9th Grade General Science

Curriculum Guide

Scranton School District

Scranton, PA



9th Grade General Science

Prerequisite:

• Completion of 8th grade physical science

9th Grade General Science is designed to be a survey course of the main branches of science offered at the high school level. Students will be introduced to basic concepts in Chemistry, Physics, Earth and Space Science, Biology, and Environmental Science. The course meets five class periods per week. The curriculum was developed as a foundation that students will build upon as they progress through high school.

Year-at-a-glance

Subject: 9 th Grade General Science	Grade Level: 9 th	Date Completed: 7/16/15

1st Quarter

Торіс	Resources	Academic Standards
Scientific Approach: Measurements Scientific Data	Approved textbook <u>Physical Science Concepts in Action with</u> <u>Earth and Space</u> : Chapter 1: 1.3,1.4 Lesson/Unit Plan Instructional Content Educational Resources Assessment Videos Web-Based Content	 3.3.10.A8 CC.3.5 CC.3.6 3.1.10.A9 Use for all Lessons Compare and contrast scientific theories. Know that both direct and indirect observations are used by scientists to study the natural world and universe. Identify questions and concepts that guide scientific investigations. Formulate and revise explanations and models using logic and evidence. Recognize and analyze alternative explanations and models. Explain the importance of accuracy and precision in making valid measurements.

<u>Chemistry</u>	Approved textbook	3.2.C.A1
Properties of Matter:	Physical Science Concepts in Action with	CC.3.5
Classifying Matter	Earth and Space: Chapter 2: 2.1, 2.2	CC.3.6
Physical Properties	Lesson/Unit Plan	3.1.C.C4: Use for all Chemistry Lessons
Chemical Properties	Instructional Content	Compare and contrast scientific theories.
	Educational Resources Assessment Videos Web-Based Content	 Know that both direct and indirect observations are used by scientists to study the natural world and universe. Identify questions and concepts that guide scientific investigations. Formulate and revise explanations and models using logic and evidence. Recognize and analyze alternative explanations and models. Explain the importance of accuracy and precision in making valid measurements. Examine the status of existing theories. Evaluate experimental information for relevance and adherence to science processes. Judge that conclusions are consistent and logical with experimental conditions. Interpret results of experimental research to predict new information propose additional investigable questions
		information, propose additional investigable questions, or advance a solution.
States of Matter:	Approved textbook	3.2.10.A3
Solids, Liquids, & Gases	Physical Science Concepts in Action with	3.2.C.A3
Phase Changes	Earth and Space: Chapter 3: 3.1,3.3	CC.3.5
	Lesson/Unit Plan	CC.3.6
	Instructional Content	
	Educational Resources	
	Assessment	
	Videos	

Atomic Structure: History of Atoms Atomic Structure Atomic Theory	Approved textbook <u>Physical Science Concepts in Action with</u> <u>Earth and Space</u> : Chapter 4: 4.1, 4.2, 4.3 Lesson/Unit Plan Instructional Content Educational Resources Assessment Videos Web-Based Content	3.2.C.A5 CC.3.5 CC.3.6
Periodic Table: Organization Modern Periodic Table Groupings	Approved textbook <u>Physical Science Concepts in Action with</u> <u>Earth and Space</u> : Chapter 5: 5.1, 5.2, 5.3 Lesson/Unit Plan Instructional Content Educational Resources Assessment Videos Web-Based Content	3.2.C.A1 3.2.10.A1 CC.3.5 CC.3.6
Chemical Bonding: Ionic Bond Covalent	Approved textbook <u>Physical Science Concepts in Action with</u> <u>Earth and Space</u> : Chapter 6: 6.1, 6.2 Lesson/Unit Plan Instructional Content Educational Resources Assessment Videos Web-Based Content	3.2.10.A2 CC.3.5 CC.3.6

Chemical Reactions:	Approved textbook	3.2.10.A4
Types of Reactions	Physical Science Concepts in Action with	3.2.C.A4
	Earth and Space: Chapter 7: 7.2	CC.3.5
	Lesson/Unit Plan	CC.3.6
	Instructional Content	
	Educational Resources	
	Assessment	
	Videos	
	Web-Based Content	

