187, 189 |

States of Matter

SC12.2.1.b Describe the energy transfer associated with phase changes between solids, liquids, and gasses | **SE/TE:** 86, 88, 91, 94-95 |

SC12.2.1.c Describe the three normal states of matter (solid, liquid, gas) in terms of energy, particle arrangement, particle motion, and strength of bond between molecules | **SE/TE:** 72-74, 94-96 |
|                                                          | **TE only:** 66C                                                      |

Physical and Chemical Changes

SC12.2.1.d Recognize a large number of chemical reactions involve the transfer of either electrons (oxidation/reduction) or hydrogen ions (acid/base) between reacting ions, molecules, or atoms | **SE/TE:** 204-205, 223, 244-245, 254-255, 256-257 |
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<th>Physical Science: Concepts in Action with Earth &amp; Space Science ©2009</th>
</tr>
</thead>
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<tr>
<td>SC12.2.1.e Identify factors affecting rates of chemical reactions (temperature, particle size, surface area)</td>
<td>SE/TE: 213, 215, 222-224</td>
</tr>
</tbody>
</table>

Atomic Structure

| SC12.2.1.f Recognize the charges and relative locations of subatomic particles (neutrons, protons, electrons) | SE/TE: 108-109, 112, 120-121 |
| SC12.2.1.g Describe properties of atoms, ions, and isotopes | SE/TE: 110, 112, 120-121, 159-160, 187-188 |

Classification of Matter

| SC12.2.1.h Describe the organization of the periodic table of elements with respect to patterns of physical and chemical properties | SE/TE: 130-136, 138, 139-145, 152-155 TE only: 124C-124D |

2. Force and Motion

| SC12.2.2 Students will investigate and describe the nature of field forces and their interactions with matter. |
| SC12.2.2.a Describe motion with respect to displacement and acceleration | SE/TE: 330-331, 342-348, 349, 350-353 |
| Inertia/Newton’s 1st law |
| SC12.2.2.b Describe how the law of inertia (Newton’s 1st law) is evident in a real-world event | SE/TE: 364-365, 369 |
| Forces/Newton’s 2nd law |
| SC12.2.2.c Make predictions based on relationships among net force, mass, and acceleration (Newton’s 2nd law) | SE/TE: 365, 367-369 |
| Newton’s 3rd law |
| SC12.2.2.d Recognize that all forces occur in equal and opposite pairs (Newton’s 3rd law) | SE/TE: 372-373, 377, 384-385 |
| SC12.2.2.e Describe how Newton’s 3rd law of motion is evident in a real-world event | SE/TE: 372-373, 377, 386 |

Universal Forces

| SC12.2.2.f Describe gravity as a force that each mass exerts on another mass, which is proportional to the masses and the distance between them | SE/TE: 380-381, 382, 384 TE only: 354D |

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</tr>
</thead>
<tbody>
<tr>
<td>SC12.2.2.g Recognize that an attractive or repulsive electric force exists between two charged particles and that this force is proportional to the magnitude of the charges and the distance between them</td>
<td>SE/TE: 379, 382, 384-385 TE only: 354D</td>
</tr>
<tr>
<td><strong>3. Energy</strong></td>
<td></td>
</tr>
<tr>
<td>SC12.2.3 Students will describe and investigate energy systems relating to the conservation and interaction of energy and matter.</td>
<td></td>
</tr>
<tr>
<td><strong>Sound/Mechanical Waves</strong></td>
<td></td>
</tr>
<tr>
<td>SC12.2.3.a Describe mechanical wave properties (speed, wavelength, frequency, amplitude) and how waves travel through a medium</td>
<td>SE/TE: 500-503, 504-507, 526-529</td>
</tr>
<tr>
<td>SC12.2.3.b Recognize that the energy in waves can be changed into other forms of energy</td>
<td>SE/TE: 500, 503, 526, 533, 538, 564</td>
</tr>
<tr>
<td><strong>Light</strong></td>
<td></td>
</tr>
<tr>
<td>SC12.2.3.c Recognize that light can behave as a wave (diffraction and interference)</td>
<td>SE/TE: 536, 565</td>
</tr>
<tr>
<td><strong>Heat</strong></td>
<td></td>
</tr>
<tr>
<td>SC12.2.3.d Distinguish between temperature (a measure of the average kinetic energy of atomic or molecular motion) and heat (the quantity of thermal energy that transfers due to a change in temperature)</td>
<td>SE/TE: 474-475, 478, 494</td>
</tr>
<tr>
<td>SC12.2.3.e Compare and contrast methods of heat transfer and the interaction of heat with matter via conduction, convection, and radiation</td>
<td>SE/TE: 479-481, 496 TE only: 483</td>
</tr>
<tr>
<td><strong>Electricity/Magnetism</strong></td>
<td></td>
</tr>
<tr>
<td>SC12.2.3.f Recognize that the production of electromagnetic waves is a result of changes in the motion of charges or by a changing magnetic field</td>
<td>SE/TE: 533, 538, 564</td>
</tr>
<tr>
<td>SC12.2.3.g Compare and contrast segments of the electromagnetic spectrum (radio, micro, infrared, visible, ultraviolet, x-rays, gamma) based on frequency and wavelength</td>
<td>SE/TE: 540, 542-545, 567</td>
</tr>
</tbody>
</table>
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<table>
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<th>Physical Science: Concepts in Action with Earth &amp; Space Science ©2009</th>
</tr>
</thead>
</table>
| Nuclear                   | **SC12.2.3.h Recognize that nuclear reactions (fission, fusion, radioactive decay) convert a fraction of the mass of interacting particles into energy, and this amount of energy is much greater than the energy in chemical interactions**  
**SE/TE:** 293-294, 296, 309-310, 315, 318-319 |
| Conservation              | **SC12.2.3.i Interpret the law of conservation of energy to make predictions for the outcome of an event**  
**SE/TE:** 209, 455, 457-459, 470, 482 |
| Mechanical Energy         | **SC12.2.3.j Identify that all energy can be considered to be either kinetic, potential, or energy contained by a field (e.g. electromagnetic waves)**  
**SE/TE:** 6, 71, 447-450, 468-469 |
| Chemical Energy           | **SC12.2.3.k Identify endothermic and exothermic reactions**  
**SE/TE:** 208-209, 223, 232-233 |

