Correlation to North Carolina Science Standards

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Level	Strand	Competency Goal	Objective	student text pg	detail	investigation pg	detail
GEN01.1	Unifying Threads of Understanding	Nature of Science	Develop on understanding of science as a human endeavor, nature of science knowledge and historical perspectives.	34	Newton's research impacted mathematics	6	asking questions and learning about natural world
				34	Newton and the history of physics	130	investigate Rutherford's gold foil experiment
				45	Newton's Principia		
				45	Newton's discovery of the 2nd law		
				46	oldest known standard weight		
				55	Newton and the apple legend		
				73	impact of technology		
				73	impact of Da Vinci's work		
				73	Leonardo DaVinci		
				86	James Watt		
				110	research Franklin's electricity experiments		
				115	Volta's batteries		
				131	Georg Ohm's work with circuits		
				134	history of superconductivity		
				160	Faraday's contributions		
				161	history of magnetism		
				312	history of atomic theory		
				312	Dalton's contributions		

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Standard #: Strand Competency Goal Objective Level	student text pg	detail	investigation pg	detail
	313	development of atomic theory		
	320	the quests of alchemists		
	321	Mendeleev's periodic table		
	324	research and create a poster to illustrate development of atomic model		
	332	Linus Pauling and electronegativities		
	343	Avogadro's number		
	363	history of law of conservation of mass		
	363	Antoine Lavoisier		
	370	research Lavoisier's contributions		
	391	scientific discovery and the atomic age		
	393	accomplishments of Marie Curie		
	393	Marie and Pierre Curie		
	393	history of nuclear chemistry		
	400	research the Clean Air Act of 1970 and 1990		
	434	research local water supply history		
	456	contributions of Joule		

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Standard #: Level	Strand	Competency Goal	Objective	student text pg	detail	investigation pg	detail
				464	research the history of heat and temperature		

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Standard #: Level	Strand	Competency Goal	Objective	student text pg	student text detail	investigation pg	investigation detail
GEN02.1	Unifying Threads of Understanding	Science as Inquiry	Develop the ability to do scientific inquiry and perform safe and appropriate manipulation of materials, equipment, and technologies.		featured throughout CPO Science program		featured throughout CPO Science program
				500	safety rules described	20	safety tip for car/ramp setup
				501	safety quiz	24	ropes and pulley safety
				501	safety quiz	26	safety tip for hanging weights from lever
						40	electrical safety
						44	short circuit safety warning
						56	short circuit safety warning
						58	short circuit safety warning
						146	safety in the lab
						150	chemistry safety
						158	wear goggles and apron
						164	safety equipment
						168	hot water safety
						172	safety tip for water testing
						175	safety tip for testing local surface water
						180	thermometer safety
						182	heat safety
						186	thermometer safety
						192	heat safety

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Standard #: Level	Strand	Competency Goal	Objective	student text pg	detail	investigation pg	detail
						198	heat safety
						200	safely using rubber bands

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Foundations of Physical Science Student Text and Investigation Manual

Standard #: Level	Strand	Competency Goal	Objective	student text pg	detail	investigation pg	detail
GEN02.2	Unifying Threads of Understanding	Science as Inquiry	Develop a mastery of integrated process skills: acquiring, processing, and interpreting data; identifying variables and their relationships; designing investigations; experimenting; analyzing investigations; constructing hypotheses; formulating models.	5	measuring distance		data tables and graphs can be created on computer or graphing calculator
				7	experimentation begins with a question	4	difference between precise and accurate data
				9	steps in the scientific method	5	measuring metric and english lengths
				10	the research question and hypothesis	6	compare results with other groups
				10	forming a hypothesis	6	measure time
				11	control and experimental variables	6	how do we ask questions and get answers from nature?
				12	importance of reliable and accurate data collection	6	formulate hypothesis
				12	writing lab procedures	6	predict which car will move fastest
				19	design your own experiment	6	electronic timer and release technique
				19	design your own experiment	7	perform your own experiment
				20	finding variability in data	7	record time interval
				24	making a graph	7	design your own experiment
				24	interpretations of patterns in data	7	test the effect of one other variable
				26	independent and dependent variables	7	doing a controlled experiment
				26	creating graphs		
				27	reading a graph		
				28	identifying cause and effect relationships		

