

A Correlation of

Chemistry

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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 *Pearson Chemistry @2012* 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.

Pearson Chemistry combines proven and tested content with cutting-edge digital support and hands-on learning opportunities. This program provides you with everything you need to engage and motivate your students, as well as the tools to support the varied types of learners in your classroom.

Built on Grant Wiggins' *Understanding by Design* framework, this learning model connects curriculum, instruction, and assessment to the "Big Ideas" of chemistry that develops deep understanding.

Pearson Chemistry provides all of the problem-solving and math support that students need to be successful in the course, with ample opportunity for practice both in the Student Edition and in the program's digital resources.

Pearson Chemistry helps you meet the unique learning styles of each student in your classroom with a variety of resources. A variety of assessment opportunities helps you monitor student progress ensure student success on high-stakes tests.

Pearsonchem.com integrates key concepts from the text and brings them alive online with complete Student and Teacher eTexts, animations, virtual labs, tutorials, practice problems, and a comprehensive teacher center. Digital references are referenced at point-of-use in the textbook. PearsonChem.com also offers valuable tools you can use to monitor student's progress through your course.

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| GRADES 9-12 | |
| 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 | <i>Opportunities to address this standard can be found on the following pages:</i> SE/TE: 51, 92, 120, 149, 200, 254, 324, 374, 399, 435, 475, 508, 545, 583, 635, 717, 752, 849 |
| Scientific Investigations | |
| SC12.1.1.b Design and conduct logical and sequential scientific investigations with repeated trials and apply findings to new investigations | TE only: 887, 896 |
| Scientific Controls and Variables | |
| SC12.1.1.c Identify and manage variables and constraints | SE/TE: 17, 207, 238, 254, 435, 491, 662, 750 |
| Scientific Tools | |
| SC12.1.1.d Select and use lab equipment and technology appropriately and accurately | SE/TE: 51, 92, 120, 142, 200, 207, 238, 279, 324, 328, 354, 399, 404, 435, 467, 479, 491, 508, 545, 583, 600, 635, 699, 750, 752, 818, 849 |
| Scientific Observations | |
| SC12.1.1.e Use tools and technology to make detailed qualitative and quantitative observations | SE/TE: 72, 92, 120, 149, 238, 324, 399, 467, 545, 571, 583, 635, 699, 752, 849 |
| Scientific Data Collection | |
| SC12.1.1.f Represent and review collected data in a systematic, accurate, and objective manner | SE/TE: 51, 120, 200, 238, 254, 328, 374, 399, 435, 467, 635, 699, 717, 752, 849, 887 |

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| Scientific Interpretations, Reflections, and Applications | |
| SC12.1.1.g Analyze and interpret data, synthesize ideas, formulate and evaluate models, and clarify concepts and explanations | SE/TE: 17, 39, 51, 92, 120, 200, 207, 238, 254, 279, 324, 328, 354, 374, 399, 404, 435, 467, 475, 491, 508, 519, 545, 583, 600, 635, 662, 670, 717, 750, 752, 849, 887 |
| SC12.1.1.h Use results to verify or refute a hypothesis | SE/TE: 17 |
| SC12.1.1.i Propose and/or evaluate possible revisions and alternate explanations | TE only: 571 |
| 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: 17, 39, 51, 92, 109, 120, 142, 149, 200, 207, 238, 254, 279, 324, 328, 354, 374, 399, 404, 435, 437, 467, 475, 491, 508, 519, 545, 571, 583, 600, 635, 662, 699, 717, 750, 752, 818, 849, 887, 896 |
| SC12.1.1.k Evaluate scientific investigations and offer revisions and new ideas as appropriate | TE only: 17 |
| Mathematics | |
| SC12.1.1.l Use appropriate mathematics in all aspects of scientific inquiry | SE/TE: 72, 92, 120, 149, 238, 324, 328, 399, 404, 467, 545, 571, 583, 635, 670, 717, 849, 887, 896 TE only: 39 |
| 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 | SE/TE: 17, 30-31 TE only: 19 |
| 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 | <i>Opportunities to address this standard can be found on the following pages:</i> SE/TE: 8-10, 11, 12-13 |

