

Correlation to Pennsylvania Academic Standards for Science
***Foundations of Physical Science* Student Text and Investigation Manual**

Standard #:	Category	Standard Statement	Standard Descriptors	student text pg	detail	investigation pg	detail
3.2.10.A1	Inquiry and Design	Apply knowledge and understanding about the nature of scientific and technological knowledge.	Compare and contrast scientific theories and beliefs.	10 34 45 54 73 105 107 320 391	process of reviewing hypothesis explained Aristotle vs. Newton Newton's Laws of Motion Newton and the force of gravity impact of Da Vinci's work Benjamin Franklin Charles-Augustin Coulomb the quests of alchemists scientific discovery and the atomic age	35 39 39 39 77 77 151 167	what evidence is there in support of your hypothesis? critique group's explanation of energy transformations review energy theory in context of everyday scenarios analyze energy transformations in different scenarios show how energy loss data could be applied to designing a real clock compare law of conservation of energy to motion of pendulum review your hypothesis did you prove or disprove your hypothesis?

Correlation to Pennsylvania Academic Standards for Science
Foundations of Physical Science Student Text and Investigation Manual

Standard #:	Category	Standard Statement	Standard Descriptors	student text pg	detail	investigation pg	detail
3.2.10.A2	Inquiry and Design	Apply knowledge and understanding about the nature of scientific and technological knowledge.	Know that science uses both direct and indirect observation means to study the world and the universe.	20	finding variability in data	14	record three different time intervals
				79	look at force data and decide the usefulness of a machine	18	use data to describe relationship between force and motion
				372	observe chemical changes	19	use data to infer correct relationship between variables
						25	collect force data
						27	write down the number of weights you use
						30	interpret block and tackle data
						100	observe glow-in-the-dark paper
						141	build models of Na and Cl and use them to explain bonding
						146	record detailed observations
						146	observe evidence of chemical change
						150	record data as you perform experiment
						158	observe temperature changes in chemical reactions
						164	observe Tyndall effect
						168	observe dissolving process

Correlation to Pennsylvania Academic Standards for Science
***Foundations of Physical Science* Student Text and Investigation Manual**

Standard #:	Category	Standard Statement	Standard Descriptors	student text pg	detail	investigation pg	detail
						175	make observations about local surface water
						192	observe convection currents
3.2.10.A3	Inquiry and Design	Apply knowledge and understanding about the nature of scientific and technological knowledge.	Integrate new information into existing theories and explain implied results.			21	construct reasonable explanation based on data
						35	study data and determine importance of height on speed of marble
						45	analyze data and explain a rule
						157	add new rules to list based on findings

Correlation to Pennsylvania Academic Standards for Science
***Foundations of Physical Science* Student Text and Investigation Manual**

Standard #:	Category	Standard Statement	Standard Descriptors	student text pg	detail	investigation pg	detail
3.2.10.B1	Inquiry and Design	Apply process knowledge and organize scientific and technological phenomena in varied ways.	Describe materials using precise quantitative and qualitative skills based on observations.	5	make measurements with precision	4	difference between precise and accurate data
				12	importance of reliable and accurate data collection	5	making measurements with precision
						6	electronic timer and release technique
						7	record time interval
						7	measure and record variables
						9	collect speed data
						14	record three different time intervals
						17	measure the force
						17	record times
						17	measure the force
						24	collect weight data
						25	collect force data
						25	measure and record the force
						27	write down the number of weights you use
						30	measure height difference
						36	make precise height measurements
						36	collect precise speed and height data

Correlation to Pennsylvania Academic Standards for Science
***Foundations of Physical Science* Student Text and Investigation Manual**

Standard #:	Category	Standard Statement	Standard Descriptors	student text pg	detail	investigation pg	detail
						63	making measurements with precision
						75	collect mass and amplitude data
						75	make precise length measurements
						146	record detailed observations
						150	record data as you perform experiment
						167	collect time data and record observations
						176	measure pH

Correlation to Pennsylvania Academic Standards for Science
Foundations of Physical Science Student Text and Investigation Manual

