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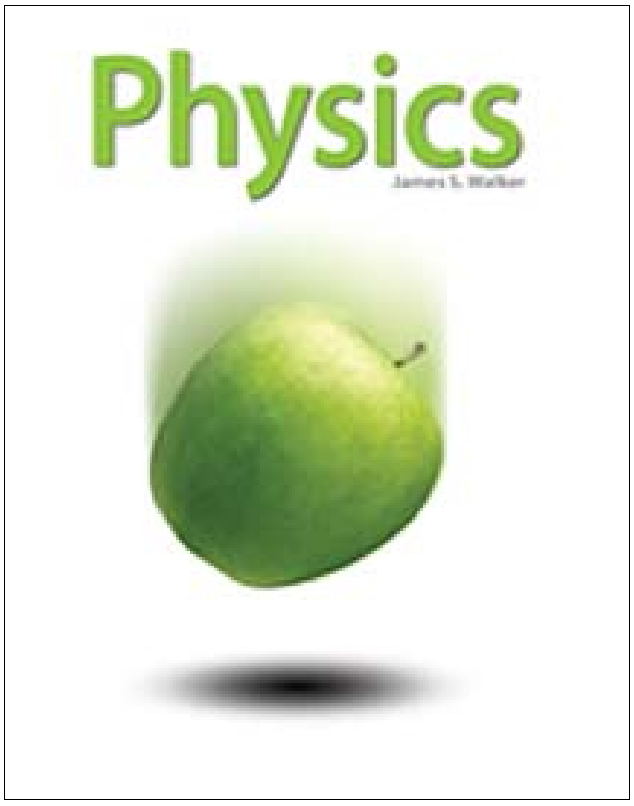

To the

Colorado Academic Standards for High School Science

Physical Science

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to the
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Physical Science

Introduction

This document demonstrates the alignment between ***Pearson Physics,*** ©2014, and the Colorado Academic Standards for High School Science, Physical Science. Correlation page references are to the Student and Teacher's Editions.

Pearson Physics offers a new path to mastery— a "concepts first" approach that supports a superior, step-by-step problem solving process.

Pearson Physics is the only high school program that blends conceptual development and quantitative problem solving. The conversational and engaging writing style, numerous and varied examples, annotated art program, and dual emphasis on concepts and math—together with MasteringPhysics® — deliver a superior program.

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Physical Science

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Content Area: Science **Grade Level Expectations: High School** **Standard: 1. Physical Science**	
Prepared Graduates: • Observe, explain, and predict natural phenomena governed by Newton's laws of motion, acknowledging the limitations of their application to very small or very fast objects	
Concepts and skills students master: 1. Newton's laws of motion and gravitation describe the relationships among forces acting on and between objects, their masses, and changes in their motion - but have limitations	
Evidence Outcomes	
Students Can:	
a. Gather, analyze and interpret data and create graphs regarding position, velocity and acceleration of moving objects (DOK 1-3)	**SE / TE:** 54-57, 58-62, 76-79, 90
b. Develop, communicate and justify an evidence-based analysis of the forces acting on an object and the resultant acceleration produced by a net force (DOK 1-3)	**SE / TE:** 152, 153-156
c. Develop, communicate and justify an evidence-based scientific prediction regarding the effects of the action-reaction force pairs on the motion of two interacting objects (DOK 1-3)	**SE / TE:** 158, 244, 308
d. Examine the effect of changing masses and distance when applying Newton's law of universal gravitation to a system of two bodies (DOK 1-2)	**SE / TE:** 308-309
e. Identify the limitations of Newton's laws in extreme situations (DOK 1)	**SE / TE:** 949-952
21st Century Skill and Readiness Competencies	
Inquiry Questions:	
1. How can forces be acting on an object without changing the object's motion?	**SE / TE:** 151-156, 158, 162, 161-162, 233, 322, 684, 889, 951
2. Why do equal but opposite action and reaction forces not cancel?	**SE / TE:** 151-156, 158
Relevance & Application:	
1. Newton's laws are used in a variety of design processes such as vehicle safety, aerospace, bridge design and interplanetary probes.	**SE / TE:** 321-322

