
Physical Science

Curriculum Guide

Scranton School District

Scranton, PA



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Curriculum Guide**

Physical Science

Prerequisite:

- Successful completion of general science and biology courses.
- Students should also possess solid math skills.

Physical Science provides a basic understanding of physics and chemistry related concepts. Students learn to develop problem solving skills and strategies that are related to students' interests and that address everyday problems. Topics include, but are not limited to: introductory science skills and concepts, properties of matter, atoms and molecules, chemical elements, chemical reactions, Newton's Laws, motion and force, work, energy and momentum, and thermodynamics. These areas require a limited amount of mathematics. Although Physical Science is not a laboratory course, some exploratory activities are used.

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Year-at-a-glance

Subject: Physical Science	Grade Level: 11/12	Date Completed: 7-7-15
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1st Quarter

Topic	Resources	Academic Standards
Introduction to Science	Approved textbook	3.2.12.B7 3.2.10.A6 CC.3.5 CC.3.6
Newton's Laws of Motion	Approved textbook	3.2.12.B7 3.2.10.B1 3.2.12.B2 CC.3.5 CC.3.6
Work and Energy	Approved textbook	3.2.12.B7 3.2.10.B2 3.2.12.B6 CC.3.5 CC.3.6

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2nd Quarter

Topic	Resources	Academic Standards
Gravity and Projectile Motion	Approved textbook	3.2.12.B7 3.2.12.B4 3.2.12.B6 CC.3.5 CC.3.6
Thermodynamics	Approved textbook	3.2.12.B7 3.2.10.B3 3.2.10.A3 3.2.12.B3 CC.3.5 CC.3.6
Electricity and Magnetism	Approved textbook	3.2.12.B7 3.2.10.B4 3.2.12.B4 CC.3.5 CC.3.6
Waves – Sound and Light	Approved textbook	3.2.12.B7 3.2.10.B5 CC.3.5 CC.3.6

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3rd Quarter

Topic	Resources	Academic Standards
Atoms and the Periodic Table	Approved textbook	3.2.C.A6 3.2.10.A1 3.2.10.A5 3.2.12.A2 CC.3.5 CC.3.6
Chemical Bonding and Reactions	Approved textbook	3.2.C.A6 3.2.10.A2 3.2.10.A4 CC.3.5 CC.3.6
Radioactivity	Approved textbook	3.2.C.A6 3.2.12.A2 CC.3.5 CC.3.6

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4th Quarter

Topic	Resources	Academic Standards
Nuclear Fission and Fusion	Approved textbook	3.2.C.A6 3.2.12.A3 CC.3.5 CC.3.6
Mixtures	Approved textbook	3.2.C.A6 3.2.12.A1 CC.3.5 CC.3.6
Acids and Bases/Oxidation and Reduction	Approved textbook	3.2.C.A6 3.2.12.A4 CC.3.5 CC.3.6
Optional: Earth and Space Science topics as time allows	Approved textbook	
Final Exam Review		

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General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
Introduction to Science	3.2.10.A6	<p>Compare and contrast scientific theories.</p> <p>Know that both direct and indirect observations are used by scientists to study the natural world and universe.</p> <p>Identify questions and concepts that guide scientific investigations.</p> <p>Formulate and revise explanations and models using logic and evidence.</p> <p>Recognize and analyze alternative explanations and models.</p> <p>Explain the importance of accuracy and precision in making valid measurements.</p>	<p>Approved text book</p> <p><u>Conceptual Physical Science Explorations:</u> Chapter 1 Resource Guide</p> <p>Calculators</p> <p>Measurement Lab Activity</p>	<p>Teacher prepared tests, quizzes, etc.</p> <p>Available online assessments (optional)</p> <p>Teacher prepared lab activities</p>	10 days
	CC.3.5	<p>Reading information Text – Students read, understand, and respond to informational text – with emphasis on comprehension, making connections among ideas and between texts with focus on textual evidence.</p>			
	CC.3.6	<p>Writing – Students write for different purposes and audiences. Students write clear and focused text to convey a well defined perspective and appropriate content.</p>			
	3.2.12.B7	<p>Examine the status of existing theories.</p> <p>Evaluate experimental information for relevance and adherence to science processes.</p> <p>Judge that conclusions are consistent and logical with experimental conditions.</p> <p>Interpret results of experimental research to predict new information, propose additional investigable questions, or advance a solution.</p> <p>Communicate and defend a scientific argument.</p> <p>(Use with all Physics topics)</p>			

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Gravity and Projectile Motion	3.2.12.B4	Describe conceptually, the attractive and repulsive forces between objects relative to their charges and the distance between them.	Approved textbook <u>Conceptual Physical Science Explorations:</u> Chapters 6-7 Resource Guides Lab Activities Teacher demonstrations		10 days
	3.2.12.B6	Compare and contrast motions of objects using forces and conservation laws.			
	CC.3.5	Reading Informational Text			
	CC.3.6	Writing			