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Standard #: Strand Competency Goal Objective Level	student text pg	detail	investigation pg	detail
	41	identify cause and effect	7	variables in an experiment
	41	make a graph	7	compare results with hypothesis
	42	devise an experiment	9	collect speed data
	42	interpreting distance/time graph	9	design three experiments using car and ramp
	42	analyze a speed/distance graph	9	design three experiments and choose technology
	78	analyze lever diagram	9	construct a data table
	79	look at force data and decide the usefulness of a machine	9	devise a hypothesis
			10	conduct car/ramp experiment
			11	analyze speed change of car
			11	graph speed vs. position
			11	calculate % error
			12	understand and use data table
			13	graph distance vs. time
			14	record three different time intervals
			15	construct a quantitative graphical model
			15	interpret a speed vs. time graph
			16	investigate Newton's 2nd law

Standard #: Strand Competency Goal Objective Level	student text pg	detail	investigation pg	detail
			16	decide how to vary the force on the car for this experiment
			16	measure force
			17	record times
			17	record results in data table
			18	study data table for relationship between force and motion
			18	organize different combinations of data
			18	use data to describe relationship between force and motion
			19	use data to infer correct relationship between variables
			21	determine effect of increasing mass
			21	choose independent and dependent variables for graph
			24	use data table to record results
			24	collect weight data
			25	create a mathematical model
			25	collect force data

Correlation to North Carolina Science Standards

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Standard #: Strand Competency Goal Objective Level	student text pg	detail	investigation pg	detail
			25	analyze block and tackle data
			26	what variables can be changed?
			27	find math rule for lever equilibrium
			27	write down the number of weights you use
			27	think about the variables
			27	analyze lever equilibrium data
			27	use data table to record results
			27	recognize variables
			28	derive a math formula
			30	interpret block and tackle data
			30	record ropes and pulley data in table
			34	investigate motion on a rollercoaster
			34	where does the marble move the fastest?
			34	formulate hypothesis
			35	does data support hypothesis?
			36	organize data into a table

Correlation to North Carolina Science Standards

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Level	Strand	Competency Goal	Objective	student text pg	detail	investigation pg	detail
						36	collect precise speed and height data
						37	organize data into a graph of speed vs. height
						40	choose circuit parts to light a bulb
						43	how did A and B tapes acquire different charge?
						44	measure voltage
						45	did battery voltage change?
						46	measure current
						48	measure resistance
						51	graph voltage vs. current
						75	perform self-designed experiment
						75	plan three experiments to determine which variable affects the period of a pendulum
						75	design pendulum experiment
						75	collect mass and amplitude data
						75	investigate variables that affect the period of a pendulum
						75	create data table for self-designed experiment

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Standard #: Strand Competency Goal Objective Level	student text pg	detail	investigation pg	detail
			76	analyze pendulum data
			76	calculate % error
			87	measure wavelength
			93	decision trees and the advantage of doing multiple trials
			116	measure mass
			117	measure volume
			121	graph mass vs. volume
			129	find average velocity
			141	build models of Na and Cl and use them to explain bonding
			146	record detailed observations
			147	organize observations into a category table
			147	students analyze chemical change lab results
			150	record data as you perform experiment
			151	design experiment to find out if mass is conserved
			151	perform the experiment you designed
			151	explain how hypothesis compares to results

