

Correlation to Georgia Quality Core Curriculum - Science
Foundations of Physical Science Student Text and Investigation Manual

Standard #: Course	Topic	Standard	Benchmark	student text pg	detail	investigation pg	detail
PS01.0 Physical Science	Inquiry, Process and Problem Solving	Uses science process skills in laboratory or field investigations, including observation, classification, communication, metric measurement, prediction, inference, collecting and analyzing data.	Uses science process skills in laboratory or field investigations, including observation, classification, communication, metric measurement, prediction, inference, collecting and analyzing data.	5	measuring distance	5	measuring metric and english lengths
				6	scientists use metric units	6	measure time
				20	how will speed change?	6	compare results with other groups
				20	explain your reasoning	9	present conclusions to the class
				24	making a graph	9	construct a data table
				24	predicting speed from a graph	11	graph speed vs. position
				26	creating graphs	11	analyze speed change of car
				41	make a graph	12	understand and use data table
				42	analyze a speed/distance graph	12	make metric length measurement
				42	predict the speed of a car	13	graph distance vs. time
						14	record three different time intervals
						15	construct a quantitative graphical model
						16	measure force
						17	record results in data table
		18	organize different combinations of data				
		18	study data table for relationship between force and motion				

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						24	use data table to record results
						25	collect force data
						25	analyze block and tackle data
						27	use data table to record results
						27	write down the number of weights you use
						27	analyze lever equilibrium data
						30	record ropes and pulley data in table
						35	does data support hypothesis?
						36	organize data into a table
						37	describe the flow of energy based on experimental graph
						37	organize data into a graph of speed vs. height
						39	give a brief presentation to the class
						44	measure voltage
						45	did battery voltage change?
						46	measure current
						47	present and defend an explanation

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						48	measure resistance
						51	graph voltage vs. current
						75	create data table for self-designed experiment
						76	use data to predict best string length for a pendulum clock
						76	analyze pendulum data
						87	measure wavelength
						116	measure mass
						117	measure volume
						121	use graph to predict mass of six objects
						121	graph mass vs. volume
						145	present findings and methods used
						145	present findings to the class
						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 a data table

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Standard #: Course	Topic	Standard	Benchmark	student text pg	detail	investigation pg	detail
						151 present results to the class 156 make predictions about solubility 167 use data table for observations 173 organize water quality data into a table 180 measure temperature 181 construct a graphical model 183 construct a temperature vs. time graph	

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PS01.1 Physical Science	Inquiry, Process and Problem Solving	Uses science process skills in laboratory or field investigations, including observation, classification, communication, metric measurement, prediction, inference, collecting and analyzing data.	Designs and conducts a scientific experiment that identifies the problem, distinguishes manipulated, responding, and controlled variables, collects, analyzes and communicates data, and makes valid inferences and conclusions.	7	experimentation begins with a question	6	compare results with other groups
				9	steps in the scientific method	7	doing a controlled experiment
				10	forming a hypothesis	7	design your own experiment
				11	control and experimental variables	7	compare results with hypothesis
				19	design your own experiment	7	perform your own experiment
				19	design your own experiment	9	design three experiments using car and ramp
				20	finding variability in data	9	construct a data table
				24	making a graph	10	conduct car/ramp experiment
				26	independent and dependent variables	11	analyze speed change of car
				26	creating graphs	11	graph speed vs. position
				28	identifying cause and effect relationships	12	understand and use data table
				41	identify cause and effect	13	graph distance vs. time
				41	make a graph	14	record three different time intervals
				42	devise an experiment	15	construct a quantitative graphical model
				42	analyze a speed/distance graph	16	investigate Newton's 2nd law
				79	look at force data and decide the usefulness of a machine		

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						16	decide how to vary the force on the car for this experiment
						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	choose independent and dependent variables for graph
						21	construct reasonable explanation based on data
						21	determine effect of increasing mass
						24	use data table to record results
						25	analyze block and tackle data
						25	collect force data
						26	what variables can be changed?