Standard #:	Category	Standard Statement	Standard Descriptors	student text pg	detail	investigation pg	detail
3.2.10.B2	Inquiry and Design	Apply process knowledge and organize scientific and technological phenomena in varied ways.	Develop appropriate scientific experiments: raising questions, formulating hypotheses, testing, controlled experiments, recognizing variables, manipulating variables, interpreting data, and producing solutions.	7	experimentation begins with a question	6	predict which car will move fastest
				9	steps in the scientific method	6	how do we ask questions and get answers from nature?
				10	forming a hypothesis	6	formulate hypothesis
				10	the research question and hypothesis	7	doing a controlled experiment
				11	control and experimental variables	7	perform your own experiment
				12	writing lab procedures	7	test the effect of one other variable
				19	design your own experiment	7	design your own experiment
				19	design your own experiment	7	variables in an experiment
				20	finding variability in data	7	compare results with hypothesis
				26	independent and dependent variables	9	design three experiments using car and ramp
				28	identifying cause and effect relationships	9	design three experiments and choose equipment
				41	identify cause and effect	9	conduct three experiments with appropriate equipment
				42	devise an experiment	9	devise a hypothesis
				79	look at force data and decide the usefulness of a machine	10	conduct car/ramp experiment
				288	find the thickness of a single card		

Correlation to Pennsylvania Academic Standards for Science
***Foundations of Physical Science* Student Text and Investigation Manual**

Standard #:	Category	Standard Statement	Standard Descriptors	student text pg	detail	investigation pg	detail
						10	selecting ramp and photogates
						12	select equipment and set up experiment
						16	decide how to vary the force on the car for this experiment
						16	investigate Newton's 2nd law
						18	use data to describe relationship between force and motion
						19	use data to infer correct relationship between variables
						21	choose independent and dependent variables for graph
						21	determine effect of increasing mass
						26	what variables can be changed?
						27	recognize variables
						27	think about the variables
						30	rigging block and tackle
						30	interpret block and tackle data
						34	formulate hypothesis

Correlation to Pennsylvania Academic Standards for Science
***Foundations of Physical Science* Student Text and Investigation Manual**

Standard #:	Category	Standard Statement	Standard Descriptors	student text pg	detail	investigation pg	detail
						34	investigate motion on a rollercoaster
						34	where does the marble move the fastest?
						43	how did A and B tapes acquire different charge?
						75	design pendulum experiment
						75	perform self-designed experiment
						75	investigate variables that affect the period of a pendulum
						75	plan three experiments to determine which variable affects the period of a pendulum
						93	decision trees and the advantage of doing multiple trials
						141	build models of Na and Cl and use them to explain bonding
						145	carry out procedure and select equipment
						145	plan a procedure and select necessary equipment
						151	perform the experiment you designed

Correlation to Pennsylvania Academic Standards for Science
***Foundations of Physical Science* Student Text and Investigation Manual**

Standard #:	Category	Standard Statement	Standard Descriptors	student text pg	detail	investigation pg	detail
						151	explain how hypothesis compares to results
						151	plan procedures and select materials
						151	design experiment to find out if mass is conserved
						151	select materials from list
						151	write a procedure
						157	add new rules to list based on findings
						166	write a procedure
						166	what three factors influence dissolving rate?
						166	devise hypothesis and explain
						166	which factor will produce fastest dissolving rate?
						166	which method will give fastest dissolving rate?
						178	formulate hypothesis
						198	which type of food contains the most energy?
						198	formulate hypothesis

Correlation to Pennsylvania Academic Standards for Science
Foundations of Physical Science Student Text and Investigation Manual

Standard #:	Category	Standard Statement	Standard Descriptors	student text pg	detail	investigation pg	detail
3.2.10.B3	Inquiry and Design	Apply process knowledge and organize scientific and technological phenomena in varied ways.	Use process skills to make inferences and predictions using collected information and to communicate, using space / time relationships, defining operationally.	20 24 42 42	how will speed change? predicting speed from a graph predict the speed of a car interpreting distance/time graph	25 27 28 76 121 151 156	create a mathematical model find math rule for lever equilibrium derive a math formula use data to predict best string length for a pendulum clock use graph to predict mass of six objects does your experiment agree with law of conservation of mass? make predictions about solubility
3.2.10.C1	Inquiry and Design	Apply the elements of scientific inquiry to solve problems.	Generate questions about objects, organisms and/or events that can be answered through scientific investigations.	10	the research question and hypothesis	6	how do we ask questions and get answers from nature?
3.2.10.C2	Inquiry and Design	Apply the elements of scientific inquiry to solve problems.	Evaluate the appropriateness of questions.	10	the research question and hypothesis	6	how do we ask questions and get answers from nature?