2nd Quarter

Торіс	Resources	Academic Standards
Physics Motion:	Approved textbook Physical Science Concepts in Action with Earth	3.2.P.B1 CC.3.5
Distance and Displacement Speed and Velocity Acceleration	and Space: Chapter 11: 11.1, 11.2, 11.3 Lesson/Unit Plan Instructional Content Educational Resources Assessment Videos Web-Based Content	 CC.3.6 3.1.P.A9: <u>Use for all Lessons in Physics</u> Compare and contrast scientific theories. Know that both direct and indirect observations are used by scientists to study the natural world and universe. Identify questions and concepts that guide scientific investigations. Formulate and revise explanations and models
		 Formulate and revise explanations and models using logic and evidence. Recognize and analyze alternative explanations and models. Explain the importance of accuracy and precision in making valid measurements. Examine the status of existing theories. Evaluate experimental information for relevance and adherence to science processes. Judge that conclusions are consistent and logical with experimental conditions.
		 Interpret results of experimental research to predict new information, propose additional investigable questions, or advance a solution. Communicate and defend a scientific argument.

Force and Motion:	Approved textbook	3.2.10.B1
Forces	Physical Science Concepts in Action with Earth	CC.3.5
Newton's Laws	and Space: Chapter 12: 12.1-12.4	CC.3.6
Momentum	Lesson/Unit Plan	
Universal Forces	Instructional Content	
	Educational Resources	
	Assessment	
	Videos	
	Web-Based Content	

3rd Quarter

Resources	Academic Standards
Approved textbook	3.3.12.A2
Physical Science Concepts in Action with Earth	3.2.P.B2
and Space: Chapter 15: 15.1-15.3	CC.3.5
Lesson/Unit Plan	CC.3.6
Instructional Content	
Educational Resources	
Assessment	
Videos	
Web-Based Content	
	Approved textbook <u>Physical Science Concepts in Action with Earth</u> <u>and Space</u> : Chapter 15: 15.1-15.3 Lesson/Unit Plan Instructional Content Educational Resources Assessment Videos

Earth Science	Approved textbook	3.3.10.A3
Earth's Structure:	Physical Science Concepts in Action with Earth	3.3.10.A1
Plate Tectonics	and Space: Chapter 22: 22.1, 22.4-22.6	CC.3.5
Earthquakes	Lesson/Unit Plan	CC.3.6
Volcanoes	Instructional Content	3.3.10.A8: Use for all Earth Science
	Educational Resources	• Compare and contrast scientific theories.
	Assessment	Know that both direct and indirect
	Videos	observations are used by scientists to study the
	Web-Based Content	natural world and universe.
		Identify questions and concepts that guide
		scientific investigations.
		Formulate and revise explanations and models
		using logic and evidence.
		Recognize and analyze alternative explanations
		and models.
		Explain the importance of accuracy and
		precision in making valid measurements.

Earth's History :	Approved textbook	3.3.10.A5
Weathering and Mass	Physical Science Concepts in Action with Earth	CC.3.5
Movement	and Space: Chapter 23: 23.2-23.5	CC.3.6
Water Shapes the Land	Lesson/Unit Plan	
Glaciers and Wind	Instructional Content	
Oceans	Educational Resources	
	Assessment	
	Videos	
	Web-Based Content	

4^{th}	Quarter
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Торіс	Resources	Academic Standards
Weather and Climate:	Approved textbook	3.3.10.A6
The Atmosphere	Physical Science Concepts in Action with Earth and	3.3.12.A6
The Sun/Seasons	Space: Chapter 24: 24.1-24.6	3.3.12.A8
Solar Energy	Lesson/Unit Plan	3.3.10.A4
Water	Instructional Content	CC.3.5
Atmosphere	Educational Resources	CC.3.6
Weather/Climate	Assessment	
	Videos	
	Web-Based Content	

The Solar System:	Approved textbook	3.3.10.B1
Exploring the solar system	Physical Science Concepts in Action with Earth and	3.3.12.B3
Earth Moon System	<u>Space</u> : Chapter 25: 25.1-25.5	CC.3.5
Planets	Lesson/Unit Plan	CC.3.6
Origin	Instructional Content	3.3.10.B3 Use for Solar System Lessons
	Educational Resources	
	Assessment	Compare and contrast scientific theories.
	Videos	Know that both direct and indirect observations
	Web-Based Content	 are used by scientists to study the natural world and universe. Identify questions and concepts that guide scientific investigations. Formulate and revise explanations and models using logic and evidence. Recognize and analyze alternative explanations and models. Explain the importance of accuracy and precision in making valid measurements.