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Standard #: Level	Strand	Competency Goal	Objective	student text pg	detail	investigation pg	detail
						151	design a data table
						151	write a procedure
						151	does your experiment agree with law of conservation of mass?
						157	add new rules to list based on findings
						166	write a procedure
						166	devise hypothesis and explain
						166	which factor will produce fastest dissolving rate?
						166	what three factors influence dissolving rate?
						166	which method will give fastest dissolving rate?
						167	use data table for observations
						167	collect time data and record observations
						167	average dissolving rate
						173	organize water quality data into a table
						178	formulate hypothesis
						180	measure temperature
						181	construct a graphical model

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Standard #: Level	Strand	Competency Goal	Objective	student text pg	detail	investigation pg	detail
						183	construct a temperature vs. time graph
						198	formulate hypothesis
						198	which type of food contains the most energy?
GEN03.1	Unifying Threads of Understanding	Science and Technology	Develop on understanding of technology, the ability to perform technological design, and on understanding of the connection between science and technology.	73	relationship between science and technology	70	designing and testing different electric motors
				74	sample engineering problem	70	proposing and comparing different electric motor designs
						70	using engineering design cycle
						71	testing a motor for performance
						71	did draining the batteries affect motor speed?
						71	which motor gave the highest speed and why?

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Standard #: Level	Strand	Competency Goal	Objective	student text pg	detail	investigation pg	detail
GEN04.1	Unifying Threads of Understanding	Science Personal and Social Perspectives	Develop on understanding of personal and community health; population growth; natural and human induced hazards; science and technology in local, national and global challenges; careers in science and technology.	333	problems with disposing of plastics	163	economic impact of end-product of combustion reaction
				355	recycling tires	163	too much CO2
				356	recycling discarded tires	163	consider a vehicle's fuel economy
				364	petroleum	163	research how trees offset accumulation of CO2
				368	limiting reactants	163	can trees compensate for manmade CO2 from vehicles and industry?
				379	hydrogen-powered cars and the environment	172	save water for houseplants
				379	research environmental impact of fuel cells	172	perform water quality tests
				379	research fuel cells	174	wise use of water supply
				379	research economic impact of fuel cells	175	maintaining water supply quality
				379	research fuel cells	178	investigate effect of acid rain on microorganisms
				392	storage of nuclear waste		
				395	fossil fuels		
				400	economic impact of reducing air pollution		
				400	problems caused by airborne pollutants		
				400	economic impact of pollution		
				421	wise use of water		
				425	water cycle and conservation		
				430	water usage and quality		
				444	acid rain explained		

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Standard #: Level	Strand	Competency Goal	Objective	student text pg	detail	investigation pg	detail
				448	research the issue of acid rain		
				448	research economic impact of producing gases that cause acid rain		

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Standard #: Level	Strand	Competency Goal	Objective	student text pg	detail	investigation pg	detail
PS01.02 9-12	Physical Science Content	The learner will construct an understanding of mechanics.	Analyze forces and their relationship to motion, Newton's Three Laws of Motion.	45	Newton's first law summarized	14	exploring acceleration on a ramp
				45	Newton's second law summarized	16	2nd law
				45	Newton's third law summarized	16	unbalanced forces and acceleration of car
				46	force has potential to change motion	16	thinking about force
				48	Newton's laws explained and applied	19	discover 2nd law of motion
				48	Newton's first law in detail	19	find correct relationship between force mass and acceleration
				49	Newton's second law in detail	20	investigate effect of gravity on motion
				49	force is related to acceleration	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
				51	net force explained	23	using 3rd law to explain common phenomena
				52	the effect of gravity		
				56	friction explained		
				59	Newton's third law in detail		
				64	research effect of friction on human joints		
				64	solving problems using f=ma		

