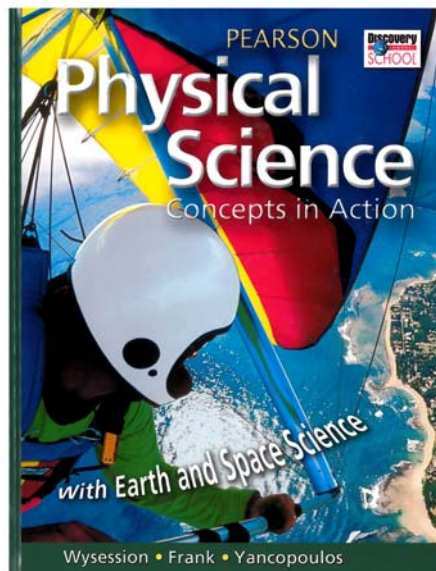


A Correlation of

# 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

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**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 21<sup>st</sup> 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 21<sup>st</sup> 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.

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Nebraska Science Standards	Physical Science: Concepts in Action with Earth & Space Science © 2011
<b>GRADES 9-12</b>	
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.	
1. Inquiry, the Nature of Science, and Technology	
1. Abilities to do Scientific Inquiry	
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.	
Scientific Questioning	
SC12.1.1.a Formulate a testable hypothesis supported by prior knowledge to guide an investigation	<b>SE/TE:</b> 79, 157, 220-221, 224, 285, 327, 355, 360, 389, 411, 499, 502, 745, 787 <b>TE only:</b> 399, 423
Scientific Investigations	
SC12.1.1.b Design and conduct logical and sequential scientific investigations with repeated trials and apply findings to new investigations	<b>SE/TE:</b> 383
Scientific Controls and Variables	
SC12.1.1.c Identify and manage variables and constraints	<b>SE/TE:</b> 46, 184-185, 214, 285, 383, 429, 454, 467, 473, 499, 571 <b>TE only:</b> 370
Scientific Tools	
SC12.1.1.d Select and use lab equipment and technology appropriately and accurately	<b>SE/TE:</b> 18, 26-27, 46, 56, 60-61, 79, 90, 92-93, 119, 135, 150-151, 184-185, 191, 196, 203, 214, 220-221, 232, 248, 254-255, 285, 316-317, 327, 330, 349, 383, 405, 424, 429, 438-439, 450, 454, 467, 473, 481, 493, 499, 505, 524-525, 531, 544, 559, 563, 571, 593, 606, 612, 623, 629, 632, 637, 648-649, 671, 705, 714, 739, 745, 787, 836 <b>TE only:</b> 208, 237, 270, 522, 548, 587, 666
Scientific Observations	
SC12.1.1.e Use tools and technology to make detailed qualitative and quantitative observations	<b>SE/TE:</b> 18, 26-27, 46, 79, 90, 92-93, 150-151, 191, 196, 232, 248, 254-255, 285, 316-317, 327, 330, 349, 383, 405, 424, 429, 438-439, 450, 454, 467, 473, 493, 505, 524-525, 559, 571, 606, 623, 648-649, 671, 714, 745, 787, 836 <b>TE only:</b> 208, 237, 360, 370, 612, 666

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Nebraska Science Standards	Physical Science: Concepts in Action with Earth & Space Science © 2011
Scientific Data Collection	
SC12.1.1.f Represent and review collected data in a systematic, accurate, and objective manner	<b>SE/TE:</b> 26-27, 60-61, 92-93, 119, 150-151, 184-185, 220-221, 254-255, 285, 300, 349, 383, 405, 429, 438-439, 454, 467, 493, 563, 623, 648-649, 697, 787, 860-861 <b>TE only:</b> 606
Scientific Interpretations, Reflections, and Applications	
SC12.1.1.g Analyze and interpret data, synthesize ideas, formulate and evaluate models, and clarify concepts and explanations	<b>SE/TE:</b> 18, 26-27, 46, 56, 60-61, 79, 90, 92-93, 102, 117, 119, 125, 128, 135, 150-151, 173, 184-185, 191, 196, 203, 214, 220-221, 227, 232, 243, 248, 254-255, 278, 285, 291, 300, 304, 316-317, 327, 330, 349, 355, 360, 365, 380, 383, 389, 401, 405, 411, 424, 429, 438-439, 445, 450, 454, 467, 473, 481, 493, 499, 502, 505, 524-525, 531, 544, 559, 563, 569, 571, 585, 593, 599, 606, 612, 623, 629, 632, 637, 648-649, 659, 668, 671, 687, 697, 703, 705, 714, 739, 745, 749, 766, 787, 793, 797, 823, 825, 831, 836, 860-861 <b>TE only:</b> 208, 237, 255, 285, 370, 399, 423, 502, 522, 544, 548, 556, 587, 606, 612, 616, 632, 666, 668, 672, 686, 694, 739
SC12.1.1.h Use results to verify or refute a hypothesis	<b>SE/TE:</b> 220-221, 285 <b>TE only:</b> 399, 423
SC12.1.1.i Propose and/or evaluate possible revisions and alternate explanations	<b>TE only:</b> 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)	<b>SE/TE:</b> 1, 563 <b>TE only:</b> 423
SC12.1.1.k Evaluate scientific investigations and offer revisions and new ideas as appropriate	<b>SE/TE:</b> 285 <b>TE only:</b> 739
Mathematics	
SC12.1.1.l Use appropriate mathematics in all aspects of scientific inquiry	<b>SE/TE:</b> 26-27, 150-151, 196, 316-317, 349, 360, 383, 405, 424, 429, 438-439, 454, 467, 493, 505, 593, 623, 797, 825, 837 <b>TE only:</b> 666