SE = Student Edition TE = Teacher's Edition

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2. An understanding of forces leads to safer building designs such as earthquake-safe buildings.	**SE / TE:** 177
3. Forces present in the earth lead to plate tectonics.	**SE / TE:** 787
Nature Of:	
1. Use an inquiry approach to answer a testable question about an application of Newton's laws of motion. (DOK 1-4)	**SE / TE:** 160
2. Share experimental data, respectfully discuss conflicting results, and analyze ways to minimize error and uncertainty in measurement. (DOK 2-3)	**SE / TE:** 24-26
3. Differentiate between the use of the terms "law" and "theory" as they are defined and used in science compared to how they are used in other disciplines or common use. (DOK 1-2)	For related content, please see: **SE / TE:** 9
4. Use technology to perform calculations and to organize, analyze and report data. (DOK 1-2)	**SE / TE:** 120
Prepared Graduates: • Apply an understanding of atomic and molecular structure to explain the properties of matter, and predict outcomes of chemical and nuclear reactions	
Concepts and skills students master: 2. Matter has definite structure that determines characteristic physical and chemical properties	
Evidence Outcomes	
Students Can:	
a. Develop, communicate, and justify an evidence-based scientific explanation supporting the current model of an atom (DOK 1-3)	**SE / TE:** 883-885, 897
b. Gather, analyze and interpret data on chemical and physical properties of elements such as density, melting point, boiling point, and conductivity (DOK 1-2)	**SE / TE:** 354-355, 368, 425, 681, 912, R65-R66
c. Use characteristic physical and chemical properties to develop predictions and supporting claims about elements' positions on the periodic table (DOK 1-2)	**SE / TE:** 676-677, R68

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d. Develop a model that differentiates atoms and molecules, elements and compounds, and pure substances and mixtures (DOK 2-3)	For related content, please see: **SE / TE:** 676-677
21st Century Skill and Readiness Competencies	
Inquiry Questions:	
1. What patterns can be observed in the properties of elements and families in the periodic table?	**SE / TE:** R68
2. What properties do nanoscale particles have that are different than those of macroscopic samples of the same substance?	This objective falls outside the scope of this program.
Relevance & Application:	
1. The unique properties of various elements make them useful for specific applications. For example, metalloids and semiconductors are useful in electronic applications.	**SE / TE:** 682, 754-756, 772
2. Alloys are created by combining metals with other elements to produce materials with useful properties that are not found in nature. For example, iron and carbon make steel.	This objective falls outside the scope of this program.
3. Consumers can make informed decisions regarding the purchase of household chemicals when they understand chemical properties and their implications. For example, choosing lead based versus non-lead based paints weighs safety concerns against color and durability in applications.	For related content, please see: **SE / TE:** 10
4. The unique properties of nanoscale particles provide special benefits and dangers.	This objective falls outside the scope of this program.
Nature Of:	
1. Recognize that the current understanding of molecular structure related to the physical and chemical properties of matter has developed over time and become more sophisticated as new technologies have led to new evidence. (DOK 1)	**SE / TE:** 883-887, 938-939

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2. Ask testable questions about the nature of matter, and use an inquiry approach to investigate it. (DOK 1-4)	**SE/TE:** 3, 6-7
Prepared Graduates: • Apply an understanding of atomic and molecular structure to explain the properties of matter, and predict outcomes of chemical and nuclear reactions	
Concepts and skills students master: 3. Matter can change form through chemical or nuclear reactions abiding by the laws of conservation of mass and energy	
Evidence Outcomes	
Students Can:	
a. Recognize, analyze, interpret, and balance chemical equations (synthesis, decomposition, combustion, and replacement) or nuclear equations (fusion and fission) (DOK 1-2)	**SE/TE:** 926-927, 931, 933, 935, 968
b. Predict reactants and products for different types of chemical and nuclear reactions (DOK 1-2)	For related content, please see: **SE/TE:** 925-928
c. Predict and calculate the amount of products produced in a chemical reaction based on the amount of reactants (DOK 1-2)	This objective falls outside the scope of this program.
d. Examine, evaluate, question, and ethically use information from a variety of sources and media to investigate the conservation of mass and energy (DOK 1-2)	**SE/TE:** 206-211, 254-255, 913-915, 958
21st Century Skill and Readiness Competencies	
Inquiry Questions:	
1. What patterns of chemical reactions exist?	This objective falls outside the scope of this program.
2. How are chemical reactions distinguished from nuclear reactions?	For related content, please see: **SE/TE:** 925-935
Relevance & Application:	
1. Products formed in different types of reactions are useful to people. For example, polymerase reactions making nylon.	**SE/TE:** 772