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Standard #: Level	Strand	Competency Goal	Objective	student text pg	detail	investigation pg	detail
PS01.03 9-12	Physical Science Content	The learner will construct an understanding of mechanics.	Analyze the conservation of energy and work: through work, power, kinetic energy, potential energy, and conservation of mechanical energy.	68	compound machines	29	design and construct complex gear machines
				83	how to calculate work	31	calculate work done on block
				84	work input and output	31	work output vs. work input
				86	power explained	31	work = force X distance
				86	how to calculate power	36	energy conservation and the roller coaster
				87	concept of energy as stored work	37	investigating conservation of energy with rollercoaster
				88	potential and kinetic energy explained	38	identify potential/kinetic energy conversions
				90	conservation of energy explained	38	explore energy transformations
				91	energy conversions	38	conservation of energy and energy transformations
				91	understand basic forms of energy	39	make an energy flow chart
				91	following an energy transformation	39	identify type of energy involved
				91	following an energy transformation	188	specific heat and conservation of energy
				92	energy transformations and conservation		
				93	different forms of energy described		
				96	decide whether or not work is done		
				96	calculate work done		
				96	prove that energy is conserved		

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Standard #: Strand Competency Goal Objective Level	student text pg	detail	investigation pg	detail
	97	calculate power of two different machines		
	97	calculate power		
	97	calculate work accomplished by a motor		
	97	compare different amounts of work done		
	97	analyze power of motor		
	138	how to calculate electrical power		
	488	work vs. calories used by the body		
	488	work vs. calories used by the body		
	491	work and mechanical systems		

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Standard #: Level	Strand	Competency Goal	Objective	student text pg	detail	investigation pg	detail
PS02.01 9-12	Physical Science Content	The learner will build an understanding of thermal energy.	Assess molecular motion as it relates to temperature and phase changes: thermal energy, expansion and contraction, temperature, phase change, heats of fusion and vaporization, and specific heat.	284	states of matter and arrangement of molecules	118	observe melting process and study quantitatively
				284	changes of state	118	molecules in a liquid
				285	characteristics of matter related to its state	118	investigate melting
				451	increasing temperature means increasing motion of molecules	118	think of melting process at molecular level
				455	temperature and thermal energy and heat	119	investigate temperature and energy transfer in melting process
				468	heat transfer through air	119	investigate melting and create a graph
				468	densely packed solids are good conductors of heat	119	adding heat energy to melt an ice cube
				469	thermal conductivity explained	119	create a temperature vs. time graph of phase change
				470	convection currents and weather	119	energy and phase changes
				470	warming hands over candle	182	relationship between heat and temperature
				472	convection currents in water	190	investigate conduction through all states of matter
				476	solid road surface emits radiation	190	investigate and rank materials for thermal conductivity
				478	apply knowledge of heat transfer to different situations	192	investigate convection in liquids
				481	global warming and heat transfer by radiation	194	investigate radiation emitted by solids

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Standard #: Level	Strand	Competency Goal	Objective	student text pg	detail	investigation pg	detail
						194	investigate radiation emitted by liquids
PS02.02 9-12	Physical Science Content	The learner will build an understanding of thermal energy.	Analyze the conservation of the total amount of energy, including heat energy, in a closed system; the First Law of Thermodynamics.	88 90 92 93 96	potential and kinetic energy explained conservation of energy explained energy transformations and conservation different forms of energy described prove that energy is conserved	37 38 147 188	investigating conservation of energy with rollercoaster conservation of energy and energy transformations feel the heat generated by chemical reaction specific heat and conservation of energy
PS02.03 9-12	Physical Science Content	The learner will build an understanding of thermal energy.	Analyze the Second Law of Thermodynamics: heat will not flow spontaneously from a cold to a hot body, and it is impossible to build a machine that does nothing but convert heat into useful work.	84 85 85 85 92 96 97 97	work input and output efficiency explained efficiency and bicycles some input work is converted to heat where does "spent" energy go? explain the "lost" energy find the efficiency of a machine calculate work output from efficiency data	31 185	work output vs. work input find efficiency of water heater