Correlation to Pennsylvania Academic Standards for Science
Foundations of Physical Science Student Text and Investigation Manual

Standard #:	Category	Standard Statement	Standard Descriptors	student text pg	detail	investigation pg	detail
3.2.10.C3	Inquiry and Design	Apply the elements of scientific inquiry to solve problems.	Design an investigation with adequate control and limited variables to investigate a question.	11	control and experimental variables	7	doing a controlled experiment
				26	independent and dependent variables	21	choose independent and dependent variables for graph
						27	recognize variables
3.2.10.C4	Inquiry and Design	Apply the elements of scientific inquiry to solve problems.	Conduct a multiple step experiment.	12	writing lab procedures	9	conduct three experiments with appropriate equipment
						10	selecting ramp and photogates
						12	select equipment and set up experiment
						30	rigging block and tackle
						145	carry out procedure and select equipment
						151	write a procedure
						151	select materials from list
						166	write a procedure

Correlation to Pennsylvania Academic Standards for Science
Foundations of Physical Science Student Text and Investigation Manual

Standard #:	Category	Standard Statement	Standard Descriptors	student text pg	detail	investigation pg	detail
3.2.10.C5	Inquiry and Design	Apply the elements of scientific inquiry to solve problems.	Organize experimental information using a variety of analytic methods.	24	making a graph	9	construct a data table
				26	creating graphs	12	understand and use data table
				41	make a graph	13	graph distance vs. time
				42	interpreting distance/time graph	15	construct a quantitative graphical model
						17	record results in data table
						18	organize different combinations of data
						24	use data table to record results
						25	create a mathematical model
						27	use data table to record results
						27	find math rule for lever equilibrium
						28	derive a math formula
						30	record ropes and pulley data in table
						36	organize data into a table
						37	organize data into a graph of speed vs. height
						51	graph voltage vs. current
						75	create data table for self-designed experiment
						121	graph mass vs. volume

Correlation to Pennsylvania Academic Standards for Science
***Foundations of Physical Science* Student Text and Investigation Manual**

Standard #:	Category	Standard Statement	Standard Descriptors	student text pg	detail	investigation pg	detail
						147 organize observations into a category table 151 design a data table 167 use data table for observations 173 organize water quality data into a table 181 construct a graphical model 183 construct a temperature vs. time graph	
3.2.10.C6	Inquiry and Design	Apply the elements of scientific inquiry to solve problems.	Judge the significance of experimental information in answering the question.	19	which group did the best experiment?	18 evaluate graphs as to whether or not they show relationships between variables 21 evaluate percent change for data collected 21 construct reasonable explanation based on data 35 study data and determine importance of height on speed of marble 45 analyze data and explain a rule 75 evaluate statistical significance 167 evaluate method based on data	

Correlation to Pennsylvania Academic Standards for Science
Foundations of Physical Science Student Text and Investigation Manual

Standard #:	Category	Standard Statement	Standard Descriptors	student text pg	detail	investigation pg	detail
3.2.10.C7	Inquiry and Design	Apply the elements of scientific inquiry to solve problems.	Suggest additional steps that might be done experimentally.	12	writing lab procedures	101 117 151 166	how could you extend the investigation to explore materials that give off light when heated? how could you find the volume of one drop of water? write a procedure write a procedure
3.2.10.D1	Inquiry and Design	Identify and apply the technological design process to solve problems.	Examine the problem, rank all necessary information and all questions that must be answered.	74	sample engineering problem	70 70	designing and testing different electric motors proposing and comparing different electric motor designs
3.2.10.D2	Inquiry and Design	Identify and apply the technological design process to solve problems.	Propose and analyze a solution			70	proposing and comparing different electric motor designs
3.2.10.D3	Inquiry and Design	Identify and apply the technological design process to solve problems.	Implement the solution.			70	designing and testing different electric motors