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| 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: 15, 17, 102-104, 105-109, 123-124, 128-130, 133, 152 |
| 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> SE/TE: 102-103, 105-109, 128-130 |
| 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 | <i>Opportunities to address this standard can be found on the following pages:</i> SE/TE: 239, 440-441, 476-477, 602-603, 892-893 |
| SC12.1.3.b Assess the limits of a technological design | <i>Opportunities to address this standard can be found on the following pages:</i> SE/TE: 239, 440-441, 476-477, 602-603, 892-893 TE only: 434, 477, 765, 603 |
| SC12.1.3.c Implement the selected solution | <i>Opportunities to address this standard can be found on the following pages:</i> SE/TE: 239, 440-441, 476-477, 602-603, 892-893 TE only: 434, 477, 765, 603 |
| SC12.1.3.d Evaluate the solution and its consequences | <i>Opportunities to address this standard can be found on the following pages:</i> SE/TE: 239, 440-441, 476-477, 602-603, 892-893 TE only: 434, 765 |
| SC12.1.3.e Communicate the problem, process, and solution | <i>Opportunities to address this standard can be found on the following pages:</i> SE/TE: 239, 440-441, 476-477, 602-603, 892-893 TE only: 434, 765 |
| Understanding of Technical Design | |
| SC12.1.3.f Compare and contrast the reasons for the pursuit of science and the pursuit of technology | <i>Opportunities to address this standard can be found on the following pages:</i> SE/TE: 8-11 |
| SC12.1.3.g Explain how science advances with the introduction of new technology | SE/TE: 104, 110-111 |

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| SC12.1.3.h Recognize creativity, imagination, and a good knowledge base are all needed to advance the work of science and engineering | SE/TE: 14-17, 18-19 |
| 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) | SE/TE: 201-202, 209, 213, 223, 226, 230, 232, 255-256 TE only: 225, 762 |
| States of Matter | |
| SC12.2.1.b Describe the energy transfer associated with phase changes between solids, liquids, and gasses | SE/TE: 420, 425-426, 430, 431, 442-443 |
| 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: 420, 425-426, 430, 431, 434, 442-443 |
| 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: 672, 684-685, 692-696, 699, 700, 707-708, 718, 720-723, 725 |
| SC12.2.1.e Identify factors affecting rates of chemical reactions (temperature, particle size, surface area) | SE/TE: 598-601, 636, 638, 643 |
| Atomic Structure | |
| SC12.2.1.f Recognize the charges and relative locations of subatomic particles (neutrons, protons, electrons) | SE/TE: 105-107, 109, 121-122, 125 |
| SC12.2.1.g Describe properties of atoms, ions, and isotopes | SE/TE: 105-109, 114-115, 119, 121-122, 125, 195-199, 213-214 |

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| 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: 174-175, 177-182, 184, 185-189, 191, R158 |
| 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 | <i>Opportunities to address this standard can be found in Pearson's <u>Conceptual Physics (Hewitt) © 2009</u></i> |
| 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 | <i>Opportunities to address this standard can be found in Pearson's <u>Conceptual Physics (Hewitt) © 2009</u></i> |
| Forces/Newton's 2nd law | |
| SC12.2.2.c Make predictions based on relationships among net force, mass, and acceleration (Newton's 2nd law) | <i>Opportunities to address this standard can be found in Pearson's <u>Conceptual Physics (Hewitt) © 2009</u></i> |
| Newton's 3rd law | |
| SC12.2.2.d Recognize that all forces occur in equal and opposite pairs (Newton's 3rd law) | <i>Opportunities to address this standard can be found in Pearson's <u>Conceptual Physics (Hewitt) © 2009</u></i> |
| SC12.2.2.e Describe how Newton's 3rd law of motion is evident in a real-world event | <i>Opportunities to address this standard can be found in Pearson's <u>Conceptual Physics (Hewitt) © 2009</u></i> |
| 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 | <i>Opportunities to address this standard can be found in Pearson's <u>Conceptual Physics (Hewitt) © 2009</u></i> |
| 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 | SE/TE: 106 |

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| 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 | <i>Opportunities to address this standard can be found on the following pages:</i> SE/TE: 138-139 |
| SC12.2.3.b Recognize that the energy in waves can be changed into other forms of energy | <i>Opportunities to address this standard can be found in Pearson's <u>Conceptual Physics (Hewitt)</u> © 2009</i> |
| Light | |
| SC12.2.3.c Recognize that light can behave as a wave (diffraction and interference) | <i>Opportunities to address this standard can be found on the following pages:</i> SE/TE: 138-139 |
| 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) | SE/TE: 78, 556 |
| SC12.2.3.e Compare and contrast methods of heat transfer and the interaction of heat with matter via conduction, convection, and radiation | <i>Opportunities to address this standard can be found on the following page:</i> SE/TE: 139 |
| 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 | <i>Opportunities to address this standard can be found on the following pages:</i> SE/TE: 138-139 |
| 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 | SE/TE: 139, 152-153 |
| 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: 876-879, 888-889, 891, 898, 900 |

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| Conservation | |
| SC12.2.3.i Interpret the law of conservation of energy to make predictions for the outcome of an event | SE/TE: 557, 588 |
| 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) | <i>Opportunities to address this standard can be found on the following pages:</i> SE/TE: 420, 556 |
| Chemical Energy | |
| SC12.2.3.k Identify endothermic and exothermic reactions | SE/TE: 557-558, 586 |