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Standard #: Level	Strand	Competency Goal	Objective	student text pg	detail	investigation pg	detail
PS03.01 9-12	Physical Science Content	The learner will construct an understanding of electricity and magnetism.	Analyze the nature of static electricity and the conservation of electrical charge: positive and negative charges, and opposite charges attract and like charges repel.	105	charge is a fundamental property of matter	42	investigate electric charge
				106	static charge discussed		
				107	explanation of coulomb		
				108	electroscopes		
				108	how an electroscope works		
PS03.02 9-12	Physical Science Content	The learner will construct an understanding of electricity and magnetism.	Analyze the electrical charging of objects due to the transfer of electrons by friction, induction, or conduction.	105	charge is a fundamental property of matter	42	investigate electric charge
				106	static charge discussed	44	investigate concept of voltage
				107	explanation of coulomb	73	use magnetic induction to create an electric field
				108	electroscopes		
				108	how an electroscope works	73	exploring electric generators
				114	voltage and potential energy		
				114	voltage is related to potential energy		
				115	how to measure voltage		
				171	electromagnetic induction explained		

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Standard #: Level	Strand	Competency Goal	Objective	student text pg	detail	investigation pg	detail
PS03.03 9-12	Physical Science Content	The learner will construct an understanding of electricity and magnetism.	Analyze direct current electrical circuits: electrical potential difference, resistance, Ohm's Law, simple direct current circuits, series circuit, and parallel circuit.	101	concept of electric current	44	investigate concept of voltage
				102	concept of electric circuits	45	battery chemicals and electrical charge
				103	circuit diagrams	46	investigate concept of electric current
				113	battery uses chemical energy to produce electrical charge	48	measuring resistance
				114	voltage and potential energy	50	Ohm’s law
				115	how to measure voltage	56	build a parallel circuit
				117	electrical current explained	56	build a series circuit
				119	how to measure current	57	compare brightness of bulbs in series vs. parallel
				120	ground fault circuit interrupter	58	build a series circuit and find total resistance
				123	understand the concept of electrical resistance	60	parallel circuit and Ohm’s law
				128	find and investigate circuit breakers in the home	61	compare current and voltage and resistance in each type of circuit
				131	Ohm’s law explained		
				132	using Ohm’s law to analyze circuits		
				136	potentiometer explained		
				145	series circuit defined		
				145	single path vs. branching paths		
				145	parallel circuit defined		

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Standard #: Level	Strand	Competency Goal	Objective	student text pg	detail	investigation pg	detail
				145	holiday lights as series or parallel		
				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		
PS03.04 9-12	Physical Science Content	The learner will construct an understanding of electricity and magnetism.	Analyze the practical applications of magnetism and its relationship to the movement of electrical charge.	159	magnetism explained	66	build an electromagnet
				163	understanding magnetic fields	67	find out what happens to strength of electromagnet when current is increased
				164	what is an electromagnet?	68	investigate how an electric motor works
				166	increased current vs. strength of magnetic field	73	use magnetic induction to create an electric field
				166	building an electromagnet	73	exploring electric generators
				168	how electric motors work		
				170	dissecting an electric motor		
				171	electromagnetic induction explained		
PS03.05 9-12	Physical Science Content	The learner will construct an understanding of electricity and magnetism.	Analyze permanent magnetism and the practical applications of the characteristic of permanent magnets.	159	magnetism explained		
				163	understanding magnetic fields		

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Standard #: Level	Strand	Competency Goal	Objective	student text pg	detail	investigation pg	detail
PS04.01 9-12	Physical Science Content	The learner will develop an understanding of wave motion and the wave nature of sound and light.	Analyze the characteristics of waves: wavelength, frequency, period, amplitude.	179	what is a cycle?	83	find speed of a wave
				182	concept of frequency explained	86	adjust frequency of a standing wave
				182	concept of period explained	90	what is sound and how do we hear it?
				184	understanding graphs of harmonic motion	105	explore relationship between color and wavelength
				192	analyze systems to find cycle/period/frequency		
				219	frequency of sound and pitch		
				221	importance of wavelength of sound waves		
				242	color and frequency of light waves		