Exploring the Universe: The Sun/Stars Life Cycle of Stars Groups of Stars Expanding Universe	Approved textbook <u>Physical Science Concepts in Action with Earth and</u> <u>Space</u> : Chapter 26: 26.1-26.5 Lesson/Unit Plan Instructional Content Educational Resources Assessment Videos Web-Based Content	 3.3.12.B1 3.3.12.B3 CC.3.5 CC.3.6 3.3.12.B3 Use for Universe Lessons Examine the status of existing theories. Evaluate experimental information for relevance and adherence to science processes. Judge that conclusions are consistent and logical with experimental conditions. Interpret results of experimental research to predict new information, propose additional investigable questions, or advance a solution. Communicate and defend a scientific argument.
Review and Final Examination		

*The suggested timeline and curriculum content should be adjusted and revised as needed in correlation with the PA State Standards.

General Topic	Academic	Essential Knowledge,	Resources &	Assessments	Suggested
	Standard(s)	Skills & Vocabulary	Activities		Time
Using Science Skills:	3.3.10.A8	Compare and contrast scientific theories.	Approved	Teacher	5 days
Scientific Approach			textbook	prepared	
Measurements		Know that both direct and indirect		tests,	
Scientific Data		observations are used by scientists to study the natural world and universe.	Worksheets	quizzes, etc.	
			Activity	Series	
		Identify questions and concepts that guide scientific investigations.	Assessments	available assessments	
			Smart Boards	online.	
		Formulate and revise explanations and		(Optional)	
		models using logic and evidence.	Multimedia Presentations		
		Recognize and analyze alternative			
		explanations and models.	Measurement Lab		
		Explain the importance of accuracy and			
		precision in making valid measurements.	Webquest		
	CC.3.5	Reading Informational Text			
	CC.3.6	Writing			
		-			

Chemistry	3.2.C.A1	Differentiate between physical properties	Approved	Teacher	4 days
Properties of Matter:		and chemical properties.	textbook	prepared tests,	
 Classifying Matter 				quizzes, etc.	
 Physical Properties 		Differentiate between pure substances and	Worksheets		
 Chemical Properties 		mixtures; differentiate between		Series	
		heterogeneous and homogeneous mixtures.	Activity	available	
			Assessments	assessments	
				online.	
	CC.3.5	Reading Informational Text	Smart Boards	(Optional)	
	CC.3.6	Writing	Multimedia		
			Presentations		
			Webquest		

States of Matter:	3.2.10.A3	Describe phases of matter according to the	Approved	Teacher	4 days
• Solids, Liquids, & Gases		kinetic molecular theory.	textbook	prepared	
 Phase Changes 				tests,	
		Describe the three normal states of matter in	Worksheets	quizzes, etc.	
	3.2.C.A3	terms of energy, particle motion, and phase			
		transitions.	Activity	Series	
			Assessments	available	
	CC.3.5	Reading Informational Text		assessments	
			Smart Boards	online.	
	CC.3.6	Writing		(Optional)	
			Multimedia		
			Presentations		
			Webquest		

Atomic Structure History of Atoms Atomic Structure Atomic Theory	3.2.C.A5 CC.3.5 CC.3.6	Recognize discoveries from Dalton (atomic theory), Thomson (the electron), Rutherford (the nucleus), and Bohr (planetary model of atom), and understand how each discovery leads to modern theory. Describe Rutherford's "gold foil" experiment that led to the discovery of the nuclear atom. Identify the major components (protons, neutrons, and electrons) of the nuclear atom and explain how they interact. Reading Informational Text Writing	Approved textbook Worksheets Activity Assessments Smart Boards Multimedia Presentations Webquest Construction of Model: Atom	Teacher prepared tests, quizzes, etc. Series available assessments online. (Optional)	5 days

Periodic Table:	3.2.C.A1	Explain the relationship of an element's	Approved	Teacher	6 days
Organization		position on the periodic table to its atomic	textbook	prepared	
Modern Periodic Table		number, ionization energy, electro-negativity,		tests,	
Groupings		atomic size, and classification of elements.	Worksheets	quizzes, etc.	
			Activity	Series	
	3.2.10.A1	Predict properties of elements using trends of	Assessments	available	
		the periodic table.		assessments	
			Smart Boards	online.	
				(Optional)	
	CC.3.5	Reading Informational Text	Multimedia		
			Presentations		
	CC.3.6	Writing			
			Webquest		