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2. The use of chemicals can have both positive and negative environmental effects. For example, the use of lime to make acidic soils more productive or the use of CFCs causing the ozone hole.	This objective falls outside the scope of this program.
3. When using radioactive substances, there are benefits such as medicine and energy production as well as dangers such as environmental and health concerns.	**SE / TE:** 541, 934-935
Nature Of:	
1. Critically evaluate chemical and nuclear change models. (DOK 2-3)	**SE / TE:** 920-921, 922-923, 926-927
2. Identify the strengths and weaknesses of a model which represents complex natural phenomenon. (DOK 2-3)	This objective falls outside the scope of this program.
3. Use an inquiry approach to test predictions about chemical reactions. (DOK 1-4)	This objective falls outside the scope of this program.
4. Share experimental data, and respectfully discuss conflicting results. (DOK 2-3)	This objective falls outside the scope of this program.
Prepared Graduates: • Apply an understanding of atomic and molecular structure to explain the properties of matter, and predict outcomes of chemical and nuclear reactions	
Concepts and skills students master: 4. Atoms bond in different ways to form molecules and compounds that have definite properties	
Evidence Outcomes	
Students Can:	
a. Develop, communicate, and justify an evidence-based scientific explanation supporting the current models of chemical bonding (DOK 1-3)	This objective falls outside the scope of this program.
b. Gather, analyze, and interpret data on chemical and physical properties of different compounds such as density, melting point, boiling point, pH, and conductivity (DOK 1-2)	**SE / TE:** 354-355, 368, 425, 681, 912, R65-R66

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c. Use characteristic physical and chemical properties to develop predictions and supporting claims about compounds' classification as ionic, polar or covalent (DOK 1-2)	This objective falls outside the scope of this program.
d. Describe the role electrons play in atomic bonding (DOK 1)	For related content, please see: **SE / TE:** 675-682
e. Predict the type of bonding that will occur among elements based on their position in the periodic table (DOK 1-2)	For related content, please see: **SE / TE:** R68
21st Century Skill and Readiness Competencies	
Inquiry Questions:	
1. How can various substances be classified as ionic or covalent compounds?	This objective falls outside the scope of this program.
2. What role do electrons play in different types of chemical bonds?	For related content, please see: **SE / TE:** 675-682
Relevance & Application:	
1. Related compounds share some properties that help focus chemists when looking for a substance with particular properties for a specific application. For example, finding new super conductors.	For related content, please see: **SE / TE:** 681-682
2. Carbon atoms bond in ways that provide the foundation for a wide range of applications. For example, forming chains and rings such as sugars and fats that are essential to life and developing synthetic fibers and oils.	This objective falls outside the scope of this program.
3. Living systems create and use various chemical compounds such as plants making sugars from photosynthesis and chemicals that can be used as medicine, and endocrine glands producing hormones.	This objective falls outside the scope of this program.

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Nature Of:	
1. Recognize that the current understanding of molecular structure related to the physical and chemical properties of matter has developed over time and become more sophisticated as new technologies have led to new evidence. (DOK 1)	**SE/TE:** 883-887, 938-939
2. Employ data-collection technology to gather, view, analyze, and interpret data about chemical and physical properties of different compounds. (DOK 1-2)	This objective falls outside the scope of this program.
Prepared Graduates: • Apply an understanding that energy exists in various forms, and its transformation and conservation occur in processes that are predictable and measurable	
Concepts and skills students master: 5. Energy exists in many forms such as mechanical, chemical, electrical, radiant, thermal, and nuclear, that can be quantified and experimentally determined	
Evidence Outcomes	
Students Can:	
a. Develop, communicate, and justify an evidence-based scientific explanation regarding the potential and kinetic nature of mechanical energy (DOK 1-3)	For related content, please see: **SE/TE:** 207-211
b. Use appropriate measurements, equations and graphs to gather, analyze, and interpret data on the quantity of energy in a system or an object (DOK 1-3)	**SE/TE:** 197-205
c. Use direct and indirect evidence to develop predictions of the types of energy associated with objects (DOK 2-3)	For related content, please see: **SE/TE:** 209-211, 851-856
d. Identify different energy forms, and calculate their amounts by measuring their defining characteristics (DOK 1-2)	**SE/TE:** 197-198, 202-203, 205, 207-210, 279-280,344, 354-356, 358-359, 385-387, 398, 400-401, 412
21st Century Skill and Readiness Competencies	
Inquiry Questions:	
1. What factors can be measured to determine the amount of energy associated with an object?	For related content, please see: **SE/TE:** 851-856