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						27	use data table to record results
						27	write down the number of weights you use
						27	recognize variables
						27	analyze lever equilibrium data
						30	interpret block and tackle data
						30	record ropes and pulley data in table
						34	investigate motion on a rollercoaster
						35	study data and determine importance of height on speed of marble
						35	does data support hypothesis?
						36	organize data into a table
						37	organize data into a graph of speed vs. height
						45	analyze data and explain a rule
						45	did battery voltage change?
						51	graph voltage vs. current

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						75	plan three experiments to determine which variable affects the period of a pendulum
						75	perform self-designed experiment
						75	design pendulum experiment
						75	create data table for self-designed experiment
						76	analyze pendulum data
						93	decision trees and the advantage of doing multiple trials
						121	graph mass vs. volume
						141	build models of Na and Cl and use them to explain bonding
						145	present findings to the class
						147	organize observations into a category table
						147	students analyze chemical change lab results
						150	record data as you perform experiment
						151	design a data table
						151	design experiment to find out if mass is conserved

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						166	what three factors influence dissolving rate?
						166	which factor will produce fastest dissolving rate?
						166	which method will give fastest dissolving rate?
						167	use data table for observations
						173	write prargraph to explain results
						173	organize water quality data into a table
						174	visit local water supply and perform testing
						175	create water quality report
						179	write summary of findings
						181	construct a graphical model
						183	construct a temperature vs. time graph
						198	which type of food contains the most energy?

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PS01.2 Physical Science	Inquiry, Process and Problem Solving	Uses science process skills in laboratory or field investigations, including observation, classification, communication, metric measurement, prediction, inference, collecting and analyzing data.	Evaluates procedures, data and conclusions to determine the scientific validity of research.	19	which group did the best experiment?	6 7 11 18 21 21 21 27 34 35 35 39 43	predict which car will move fastest test the effect of one other variable calculate % error evaluate graphs as to whether or not they show relationships between variables think about percent change evaluate percent change for data collected construct reasonable explanation based on data think about the variables where does the marble move the fastest? what evidence is there in support of your hypothesis? study data and determine importance of height on speed of marble critique group's explanation of energy transformations how did A and B tapes acquire different charge?

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						45	analyze data and explain a rule
						75	investigate variables that affect the period of a pendulum
						75	evaluate statistical significance
						76	calculate % error
						77	show how energy loss data could be applied to designing a real clock
						151	do the data support the hypothesis
						151	explain how hypothesis compares to results
						151	does your experiment agree with law of conservation of mass?
						151	perform the experiment you designed
						167	what was happening at molecular level?
						167	evaluate method based on data

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PS02.0 Physical Science	Inquiry, Process and Problem Solving	Uses traditional reference materials to explore background and historical information regarding a scientific concept.	Uses traditional reference materials to explore background and historical information regarding a scientific concept.	110	research Franklin's electricity experiments	130	investigate Rutherford's gold foil experiment
				313	development of atomic theory		
				324	research and create a poster to illustrate development of atomic model		
				370	research Lavoisier's contributions		
				400	research the Clean Air Act of 1970 and 1990		
				434	research local water supply history		
				464	research the history of heat and temperature		

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Standard #: Course	Topic	Standard	Benchmark	student text pg	detail	investigation pg	detail
PS02.1 Physical Science	Inquiry, Process and Problem Solving	Uses traditional reference materials to explore background and historical information regarding a scientific concept.	Uses current technologies such as CD-ROM, Internet and on-line data search to explore current research related to a science concept.	110 313 324 370 400 434 464	research Franklin's electricity experiments development of atomic theory research and create a poster to illustrate development of atomic model research Lavoisier's contributions research the Clean Air Act of 1970 and 1990 research local water supply history research the history of heat and temperature	130	investigate Rutherford's gold foil experiment

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Standard #: Course	Topic	Standard	Benchmark	student text pg	detail	investigation pg	detail
PS03.0 Physical Science	Inquiry, Process and Problem Solving	Learns and uses on a regular basis standard safety practices for laboratory or field investigations.	Learns and uses on a regular basis standard safety practices for laboratory or field investigations.			20 24 26 40 44 56 58 146 150 158 164 168 172 175 180 182 186 192 198 200	safety tip for car/ramp setup ropes and pulley safety safety tip for hanging weights from lever electrical safety short circuit safety warning short circuit safety warning short circuit safety warning safety in the lab chemistry safety wear goggles and apron safety equipment hot water safety safety tip for water testing safety tip for testing local surface water thermometer safety heat safety thermometer safety heat safety heat safety safely using rubber bands