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Nebraska Science Standards	Physical Science: Concepts in Action with Earth & Space Science © 2011
2. Nature of Science	
SC12.1.2 Students will apply the nature of scientific knowledge to their own investigations and in the evaluation of scientific explanations.	
Scientific Knowledge	
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	<b>SE/TE:</b> 9-10, 70, 100-105, 113-116, 118, 121, 474, 482, 534, 536-537, 677-681, 794-795 <b>TE only:</b> 363
Science and Society	
SC12.1.2.b Describe how society influences the work of scientists and how science, technology, and current scientific discoveries influence and change society	<b>SE/TE:</b> 52-53, 82-83, 106-107, 178-179, 182-183, 210-211, 270-271, 306-307, 312-314, 338-339, 374-375, 398-399, 422-423, 434, 436-437, 460-461, 484-485, 518-519, 522-523, 582-583, 586-587, 614-615, 616-617, 618-622, 640-641, 642-647, 731, 774-777, 810-811 <b>TE only:</b> 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	<b>SE/TE:</b> 70, 100-105, 113-116, 118, 121, 474, 482, 534, 536-537, 677-681, 794-795 <b>TE only:</b> 105, 115, 118, 363, 795
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	<i>Opportunities to address this standard can be found on the following pages:</i> <b>SE/TE:</b> 795
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	<b>SE/TE:</b> 218, 238, 408, 442, 646 <b>TE only:</b> 402
SC12.1.3.b Assess the limits of a technological design	<b>SE/TE:</b> 408
SC12.1.3.c Implement the selected solution	<b>SE/TE:</b> 408, 442 <b>TE only:</b> 402
SC12.1.3.d Evaluate the solution and its consequences	<b>SE/TE:</b> 218, 238, 408, 442, 646

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<b>Nebraska Science Standards</b>	<b>Physical Science: Concepts in Action with Earth &amp; Space Science © 2011</b>
SC12.1.3.e Communicate the problem, process, and solution	<b>SE/TE:</b> 218, 238, 408, 442, 646
Understanding of Technical Design	
SC12.1.3.f Compare and contrast the reasons for the pursuit of science and the pursuit of technology	<b>SE/TE:</b> 3, 29 <b>TE only:</b> 6
SC12.1.3.g Explain how science advances with the introduction of new technology	<b>SE/TE:</b> 3, 6, 28, 122
SC12.1.3.h Recognize creativity, imagination, and a good knowledge base are all needed to advance the work of science and engineering	<b>SE/TE:</b> 2-3
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.	
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)	<b>SE/TE:</b> 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	<b>SE/TE:</b> 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	<b>SE/TE:</b> 72-74, 94-96 <b>TE only:</b> 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	<b>SE/TE:</b> 204-205, 223, 244-245, 254-255, 256-257

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<b>Nebraska Science Standards</b>	<b>Physical Science: Concepts in Action with Earth &amp; Space Science © 2011</b>
SC12.2.1.e Identify factors affecting rates of chemical reactions (temperature, particle size, surface area)	<b>SE/TE:</b> 213, 215, 222-224
Atomic Structure	
SC12.2.1.f Recognize the charges and relative locations of subatomic particles (neutrons, protons, electrons)	<b>SE/TE:</b> 108-109, 112, 120-121
SC12.2.1.g Describe properties of atoms, ions, and isotopes	<b>SE/TE:</b> 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	<b>SE/TE:</b> 130-136, 138, 139-145, 152-155 <b>TE only:</b> 124C-124D
2. Force and Motion	
SC12.2.2 Students will investigate and describe the nature of field forces and their interactions with matter.	
Motion	
SC12.2.2.a Describe motion with respect to displacement and acceleration	<b>SE/TE:</b> 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	<b>SE/TE:</b> 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)	<b>SE/TE:</b> 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)	<b>SE/TE:</b> 372-373, 377, 384-385
SC12.2.2.e Describe how Newton's 3rd law of motion is evident in a real-world event	<b>SE/TE:</b> 372-373, 377, 386