Correlation to Pennsylvania Academic Standards for Science
Foundations of Physical Science Student Text and Investigation Manual

Standard #:	Category	Standard Statement	Standard Descriptors	student text pg	detail	investigation pg	detail
3.2.10.D4	Inquiry and Design	Identify and apply the technological design process to solve problems.	Evaluate the solution, test, redesign and improve as necessary.			70	designing and testing different electric motors
						70	proposing and comparing different electric motor designs
						71	which motor gave the highest speed and why?
						71	did draining the batteries affect motor speed?
3.2.10.D5	Inquiry and Design	Identify and apply the technological design process to solve problems.	Communicate the process and evaluate and present the impacts of the solution.			71	testing a motor for performance
						145	present findings to the class
						173	write paragraph to explain results
						175	create water quality report
						179	write summary of findings

Correlation to Pennsylvania Academic Standards for Science
Foundations of Physical Science Student Text and Investigation Manual

Standard #:	Category	Standard Statement	Standard Descriptors	student text pg	detail	investigation pg	detail
3.4.10.A1	Physical Science, Chemistry and Physics	Explain concepts about the structure and properties of matter.	Know that atoms are composed of even smaller sub-atomic structures whose properties are measurable.	311	all matter is formed from atoms	132	atomic number determines what element that atom is
				311	all matter is formed from atoms	132	comparing atoms
				311	location/size/charge of subatomic particles	132	building atom models
				311	protons/neutrons/electrons	133	exploring isotopes
				315	atomic number discussed	133	protons and neutrons
				315	atoms of same element have same atomic number	133	identify mass number
				316	isotopes explained	133	identify element symbol and name
				316	isotopes explained	133	identify atomic number
				316	mass number discussed	133	location of electrons in atom
				318	proton/electron attraction	136	model stable and neutral atoms
				322	atomic number on the periodic table	136	mass number
				322	mass number on the periodic table	136	atomic number
				322	chemical symbols and element names	136	understanding isotopes
				322	atomic mass on the periodic table	137	importance of atomic number
				322	atomic mass on the periodic table	137	build atomic models
				388	showing valence electrons in a diagram	140	review subatomic particles
				388	showing valence electrons in a diagram	140	find the number of electrons in outermost level

Correlation to Pennsylvania Academic Standards for Science
Foundations of Physical Science Student Text and Investigation Manual

Standard #:	Category	Standard Statement	Standard Descriptors	student text pg	detail	investigation pg	detail
3.4.10.A2	Physical Science, Chemistry and Physics	Explain concepts about the structure and properties of matter.	Explain the repeating pattern of chemical properties by using the repeating patterns of atomic structure within the periodic table.	320 321 321 329 330 332 332 335	groups of elements groups of elements and valence shells studying the periodic table periodic table columns and valence electrons bonding and periodic table position periodic table and electronegativities metals nonmetals and metalloids periodic table and oxidation numbers	133 136 141 142	using the periodic table building and studying the periodic table build model of Na and Cl atoms and explain why they bond to form a molecule arrangement of electrons and groups of elements
3.4.10.A3	Physical Science, Chemistry and Physics	Explain concepts about the structure and properties of matter.	Predict the behavior of gases through the use of Boyle's, Charles' or the ideal gas law, in everyday situations.	299 300 300	Charles' law what is pressure? Boyle's law		
3.4.10.A4	Physical Science, Chemistry and Physics	Explain concepts about the structure and properties of matter.	Describe phases of matter according to the Kinetic Molecular Theory.	284 284 285	states of matter and arrangement of molecules changes of state characteristics of matter related to its state	118 118 118 119	observe melting process and study quantitatively molecules in a liquid investigate melting energy and phase changes

Correlation to Pennsylvania Academic Standards for Science
***Foundations of Physical Science* Student Text and Investigation Manual**