**SC K-12.4 Comprehensive Science Standard – Earth and Space Sciences Students will integrate and communicate the information, concepts, principles, processes, theories, and models of Earth and Space Sciences to make connections with the natural and engineered world.**

### 4. Earth and Space Sciences

#### 1. Earth in Space

**SC12.4.1 Students will investigate and describe the known universe.**

**Objects in the Sky and Universe**

**SC12.4.1.a Describe the formation of the universe using the Big Bang Theory**  
**SE/TE:** 854-855, 858-859

**SC12.4.1.b Recognize that stars, like the Sun, transform matter into energy by nuclear reactions which leads to the formation of other elements**  
**SE/TE:** 829, 833, 841-843, 858  
**TE only:** 830

**SC12.4.1.c Describe stellar evolution**  
**SE/TE:** 840-844, 858-861  
**TE only:** 826C

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<table>
<thead>
<tr>
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<th>Physical Science: Concepts in Action with Earth &amp; Space Science ©2009</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2. Earth Structures and Processes</strong></td>
<td></td>
</tr>
<tr>
<td>SC12.4.2 Students will investigate the relationships among Earth’s structure, systems, and processes.</td>
<td></td>
</tr>
<tr>
<td><strong>Properties of Earth Materials</strong></td>
<td></td>
</tr>
<tr>
<td>SC12.4.2.a Recognize how Earth materials move through geochemical cycles (carbon, nitrogen, oxygen) resulting in chemical and physical changes in matter</td>
<td><strong>SE/TE:</strong> 674-675, 698-700, 705-706, 708, 740-741, 743</td>
</tr>
<tr>
<td><strong>Earth’s Processes</strong></td>
<td></td>
</tr>
<tr>
<td>SC12.4.2.b Describe how heat convection in the mantle propels the plates comprising Earth’s surface across the face of the globe (plate tectonics)</td>
<td><strong>SE/TE:</strong> 679-680, 683, 698-699</td>
</tr>
<tr>
<td><strong>Use of Earth Materials</strong></td>
<td></td>
</tr>
<tr>
<td>SC12.4.2.c Evaluate the impact of human activity and natural causes on Earth’s resources (groundwater, rivers, land, fossil fuels)</td>
<td><strong>SE/TE:</strong> 268-269, 312-313, 462</td>
</tr>
<tr>
<td><strong>3. Energy in Earth’s Systems</strong></td>
<td></td>
</tr>
<tr>
<td>SC12.4.3 Students will investigate and describe the relationships among the sources of energy and their effects on Earth’s systems.</td>
<td></td>
</tr>
<tr>
<td><strong>Energy Sources</strong></td>
<td></td>
</tr>
<tr>
<td>SC12.4.3.a Identify internal and external sources of heat energy in Earth’s systems</td>
<td><strong>SE/TE:</strong> 680, 683, 755-757, 759, 784</td>
</tr>
<tr>
<td>SC12.4.3.b Describe how radiation, conduction, and convection transfer heat in Earth’s systems</td>
<td><strong>SE/TE:</strong> 479-481, 483, 679-680, 683, 698-699, 755-756, 759, 784</td>
</tr>
<tr>
<td>SC12.4.3.c Compare and contrast benefits of renewable and nonrenewable energy sources</td>
<td><strong>SE/TE:</strong> 462-464, 470</td>
</tr>
<tr>
<td><strong>Weather and Climate</strong></td>
<td></td>
</tr>
<tr>
<td>SC12.4.3.d Describe natural influences (Earth’s rotation, mountain ranges, oceans, differential heating) on global climate</td>
<td><strong>SE/TE:</strong> 779-780, 782, 784-787</td>
</tr>
</tbody>
</table>

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<th>Physical Science: Concepts in Action with Earth &amp; Space Science ©2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Earth’s History</td>
<td></td>
</tr>
<tr>
<td>SC12.4.4 Students will explain the history and evolution of Earth.</td>
<td></td>
</tr>
<tr>
<td>Past/Present Earth</td>
<td></td>
</tr>
<tr>
<td>SC12.4.4.a Recognize that in any sequence of sediments or rocks that has not been overturned, the youngest sediments or rocks are at the top of the sequence and the oldest are at the bottom (law of superposition)</td>
<td>\textbf{SE/TE: 733-734}</td>
</tr>
<tr>
<td>SC12.4.4.b Interpret Earth’s history by observing rock sequences, using fossils to correlate the sequences at various locations, and using data from radioactive dating methods</td>
<td>\textbf{SE/TE: 300-301, 319, 732-734, 738, 740-742}</td>
</tr>
<tr>
<td>SC12.4.4.c Compare and contrast the physical and biological differences of the early Earth with the planet we live on today</td>
<td>\textbf{SE/TE: 735, 743}</td>
</tr>
</tbody>
</table>