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Standard #: Level	Strand	Competency Goal	Objective	student text pg	detail	investigation pg	detail
PS04.02 9-12	Physical Science Content	The learner will develop an understanding of wave motion and the wave nature of sound and light.	Analyze the phenomena of reflection, refraction, interference and diffraction.	201	waves and refraction	85	observing reflection in water waves
				201	waves and reflection	87	investigating resonance
				201	reflection in water waves and light waves	88	natural frequency and resonance of standing waves on a string
				201	waves and absorption	95	interference and sound waves
				202	refraction and eyeglasses	95	investigate interference with sound waves
				204	resonance explained	96	investigating sound resonance
				206	constructive and destructive interference	101	examine light through diffraction grating
				210	can wave interference sink a ship?	102	polarization of water waves
				210	natural frequency of a building and earthquakes	102	polarization of a spring wave
				223	interference of sound waves	103	polarization of light
				225	consonance and dissonance and beats	105	explore relationship between color and wavelength
				240	polarization of light	106	tracing incident and reflected rays
				242	color and frequency of light waves	107	plot reflected rays from a mirror
				245	we see color in terms of reflected light	107	investigate reflection of light
				258	refraction in optical systems		
				258	forming images with lenses		
				260	reflection and mirrors		

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Standard #: Level	Strand	Competency Goal	Objective	student text pg	detail	investigation pg	detail
				261	refraction and lenses	107	investigate how light interacts with mirrors
				263	index of refraction	108	tracing incident and refracted rays
				263	index of refraction	108	investigate how light interacts with a prism
				273	find the angle of reflection	108	explore refraction with lenses
						108	explore refraction with a prism
						110	finding focal point and focal length of a lens
						111	plotting images formed when light is refracted by a lens
PS04.03 9-12	Physical Science Content	The learner will develop an understanding of wave motion and the wave nature of sound and light.	Compare and contrast the frequency and wavelength of sound produced by a fixed source with a moving source of sound, the Doppler Effect.	213	how the ear works	90	investigate human perception of sound
				217	loudness and decibels	90	investigate human perception of sound
				219	frequency of sound and pitch	90	what is sound and how do we hear it?
				220	white noise	94	does sound behave like other waves?
				220	voice recognition programs	98	investigate sound and music
				220	sonograms		
				222	effect of medium on speed of sound wave		
				222	effect of temperature on speed of sound wave		
				226	musical instruments		

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Standard #: Level	Strand	Competency Goal	Objective	student text pg	detail	investigation pg	detail
PS05.01 9-12	Physical Science Content	The learner will build an understanding of the structure and properties of matter.	Analyze development of current atomic theory's: Dalton, J.J. Thompson, Rutherford, and Bohr.	313 324	development of atomic theory research and create a poster to illustrate development of atomic model	130	investigate Rutherford's gold foil experiment

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Standard #: Level	Strand	Competency Goal	Objective	student text pg	detail	investigation pg	detail
PS05.02 9-12	Physical Science Content	The learner will build an understanding of the structure and properties of matter.	Examine the nature of atomic structure: Protons, Neutrons, Electrons, Atomic mass, Atomic number, and Isotopes.	311	protons/neutrons/electrons	132	building atom models
				311	location/size/charge of subatomic particles	133	exploring isotopes
				315	atomic number discussed	133	identify element symbol and name
				315	atoms of same element have same atomic number	133	identify atomic number
						133	identify mass number
				316	isotopes explained	133	location of electrons in atom
				316	mass number discussed	133	protons and neutrons
				318	proton/electron attraction	136	understanding isotopes
				322	chemical symbols and element names	136	atomic number
				322	atomic number on the periodic table	136	mass number
				322	mass number on the periodic table	136	model stable and neutral atoms
				322	atomic mass on the periodic table	137	importance of atomic number
				388	showing valence electrons in a diagram	137	build atomic models
						140	find the number of electrons in outermost level
						140	review subatomic particles