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2. What are the most common forms of energy in our physical world?	**SE / TE:** 197-198, 202-203, 343-345, 769-770
3. What makes an energy form renewable or nonrenewable?	For related content, please see: **SE / TE:** 863, 873
4. What makes some forms of energy hard to measure?	For related content, please see: **SE / TE:** 202-205
Relevance & Application:	
1. Society and energy providers must conduct a cost-benefit analysis of different ways to provide electricity to our society.	**SE / TE:** 554, 769-770, 839-840
2. An understanding of energy transformations is necessary when designing clean energy systems that convert any type of energy into electricity such as wind generators and solar cells.	**SE / TE:** 333, 732, 769-770, 863, 873
3. There are advantages and disadvantages to using various energy sources such as gasoline, diesel, ethanol, hydrogen, and electricity as transportation fuel.	**SE / TE:** 903
4. Politics plays a role in shaping energy policy such as balancing conflicting stakeholder needs.	For related content, please see: **SE / TE:** 928-929
5. Energy plays a role in living systems and Earth's systems. For example, cells convert sugar to ATP and then to energy, energy inside the earth drives plate tectonic phenomena such as earthquakes and volcanoes, and energy from the Sun drives weather.	**SE / TE:** 177, 787
Nature Of:	
1. Critically evaluate scientific claims made in popular media or by peers regarding the application of energy forms, and determine if the evidence presented is appropriate and sufficient to support the claims. (DOK 2-3)	**SE / TE:** 11

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2. Use the historical context and impact of early energy research and consider the potential implications for current energy studies on science and our society. (DOK 1-3)	This objective falls outside the scope of this program.
Prepared Graduates:	
• Apply an understanding that energy exists in various forms, and its transformation and conservation occur in processes that are predictable and measurable	
Concepts and skills students master: 6. When energy changes form, it is neither created not destroyed; however, because some is necessarily lost as heat, the amount of energy available to do work decreases	
Evidence Outcomes	
Students Can:	
a. Use direct and indirect evidence to develop and support claims about the conservation of energy in a variety of systems, including transformations to heat (DOK 1-3)	For related content, please see: **SE / TE:** 358, 387, 723-724
b. Evaluate the energy conversion efficiency of a variety of energy transformations (DOK 1-2)	**SE / TE:** 390
c. Describe energy transformations both quantitatively and qualitatively (DOK 1-2)	**SE / TE:** 354-356, 358-359, 385-387, 398, 400-401
d. Differentiate among the characteristics of mechanical and electromagnetic waves that determine their energy (DOK 2)	**SE / TE:** 356, 474, 533, 536-537
e. Examine, evaluate, question, and ethically use information from a variety of sources and media to investigate energy conservation and loss (DOK 1-2)	**SE / TE:** 206-211, 254-255, 386-387, 723-724
21st Century Skill and Readiness Competencies	
Inquiry Questions:	
1. Why is 100 percent efficiency impossible in an energy transformation?	**SE / TE:** 405
2. How does the law of conservation of energy help us solve problems involving complex systems?	**SE / TE:** 254-256
3. Scientists or engineers often say energy is "lost." Is there a word that might be better than "lost?" Why?	For related content, please see: **SE / TE:** 358, 387, 390

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Relevance & Application:	
1. Incremental strides have been made in improving the efficiency of different forms of energy production and consumption. For example, today's engines are much more efficient than those from 50 years ago, and batteries are more powerful and last longer than those from just a few years ago.	**SE / TE:** 217, 390-392
2. Different technologies such as light-emitting diodes, compact fluorescent lights, and incandescent light bulbs have different efficiencies and environmental impacts.	**SE / TE:** 554, 754-755
Nature Of:	
1. Critically evaluate scientific claims made in popular media or by peers regarding the application of energy transformations, and determine if the evidence presented is appropriate and sufficient to support the claims. (DOK 2-3)	For related content, please see: **SE / TE:** 11
2. Ask testable questions and make a falsifiable hypothesis about the conservation of energy, and use an inquiry approach to find an answer. (DOK 1-4)	This objective falls outside the scope of this program.
3. Share experimental data, and respectfully discuss conflicting results emulating the practice of scientists. (DOK 2-3)	**SE / TE:** 11