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Nebraska Science Standards	Physical Science: Concepts in Action with Earth & Space Science © 2011
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	<b>SE/TE:</b> 380-381, 382, 384 <b>TE only:</b> 354D
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	<b>SE/TE:</b> 379, 382, 384-385 <b>TE only:</b> 354D
3. Energy	
SC12.2.3 Students will describe and investigate energy systems relating to the conservation and interaction of energy and matter.	
Sound/Mechanical Waves	
SC12.2.3.a Describe mechanical wave properties (speed, wavelength, frequency, amplitude) and how waves travel through a medium	<b>SE/TE:</b> 500-503, 504-507, 526-529
SC12.2.3.b Recognize that the energy in waves can be changed into other forms of energy	<b>SE/TE:</b> 500, 503, 526, 533, 538, 564
Light	
SC12.2.3.c Recognize that light can behave as a wave (diffraction and interference)	<b>SE/TE:</b> 536, 565
Heat	
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)	<b>SE/TE:</b> 474-475, 478, 494
SC12.2.3.e Compare and contrast methods of heat transfer and the interaction of heat with matter via conduction, convection, and radiation	<b>SE/TE:</b> 479-481, 496 <b>TE only:</b> 483
Electricity/Magnetism	
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	<b>SE/TE:</b> 533, 538, 564



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<b>Nebraska Science Standards</b>	<b>Physical Science: Concepts in Action with Earth &amp; Space Science © 2011</b>
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	<b>SE/TE:</b> 540, 542-545, 567
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	<b>SE/TE:</b> 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	<b>SE/TE:</b> 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)	<b>SE/TE:</b> 6, 71, 447-450, 468-469
Chemical Energy	
SC12.2.3.k Identify endothermic and exothermic reactions	<b>SE/TE:</b> 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	<b>SE/TE:</b> 858-859, 862-863
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	<b>SE/TE:</b> 833, 837, 845-847, 862 <b>TE only:</b> 834
SC12.4.1.c Describe stellar evolution	<b>SE/TE:</b> 844-848, 862-865 <b>TE only:</b> 830C

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2. Earth Structures and Processes	
SC12.4.2 Students will investigate the relationships among Earth's structure, systems, and processes.	
Properties of Earth Materials	
SC12.4.2.a Recognize how Earth materials move through geochemical cycles (carbon, nitrogen, oxygen) resulting in chemical and physical changes in matter	<b>SE/TE:</b> 674-675, 698-700, 705-706, 708, 740-741, 743
Earth's Processes	
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)	<b>SE/TE:</b> 679-680, 683, 698-699
Use of Earth Materials	
SC12.4.2.c Evaluate the impact of human activity and natural causes on Earth's resources (groundwater, rivers, land, fossil fuels)	<b>SE/TE:</b> 268-269, 312-313, 462
3. Energy in Earth's Systems	
SC12.4.3 Students will investigate and describe the relationships among the sources of energy and their effects on Earth's systems.	
Energy Sources	
SC12.4.3.a Identify internal and external sources of heat energy in Earth's systems	<b>SE/TE:</b> 680, 683, 755-757, 759, 784
SC12.4.3.b Describe how radiation, conduction, and convection transfer heat in Earth's systems	<b>SE/TE:</b> 479-481, 483, 679-680, 683, 698-699, 755-756, 759, 788
SC12.4.3.c Compare and contrast benefits of renewable and nonrenewable energy sources	<b>SE/TE:</b> 462-464, 470
Weather and Climate	
SC12.4.3.d Describe natural influences (Earth's rotation, mountain ranges, oceans, differential heating) on global climate	<b>SE/TE:</b> 779-780, 782-783, 788-791

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<b>Nebraska Science Standards</b>	<b>Physical Science: Concepts in Action with Earth &amp; Space Science © 2011</b>
4. Earth's History	
SC12.4.4 Students will explain the history and evolution of Earth.	
Past/Present Earth	
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)	<b>SE/TE:</b> 733-734
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	<b>SE/TE:</b> 300-301, 319, 732-734, 738, 740-742
SC12.4.4.c Compare and contrast the physical and biological differences of the early Earth with the planet we live on today	<b>SE/TE:</b> 735, 743