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Standard #: Level	Strand	Competency Goal	Objective	student text pg	detail	investigation pg	detail
PS05.03 9-12	Physical Science Content	The learner will build an understanding of the structure and properties of matter.	Describe radioactivity and its practical application as an alternative energy source: Alpha, Beta, and Gamma decay, Fission, and Fusion.	387	fusion and fission explained	138	fusion and fission
				388	nuclear vs chemical reactions	138	nuclear reactions
				393	carbon dating	160	radioactive decay
				393	radioisotopes in science and medicine	160	how do you simulate nuclear decay?
				400	research pros and cons of nuclear technology	161	research pros and cons of uses for radioactive elements

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Standard #: Level	Strand	Competency Goal	Objective	student text pg	detail	investigation pg	detail
PS05.04 9-12	Physical Science Content	The learner will build an understanding of the structure and properties of matter.	Assess the use of physical properties in identifying substances: density, specific heat, melting point, and boiling point.	281	volume and mass contrasted	116	mass and volume measurements
				284	melting and boiling point explained	119	melting point of ice
				284	melting and boiling points	124	build a density column
				285	table of melting and boiling points	126	investigating buoyancy with clay boats
				291	density explained	128	use CPO viscometer to study viscosity
				291	density is independent of amount of substance		
				292	elasticity is a physical property of matter		
				292	hardness is a physical property of matter		
				293	brittleness is a physical property of matter		
				294	malleability is a physical property of matter		
				294	tensile strength is a physical property of matter		
				295	relationship between mass volume and density		
				296	density of liquid water vs. ice		
				297	buoyancy explained		
				298	sinking and floating		
				302	viscosity of motor oils		

Correlation to North Carolina Science Standards

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Standard #: Level	Strand	Competency Goal	Objective	student text pg	detail	investigation pg	detail
				305	viscosity of glue mixtures		
PS05.05 9-12	Physical Science Content	The learner will build an understanding of the structure and properties of matter.	Analyze the formation of simple inorganic compounds from elements.	324 324 332 335	use the periodic table to predict chemical formulas which element is more likely to combine with other elements? metals nonmetals and metalloids chemical bonding and the periodic table	136 141 141 143	ions whan an atom ionizes modeling a chemical bond ionic compounds
PS05.06 9-12	Physical Science Content	The learner will build an understanding of the structure and properties of matter.	Analyze the periodic trends in the physical and chemical properties of elements: symbols, groups (families), and periods.	320 321 321 329 330 332 332 335	groups of elements studying the periodic table groups of elements and valence shells periodic table columns and valence electrons bonding and periodic table position metals nonmetals and metalloids periodic table and electronegativities 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

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Standard #: Level	Strand	Competency Goal	Objective	student text pg	detail	investigation pg	detail
PS06.01 9-12	Physical Science Content	The learner will build an understanding of regularities in chemistry	Identify and classify the common chemical reactions that occur in our physical environment and in our bodies: oxidation and reduction, and polymerization and depolymerization.	333	plastics	148	chemical equations
				354	chemical reactions and digestion	157	predict the products of double displacement reactions
				357	combustion reaction	162	investigating combustion reactions
				361	chemical reactions in living systems		
				361	heartburn reaction		
				378	consumer chemistry		
				378	combustion reactions		
				381	MRE ration heater reaction		
				395	chemistry of the atmosphere		
				395	chemistry of the atmosphere		
				397	carbon reactions		
				408	capsule coating		
				444	chemical reactions and the formation of acid rain		
				487	simple sugars are transported to cells		
				487	chemical reactions in living systems		
				489	metabolism and stored energy		