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Thermodynamics	3.2.10.B3	<p>Explain how heat energy will move from a higher temperature to a lower temperature until equilibrium is reached.</p> <p>Analyze the processes of convection, conduction, and radiation between objects or regions that are at different temperatures.</p>	<p>Approved textbook</p> <p><u>Conceptual Physical Science Explorations:</u> Chapters 9 and 10 Resource Guides</p> <p>Calculators</p> <p>Teacher demonstrations</p>		15 days
	3.2.12.B3	<p>Describe the relationship between the average kinetic molecular energy, temperature, and phase changes.</p>			
	3.2.10.A3	<p>Describe phases of matter according to the kinetic molecular theory.</p>			
	CC.3.5	<p>Reading Informational Text</p>			
	CC.3.6	<p>Writing</p>			

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<p>Electricity and Magnetism</p>	<p>3.2.10.B4</p>	<p>Describe quantitatively the relationships between voltage, current, and resistance to electrical energy and power.</p> <p>Describe the relationship between electricity and magnetism as two aspects of a single electromagnetic force.</p>	<p>Approved textbook</p> <p><u>Conceptual Physical Science Explorations:</u> Chapters 11 and 12 Resource Guide</p> <p>Calculators</p> <p>Circuits and Magnetism Lab Activities</p> <p>Teacher demonstrations</p>		<p>10 days</p>
	<p>3.2.12.B4</p>	<p>Describe conceptually the attractive and repulsive forces between objects relative to their charges and the distance between them.</p>			
	<p>CC.3.5</p>	<p>Reading information Text</p>			
	<p>CC.3.6</p>	<p>Writing</p>			

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Atoms and the Periodic Table	3.2.10.A1	<p>Predict properties of elements using periodic table trends.</p> <p>Explain the unique properties of water (polarity, high boiling point, forms hydrogen bonds, high specific heat) that support life on Earth.</p> <p>Identify properties of matter that depend on sample size.</p>	<p>Approved textbook</p> <p><u>Conceptual Physical Science Explorations:</u> Chapters 17 and 18 Resource Guide</p>	15 days
	3.2.10.A5	<p>Models: Describe the historical development of models of the atom and how they contributed to modern atomic theory.</p>	<p>Calculators</p>	
	3.2.12.A2	<p>Distinguish among the isotopic forms of elements.</p> <p>Explain the probabilistic nature of radioactive decay based on subatomic rearrangement in the atomic nucleus.</p> <p>Explain how light is absorbed or emitted by electron orbital transitions.</p>	<p>Periodic Tables</p> <p>Constructing Atomic Models Lab Activity</p>	
	CC.3.5	<p>Reading Informational Text</p>		
	CC.3.6	<p>Writing</p>		

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	3.2.C.A6	<p>Compare and contrast scientific theories.</p> <p>Know that both direct and indirect observations are used by scientists to study the natural world and universe.</p> <p>Identify questions and concepts that guide scientific investigations.</p> <p>Formulate and revise explanations and models using logic and evidence.</p> <p>Recognize and analyze alternative explanations and models.</p> <p>Explain the importance of accuracy and precision in making valid measurements.</p> <p>Examine the status of existing theories.</p> <p>Evaluate experimental information for relevance and adherence to science processes.</p> <p>Judge that conclusions are consistent and logical with experimental conditions.</p> <p>Interpret results of experimental research to predict new information, propose additional investigable questions, or advance a solution.</p> <p>Communicate and defend a scientific argument.</p> <p>(Use with all Chemistry topics)</p>			
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Radioactivity	3.2.12.A2 CC.3.5 CC.3.6	Distinguish among the isotopic forms of elements. Explain the probabilistic nature of radioactive decay based on subatomic rearrangement in the atomic nucleus. Reading information Text Writing	Approved textbook <u>Conceptual Physical Science Explorations:</u> Chapter 19 Resource Guide Calculators Half Life Lab Activities		15 days
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<p>Nuclear Fission and Fusion</p>	<p>3.2.12.A3</p> <p>CC.3.5</p> <p>CC.3.6</p>	<p>Explain how matter is transformed into energy in nuclear reactions according to the equation $E = mc^2$.</p> <p>Reading Informational Text</p> <p>Writing</p>	<p>Approved textbook</p> <p><u>Conceptual Physical Science Explorations:</u> Chapter 20 Resource Guide</p>		<p>10 days</p>
<p>Mixtures</p>	<p>3.2.12.A1</p> <p>CC.3.5</p> <p>CC.3.6</p>	<p>Compare and contrast colligative properties of mixtures.</p> <p>Compare and contrast the unique properties of water and other liquids.</p> <p>Reading information Text</p> <p>Writing</p>	<p>Approved textbook</p> <p><u>Conceptual Physical Science Explorations:</u> Chapter 22 Resource Guide</p> <p>Lab Activity</p>		<p>20 days</p>

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Acids and Bases/Oxidation and Reduction	3.2.12.A4 CC.3.5 CC.3.6	Apply oxidation/reduction principles to electrochemical reactions. Describe the interactions between acids and bases. Reading Informational Text Writing	Approved textbook <u>Conceptual Physical Science Explorations:</u> Chapters 25 and 26 Resource Guide Testing for Acids and Bases Lab Activity Teacher demonstrations		15 days
Earth and Space Science Topics (optional)	Not Applicable	Not Applicable	Approved textbook		Remaining days in school year
Final Exam Review	Not Applicable	Not Applicable	Approved textbook		10 days