Standard #:	Category	Standard Statement	Standard Descriptors	student text pg	detail	investigation pg	detail
3.4.10.A5	Physical Science, Chemistry and Physics	Explain concepts about the structure and properties of matter.	Explain the formation of compounds and their resulting properties using bonding theories (ionic and covalent).	278	compounds are composed of elements	136	ions
				324	use the periodic table to predict chemical formulas	140	why do atoms form chemical bonds?
				324	which element is more likely to combine with other elements?	141	when an atom ionizes
				330	ionic bonds	141	modeling a chemical bond
				331	covalent bonds	142	why do atoms combine in certain ratios?
				332	distinguishing between ionic and covalent bonds	143	classify ionic compounds
				335	chemical bonding and the periodic table	143	ionic compounds
3.4.10.A6	Physical Science, Chemistry and Physics	Explain concepts about the structure and properties of matter.	Recognize formulas for simple inorganic compounds.	336	writing a chemical formula	143	name chemical compounds
				338	summary of chemical formula writing rules	143	predict chemical formulas
				339	naming compounds	145	determine empirical formula

Correlation to Pennsylvania Academic Standards for Science
Foundations of Physical Science Student Text and Investigation Manual

Standard #:	Category	Standard Statement	Standard Descriptors	student text pg	detail	investigation pg	detail
3.4.10.A7	Physical Science, Chemistry and Physics	Explain concepts about the structure and properties of matter.	Describe various types of chemical reactions by applying the laws of conservation of mass and energy.	354	chemical reactions and digestion	148	reactants and products
				357	chemical reactions involve rearrangement of atoms	148	chemical equations
				359	balancing chemical equations	149	balance these equations
				361	chemical reactions in living systems	149	practice balancing equations
				363	history of law of conservation of mass	150	investigate conservation of mass in effervescent tablet reaction
				364	formation of petroleum is a very slow chemical reaction	152	predict how much product formed given the reactants
				371	which of the equations is balanced?	152	write the balanced equation
				375	synthesis or addition reactions	156	investigate double displacement reactions
				376	decomposition reactions	156	predict products in a double displacement reaction
				377	single displacement reactions	157	predict the products of double displacement reactions
				377	double displacement reactions	158	investigate energy changes in chemical reactions
				378	combustion reactions	158	measure energy changes in 3 different reactions
				381	exothermic reactions and MREs	162	investigating combustion reactions
				381	MRE ration heater reaction		

Correlation to Pennsylvania Academic Standards for Science
Foundations of Physical Science Student Text and Investigation Manual

Standard #:	Category	Standard Statement	Standard Descriptors	student text pg	detail	investigation pg	detail
				382	endothermic reactions and cold packs		
				395	chemistry of the atmosphere		
				395	chemistry of the atmosphere		
				397	carbon reactions		
				444	chemical reactions and the formation of acid rain		
				487	chemical reactions in living systems		
				489	metabolism and stored energy		
3.4.10.A8	Physical Science, Chemistry and Physics	Explain concepts about the structure and properties of matter.	Apply knowledge of mixtures to appropriate separation techniques.	278	mixtures can be separated by physical means	114	separating a homogeneous mixture
				279	summary of matter classification	114	investigate a homogeneous mixture
				288	create a poster of matter classification	165	investigate solutions and colloids and suspensions
3.4.10.A9	Physical Science, Chemistry and Physics	Explain concepts about the structure and properties of matter.	Understand that carbon can form several types of compounds.	364	carbon chains	162	carbon reactions and the environment
				394	photosynthesis and carbon reactions	162	structure of fossil fuels
				395	fossil fuels and carbon reactions	162	importance of fossil fuels

Correlation to Pennsylvania Academic Standards for Science
Foundations of Physical Science Student Text and Investigation Manual

Standard #:	Category	Standard Statement	Standard Descriptors	student text pg	detail	investigation pg	detail
3.4.10.B1	Physical Science, Chemistry and Physics	Analyze energy sources and transfers of heat.	Determine the efficiency of chemical systems by applying mathematical formulas.	336 368	writing chemical formulas predicting amount of product	155	calculating product yield
3.4.10.B2	Physical Science, Chemistry and Physics	Analyze energy sources and transfers of heat.	Use knowledge of chemical reactions to generate an electrical current.	357 361	combustion reaction heartburn reaction		
3.4.10.B3	Physical Science, Chemistry and Physics	Analyze energy sources and transfers of heat.	Evaluate energy changes in chemical reactions.	381 382	exothermic reactions and MREs endothermic reactions and cold packs	158	investigate energy changes in chemical reactions
3.4.10.B4	Physical Science, Chemistry and Physics	Analyze energy sources and transfers of heat.	Use knowledge of conservation of energy and momentum to explain common phenomena (e.g., refrigeration system, rocket propulsion).	45 59 60 60 64	Newton's third law summarized Newton's third law in detail how to calculate momentum law of conservation of momentum calculate momentum	22 23	car and ramp and Newton's 3rd law using 3rd law to explain common phenomena