Chemical Bonding	3.2.10.A2	Compare and contrast different bond types	Approved	Teacher	6 days
• Ionic		that result in the formation of molecules and	textbook	prepared	
Covalent		compounds.		tests,	
			Worksheets	quizzes, etc.	
		Explain why compounds are composed of			
		integer ratios of elements.	Activity	Series	
			Assessments	available	
	CC.3.5	Reading Informational Text		assessments	
			Smart Boards	online.	
	CC.3.6	Writing		(Optional)	
			Multimedia		
			Presentations		
			Webquest		

Chemical Reactions	3.2.10.A4	Explain the difference between endothermic	Approved	Teacher	5 days
• Types of Reactions		and exothermic reactions.	textbook	prepared	
Energy Changes				tests,	
Reaction Rates		Identify the factors that affect the rates of	Activity	quizzes, etc.	
		reactions.	Assessments		
				Series	
	3.2.C.A4	Classify chemical reactions as synthesis	Smart Boards	available	
		(combination), decomposition, single		assessments	
		displacement (replacement), double	Multimedia	online.	
		displacement, and combustion.	Presentations	(Optional)	
	CC.3.5	Reading Informational Text	Webquest		
	CC.3.6	Writing	Measurement		
			Lab		

Physics	3.2.P.B1	Differentiate among translational motion,	Approved	Teacher	23 Days
Motion:		simple harmonic motion, and rotational	textbook	prepared	
Distance and		motion in terms of position, velocity, and		tests,	
Displacement		acceleration.	Worksheets	quizzes, etc.	
Speed and Velocity					
Acceleration		Use force and mass to explain translational	Activity	Series	
		motion or simple harmonic motion of	Assessments	available	
		objects.		assessments	
			Smart Boards	online.	
	CC.3.5	Reading Informational Text		(Optional)	
			Multimedia		
	CC.3.6	Writing	Presentation		

Force and Motion:	3.2.10.B1	Analyze the relationships among the net	Approved	Teacher	24 Days
		forces acting on a body, the mass of the	textbook	prepared	
• Forces		body, and the resulting acceleration using		tests,	
Newton's Laws		Newton's Second Law of Motion.	Worksheets	quizzes, etc.	
Momentum					
Universal Forces		Apply Newton's Law of Universal Gravitation	Activity	Series	
		to the forces between two objects.	Assessments	available	
				assessments	
		Use Newton's Third Law to explain forces as	Smart Boards	online.	
		interactions between bodies.		(Optional)	
		Describe how interactions between objects	Multimedia		
		conserve momentum.	Presentation		
	CC.3.5	Reading Informational Text			
	CC.3.6	Writing			
	CC.3.0	writing			

Forms of Energy	3.2.P.B2	Explain the translation and simple harmonic	Approved	Teacher	10 Days
• Energy and it's forms		motion of objects using conservation of	textbook	prepared	
Conversion and		energy and conservation of momentum.		tests,	
Conservation			Worksheets	quizzes, etc.	
• Energy Resources		Explain how gravitational, electrical, and			
		magnetic forces and torques give rise to	Activity	Series	
		rotational motion.	Assessments	available	
				assessments	
	3.3.12.A2	Analyze the availability, location, and	Smart Boards	online.	
		extraction of Earth's resources.		(Optional)	
			Multimedia		
		Evaluate the impact of using renewable and	Presentation		
		nonrenewable energy resources on the			
		Earth's system.			
	CC.3.5	Reading Informational Text			
	CC.3.6	Writing			

Earth Science	3.3.10.A3	Explain how the evolution of Earth has been	Approved	Teacher	18 Days
Earth's Interior:		driven by interactions between the	textbook	prepared	
• Earth's Structure		lithosphere, hydrosphere, atmosphere, and		tests,	
• Plate Tectonics		biosphere.	Worksheets	quizzes, etc.	
Earthquakes					
Volcanoes		Relate plate tectonics to both slow and rapid	Activity	Series	
		changes in the earth's surface.	Assessments	available assessments	
	3.3.10.A1	Describe the rock cycle and the processes	Smart Boards	online.	
		that are responsible for the formation of		(Optional)	
		igneous, sedimentary, and metamorphic	Multimedia		
		rocks.	Presentation		
		Explain how the Earth is composed of a			
		number of dynamic, interacting systems			
		exchanging energy or matter.			
	CC.3.5	Reading Informational Text			
	CC.3.6	Writing			