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Standard #: Level	Strand	Competency Goal	Objective	student text pg	detail	investigation pg	detail
PS06.02 9-12	Physical Science Content	The learner will build an understanding of regularities in chemistry	Identify the reactants and products and balance simple equations of various types: single replacement, double replacement, decomposition, synthesis, and combustion.	336 357 359 368 371 375 376 377 377	writing chemical formulas chemical reactions involve rearrangement of atoms balancing chemical equations predicting amount of product which of the equations is balanced? synthesis or addition reactions decomposition reactions single displacement reactions double displacement reactions	148 149 149 152 152 155 156	reactants and products balance these equations practice balancing equations write the balanced equation predict how much product formed given the reactants calculating product yield investigate double displacement reactions
PS06.03 9-12	Physical Science Content	The learner will build an understanding of regularities in chemistry	Measure the temperature, pressure, and volume of gases and assess their interrelationship: Boyle's Law and Charles' Law.	299 300	Charles' law Boyle's law		

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Standard #: Level	Strand	Competency Goal	Objective	student text pg	detail	investigation pg	detail
PS06.04 9-12	Physical Science Content	The learner will build an understanding of regularities in chemistry	Analyze aqueous solutions and solubility: Ionic substances and covalent substances.	406	molecular motion and dissolving rate	166	design experiments to explore dissolving rate
				406	molecular motion and dissolving rate	167	what happened at the molecular level?
				407	surface area and dissolving rate	167	investigate the dissolving process
				411	effect of temperature on solubility	168	investigate solubility of sugar
				413	pressure and the solubility of gases	170	solubility and pressure
				421	why water is a nearly universal solvent	170	solubility and temperature
				421	water structure and its function as a solvent		
				421	a water molecule is v-shaped		
				423	polar solutes		

Correlation to North Carolina Science Standards

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Standard #: Level	Strand	Competency Goal	Objective	student text pg	detail	investigation pg	detail
PS06.05 9-12	Physical Science Content	The learner will build an understanding of regularities in chemistry	Assess the indicators of chemical change including: development of a gas, formation of a precipitate, and change in color.	353 354 355 357 364 372 381 382	physical and chemical changes and digestion new substances are formed when a chemical change occurs physical and chemical changes in tire recycling chemical reactions involve rearrangement of atoms formation of petroleum is a very slow chemical reaction determine if changes are chemical or physical exothermic reactions and MREs endothermic reactions and cold packs	146 156 158	investigate and observe chemical and physical changes in the lab predict products in a double displacement reaction investigate energy changes in chemical reactions
PS06.06 9-12	Physical Science Content	The learner will build an understanding of regularities in chemistry	Compare and contrast the composition of strong and weak solutions of acids or bases: degree of dissociation or ionization, electrical conductivity, ph, strength, and concentration.			176 176	measure pH investigate acids and bases

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Standard #: Level	Strand	Competency Goal	Objective	student text pg	detail	investigation pg	detail
PS1.01 9-12	Physical Science Content	The learner will construct an understanding of mechanics.	Analyze uniform and accelerated motion: Uniform motion is motion at a constant speed in a straight line (constant velocity). The rate of change in velocity is acceleration.	14	how to calculate speed	8	calculating speed
				15	compare and contrast speed and velocity	9	collect data and calculate speed of car
				20	calculate speed of car	10	calculate speed of the car
				20	find speed of bumblebee	12	calculate speed of moving car
				24	accurate speed measurements	12	find speed of car at different positions
				30	position vs. time graphs	13	make a position vs. time graph
				32	average speed vs. instantaneous	14	calculate acceleration of car on ramp
				32	average speed discussed	14	acceleration is the rate at which speed changes
				33	understanding acceleration	14	calculate speed of car at two places on the ramp
				35	how to calculate acceleration	15	make a speed vs. time graph
				36	examples of acceleration	17	explore 2nd law and acceleration
				37	speed vs. time graphs	17	caclulate speed of car
				41	find acceleration of car	36	find speed of marble
				42	calculate speed from distance/time graph		
				49	link between force and acceleration		
				53	acceleration due to gravity		