Correlation to Pennsylvania Academic Standards for Science
Foundations of Physical Science Student Text and Investigation Manual

Standard #:	Category	Standard Statement	Standard Descriptors	student text pg	detail	investigation pg	detail
3.4.10.B5	Physical Science, Chemistry and Physics	Analyze energy sources and transfers of heat.	Explain resistance, current and electro-motive force (Ohm's Law).	101	concept of electric current	44	investigate concept of voltage
				114	voltage and potential energy	46	investigate concept of electric current
				115	how to measure voltage	48	measuring resistance
				117	electrical current explained	50	Ohm's law
				119	how to measure current	56	build a series circuit
				123	understand the concept of electrical resistance	56	build a parallel circuit
				131	Ohm's law explained	57	compare brightness of bulbs in series vs. parallel
				132	using Ohm's law to analyze circuits	58	build a series circuit and find total resistance
				136	potentiometer explained	60	parallel circuit and Ohm's law
				145	parallel circuit defined	61	compare current and voltage and resistance in each type of circuit
				145	holiday lights as series or parallel		
				145	series circuit defined		
				145	single path vs. branching paths		
				146	household wiring		
				147	current and voltage in series circuits		
				151	voltage and resistance in parallel circuits		
				155	analyze a parallel circuit		
				156	analyze a series circuit		

Correlation to Pennsylvania Academic Standards for Science
Foundations of Physical Science Student Text and Investigation Manual

Standard #:	Category	Standard Statement	Standard Descriptors	student text pg	detail	investigation pg	detail
3.4.10.C1	Physical Science, Chemistry and Physics	Distinguish among the principles of force and motion.	Identify the relationship of electricity and magnetism as two aspects of a single electromagnetic force.	105	charge is a fundamental property of matter	42	investigate electric charge
				106	static charge discussed	62	describing forces that magnets exert on each other
				107	explanation of coulomb	64	testing materials to see if they are affected by magnets
				108	how an electroscope works	66	compare electromagnets and permanent magnets
				108	electroscopes	66	build an electromagnet
				159	magnetism explained	67	find out what happens to strength of electromagnet when current is increased
				163	understanding magnetic fields	68	investigate how an electric motor works
				164	what is an electromagnet?	73	use magnetic induction to create an electric field
				166	increased current vs. strength of magnetic field	73	exploring electric generators
				166	building an electromagnet		
				168	how electric motors work		
				170	dissecting an electric motor		
				171	electromagnetic induction explained		

Correlation to Pennsylvania Academic Standards for Science
Foundations of Physical Science Student Text and Investigation Manual

Standard #:	Category	Standard Statement	Standard Descriptors	student text pg	detail	investigation pg	detail
3.4.10.C2	Physical Science, Chemistry and Physics	Distinguish among the principles of force and motion.	Identify elements of simple machines in compound machines.	67	how simple machines manipulate forces	25	discover mechanical advantage of ropes and pulleys
				69	how to calculate mechanical advantage	27	changing force and distance on a lever
				70	mechanical advantage of block and tackle	27	set up a lever that has mechanical advantage
				71	parts of a lever	30	exploring force and distance with ropes and pulleys
				71	the human body and simple machines		
				71	how a lever works		
				71	pliers as an example of a lever		
				72	mechanical advantage of a lever		
				75	how gears work		
				78	design a toothbrush		
				78	set up a lever with MA greater than 1		
				79	calculate mechanical advantage		
				79	analyze block and tackle		
				79	analyze pulleys with different numbers of supporting strings		
				80	analyze wheelbarrow		
				80	analyzing the jaw as a lever		

Correlation to Pennsylvania Academic Standards for Science
***Foundations of Physical Science* Student Text and Investigation Manual**