Weather and Climate	3.3.10.A6	Interpret meteorological data to describe	Approved	Teacher	15 days
• The Atmosphere		and/or predict weather.	textbook	prepared	
The Sun/Seasons				tests,	
Solar Energy		Explain the phenomena that cause global	Worksheets	quizzes, etc.	
Water Atmosphere		atmospheric processes such as storms,			
Weather/Climate		currents, and wind patterns.	Activity	Series	
-			Assessments	available	
		Explain how the unequal heating of the		assessments	
		Earth's surface leads to atmospheric global	Smart Boards	online.	
		circulation changes, climate, local short term		(Optional)	
		changes, and weather.	Multimedia		
			Presentation		
		Examine the status of existing theories.			
		Evaluate experimental information for			
		relevance and adherence to science			
		processes.			
	3.3.12.A6	Judge that conclusions are consistent and			
		logical with experimental conditions.			
		Interpret results of experimental research to			
		predict new information, propose additional			
		investigable questions, or advance a solution.			
		Communicate and defend a scientific			
		argument.			

	2 1 2 4 9	Delete the transfer of energy through		
3.		Relate the transfer of energy through		
		radiation, conduction, and convection to		
		global atmospheric processes.		
		Delete coochemical sucles to concernation of		
		Relate geochemical cycles to conservation of		
		matter.		
3	.3.10.A4	Evaluin how the Earth's systems and its		
3.		Explain how the Earth's systems and its		
		various cycles are driven by energy.		
	C.3.5	Reading Informational Text		
	C.3.3			
	C.3.6	Writing		
	C.3.0	Writing		

Exploring the solar system	3.3.10.B1	Explain how gravity is responsible for	Approved	Teacher	10 days
Earth Moon System		planetary orbits.	textbook	prepared	-
Planets				tests,	
Origin		Explain what caused the sun, Earth, and most	Worksheets	quizzes, etc.	
		of the other planets to form between 4 and 5			
		billion years ago.	Activity	Series	
			Assessments	available	
		Provide evidence to suggest the Big Bang		assessments	
		Theory.	Smart Boards	online. (Optional)	
		Describe the basic nuclear processes involved	Multimedia	(0)00000	
		in energy production in a star.	Presentation		
		Examine the status of existing theories.			
		Evaluate experimental information for			
		relevance and adherence to science			
		processes.			
	3.3.12.B3	Judge that conclusions are consistent and			
		logical with experimental conditions.			
		Interpret results of experimental research to			
		predict new information, propose additional			
		investigable questions, or advance a solution.			
		Communicate and defend a scientific			
		argument.			
		-			
	CC.3.5	Reading Informational Text			
	CC.3.6	Writing			

Exploring the Universe: • Life Cycle of Stars	3.3.12.B1	Describe the life cycle of stars based on their	Approved textbook	Teacher prepared	10 days
Groups of Stars		mass.	LEXEBOOK	tests,	
Expanding Universe		Analyze the influence of gravity on the	Worksheets	quizzes, etc.	
		formation and life cycles of galaxies,			
		including our own Milky Way galaxy; stars;	Activity	Series	
		planetary systems; and residual material left	Assessments	available	
		from the creation of the solar system.	Smart Boards	assessments online.	
			Sillart Boarus	(Optional)	
		Relate the nuclear processes involved in	Multimedia	(optional)	
		energy production in stars and supernovas to	Presentation		
		their life cycles.			
		Examine the status of existing theories.			
		Evaluate experimental information for			
		relevance and adherence to science			
		processes.			
	3.3.12.B3	Judge that conclusions are consistent and			
	3.3.12.03	logical with experimental conditions.			
		Interpret results of experimental research to			
		predict new information, propose additional			
		investigable questions, or advance a solution.			
		Communicate and defend a scientific			
		argument.			
	CC.3.5	Reading Informational Text			
	CC.3.6	Writing			

Review and Final Examination			10 days