Standard #:	Category	Standard Statement	Standard Descriptors	student text pg	detail	investigation pg	detail
3.4.10.C3	Physical Science, Chemistry and Physics	Distinguish among the principles of force and motion.	Explain fluid power systems through the design and construction of appropriate models.			124 build a density column 126 investigating buoyancy with clay boats 128 use CPO viscometer to study viscosity	

Correlation to Pennsylvania Academic Standards for Science
Foundations of Physical Science Student Text and Investigation Manual

Standard #:	Category	Standard Statement	Standard Descriptors	student text pg	detail	investigation pg	detail
3.4.10.C4	Physical Science, Chemistry and Physics	Distinguish among the principles of force and motion.	Describe sound effects (e.g., Doppler effect, amplitude, frequency, reflection, refraction, absorption, sonar, seismic).	197	transverse and longitudinal waves	82	study wave pulses on elastic cord
				198	frequency and wavelength and amplitude	83	measure speed of a wave pulse
				201	waves and reflection	84	make different types of waves in a ripple tank
				201	waves and absorption		
				201	waves and refraction	85	observing reflection in water waves
				201	reflection in water waves and light waves	86	investigate frequency and wavelength
				202	refraction and eyeglasses	87	investigating resonance
				204	resonance explained	88	natural frequency and resonance of standing waves on a string
				205	standing waves on a string		
				206	constructive and destructive interference	90	what is sound and how do we hear it?
				210	natural frequency of a building and earthquakes	90	investigate human perception of sound
				210	can wave interference sink a ship?	90	investigate human perception of sound
				213	how the ear works	94	does sound behave like other waves?
				215	properties of sound waves	95	interference and sound waves
				217	loudness and decibels	95	investigate interference with sound waves
				219	frequency of sound and pitch	96	investigating sound resonance
				220	white noise		
				220	voice recognition programs		

Correlation to Pennsylvania Academic Standards for Science
***Foundations of Physical Science* Student Text and Investigation Manual**

Standard #:	Category	Standard Statement	Standard Descriptors	student text pg	detail	investigation pg	detail
				220	sonograms	98	investigate sound and music
				222	effect of temperature on speed of sound wave	101	examine light through diffraction grating
				222	effect of medium on speed of sound wave	108	explore refraction with a prism
				223	interference of sound waves		
				225	consonance and dissonance and beats		
				226	musical instruments		
				242	properties of light waves		
				261	refraction and lenses		

Correlation to Pennsylvania Academic Standards for Science
Foundations of Physical Science Student Text and Investigation Manual

Standard #:	Category	Standard Statement	Standard Descriptors	student text pg	detail	investigation pg	detail
3.4.10.C5	Physical Science, Chemistry and Physics	Distinguish among the principles of force and motion.	Describe light effects (e.g., Doppler effect, dispersion, absorption, emission spectra, polarization, interference).	196	waves are all around us	100	study what makes light
				234	what makes light?	101	observing white light through diffraction grating
				237	microwave ovens	102	polarization of water waves
				237	radio and television signals	102	polarization of a spring wave
				237	light waves and the electromagnetic spectrum	103	polarization of light
				237	visible light and the electromagnetic spectrum	104	investigate RGB model of color
				240	polarization of light	105	explore relationship between color and wavelength
				242	color and frequency of light waves	106	tracing incident and reflected rays
				243	RGB model of color	107	investigate how light interacts with mirrors
				245	we see color in terms of reflected light	107	investigate reflection of light
				250	identify uses of electromagnetic waves	107	plot reflected rays from a mirror
				258	forming images with lenses	108	explore refraction with lenses
				258	refraction in optical systems	108	investigate how light interacts with a prism
				260	reflection and mirrors	108	tracing incident and refracted rays
				263	index of refraction	110	finding focal point and focal length of a lens
				263	index of refraction		
				264	human eye as an optical instrument		

Correlation to Pennsylvania Academic Standards for Science
***Foundations of Physical Science* Student Text and Investigation Manual**

Standard #:	Category	Standard Statement	Standard Descriptors	student text pg	detail	investigation pg	detail
				272	identify uses of electromagnetic waves	111	plotting images formed when light is refracted by a lens
				273	find the angle of reflection		
				474	ultraviolet and infrared light	134	investigating visible light with a spectrometer
				476	absorption and emission		

Correlation to Pennsylvania Academic Standards for Science
Foundations of Physical Science Student Text and Investigation Manual

Standard #:	Category	Standard Statement	Standard Descriptors	student text pg	detail	investigation pg	detail
3.4.10.C6	Physical Science, Chemistry and Physics	Distinguish among the principles of force and motion.	Describe and measure the motion of sound, light and other objects.	14	how to calculate speed	8	calculating speed
				15	compare and contrast speed and velocity	9	collect data and calculate speed of car
				20	find speed of bumblebee	10	calculate speed of the car
				20	calculate speed of car	12	calculate speed of moving car
				24	accurate speed measurements	12	model the car's motion graphically
				29	position vs. time graph discussion	12	find speed of car at different positions
				30	position vs. time graphs	13	make a position vs. time graph
				32	average speed discussed	14	calculate speed of car at two places on the ramp
				32	average speed vs. instantaneous	14	acceleration is the rate at which speed changes
				33	understanding acceleration	15	make a speed vs. time graph
				36	examples of acceleration	15	changes in motion can be represented graphically
				37	speed vs. time graph discussion	17	calculate speed of car
				37	speed vs. time graphs	20	investigate effect of gravity on motion
				42	calculate speed from distance/time graph	21	effect of friction on the car
				52	the effect of gravity	36	find speed of marble
				56	friction explained	83	find speed of a wave
				64	research effect of friction on human joints	86	adjust frequency of a standing wave
				179	what is a cycle?		

Correlation to Pennsylvania Academic Standards for Science
***Foundations of Physical Science* Student Text and Investigation Manual**

Standard #:	Category	Standard Statement	Standard Descriptors	student text pg	detail	investigation pg	detail
				182	concept of frequency explained		
				182	concept of period explained		
				192	analyze systems to find cycle/period/frequency		
				195	waves transmit energy		
				221	importance of wavelength of sound waves		
				474	energy and radiation relationships		

Correlation to Pennsylvania Academic Standards for Science
Foundations of Physical Science Student Text and Investigation Manual

Standard #:	Category	Standard Statement	Standard Descriptors	student text pg	detail	investigation pg	detail
3.4.10.C7	Physical Science, Chemistry and Physics	Distinguish among the principles of force and motion.	Know Newton's laws of motion (including inertia, action, and reaction) and gravity and apply them to solve problems related to forces and mass.	45	Newton's third law summarized	14	exploring acceleration on a ramp
				45	Newton's second law summarized	16	2nd law
				45	Newton's first law summarized	16	unbalanced forces and acceleration of car
				46	force has potential to change motion	16	thinking about force
				46	force has potential to change motion	19	discover 2nd law of motion
				48	Newton's laws explained and applied	19	find correct relationship between force mass and acceleration
				48	Newton's first law in detail		
				49	force is related to acceleration	20	investigate effect of gravity on motion
				49	Newton's second law in detail	20	force and motion with car and ramp
				50	Newton's second law applied	21	effect of friction on the car
				51	balanced and unbalanced forces	22	car and ramp and Newton's 3rd law
				52	the effect of gravity	23	using 3rd law to explain common phenomena
				56	friction explained		
				59	Newton's third law in detail		
				64	research effect of friction on human joints		
64	solving problems using $f=ma$						

Correlation to Pennsylvania Academic Standards for Science
***Foundations of Physical Science* Student Text and Investigation Manual**

Standard #:	Category	Standard Statement	Standard Descriptors	student text pg	detail	investigation pg	detail
3.4.10.C8	Physical Science, Chemistry and Physics	Distinguish among the principles of force and motion.	Determine the efficiency of mechanical systems by applying mathematical formulas.	85 85 97 97	efficiency explained efficiency and bicycles find the efficiency of a machine calculate work output from efficiency data	185	find efficiency of water heater
3.4.10.D6	Physical Science, Chemistry and Physics	Explain essential ideas about the composition and structure of the universe.	Explain the impact of the Copernican and Newtonian thinking on man's view of the universe.	34 45 54 105 107	featured in CPO Science Earth and Space Science curriculum Aristotle vs. Newton Newton's Laws of Motion Newton and the force of gravity Benjamin Franklin Charles-Augustin Coulomb		featured in Earth and Space Science module