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Standard #: Course	Topic	Standard	Benchmark	student text pg	detail	investigation pg	detail
PS03.1 Physical Science	Inquiry, Process and Problem Solving	Learns and uses on a regular basis standard safety practices for laboratory or field investigations.	Learns and uses safety procedures specific to an investigation or research activity.			20 24 26 40 44 56 58 146 150 158 164 168 172 175 180 182 186 192 198 200	safety tip for car/ramp setup ropes and pulley safety safety tip for hanging weights from lever electrical safety short circuit safety warning short circuit safety warning short circuit safety warning safety in the lab chemistry safety wear goggles and apron safety equipment hot water safety safety tip for water testing safety tip for testing local surface water thermometer safety heat safety thermometer safety heat safety heat safety safely using rubber bands

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Standard #: Course	Topic	Standard	Benchmark	student text pg	detail	investigation pg	detail
PS04.0 Physical Science	Matter: Structure and Properties	Compares and contrasts matter and its characteristics related to its state (solids, liquids, and gases).	Compares and contrasts matter and its characteristics related to its state (solids, liquids, and gases).	284 284 285	states of matter and arrangement of molecules changes of state characteristics of matter related to its state	118 118 118 118 119	observe melting process and study quantitatively molecules in a liquid investigate melting think of melting process at molecular level energy and phase changes
PS04.1 Physical Science	Matter: Structure and Properties	Compares and contrasts matter and its characteristics related to its state (solids, liquids, and gases).	Identifies and classifies exanples of matter in the learner's environment as molecules, atoms or ions.	279 288 311 311	summary of matter classification create a poster of matter classification all matter is formed from atoms all matter is formed from atoms	114 132 165	investigate a homogeneous mixture comparing atoms investigate solutions and colloids and suspensions
PS04.2 Physical Science	Matter: Structure and Properties	Compares and contrasts matter and its characteristics related to its state (solids, liquids, and gases).	Compares and contrasts the terms atoms, molecules, and ions and provide examples of each.	279 288 311 311	summary of matter classification create a poster of matter classification all matter is formed from atoms all matter is formed from atoms	114 132 165	investigate a homogeneous mixture comparing atoms investigate solutions and colloids and suspensions

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PS04.3 Physical Science	Matter: Structure and Properties	Compares and contrasts matter and its characteristics related to its state (solids, liquids, and gases).	Identifies matter in its various forms including pure substances, heterogeneous and homogeneous mixtures and solutions.	278	mixtures can be separated by physical means	114	separating a homogeneous mixture
				279	summary of matter classification	114	investigate a homogeneous mixture
				283	atoms and molecules	141	compare and contrast elements and compounds
				288	create a poster of matter classification	165	investigate solutions and colloids and suspensions
PS04.4 Physical Science	Matter: Structure and Properties	Compares and contrasts matter and its characteristics related to its state (solids, liquids, and gases).	Describes solutions in terms of solvent, solute, and relative solubility.	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
				423	polar solutes		
PS04.5 Physical Science	Matter: Structure and Properties	Compares and contrasts matter and its characteristics related to its state (solids, liquids, and gases).	Identifies the characteristics of water that make it the universal solvent.	421	water structure and its function as a solvent		
				421	a water molecule is v- shaped		

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PS05.0 Physical Science	Matter: Structure and Properties	Quantifies mass, weight, volume, density, conductivity, and temperature as physical properties of objects in the learner's environment.	Quantifies mass, weight, volume, density, conductivity, and temperature as physical properties of objects in the learner's environment.	78 121 281 295	use and understand mass measurements electrical conductivity explained volume and mass contrasted relationship between mass volume and density	49 116 116 124 126 128	conductivity of aluminum vs. copper measuring mass mass and volume measurements build a density column investigating buoyancy with clay boats use CPO viscometer to study viscosity
PS05.1 Physical Science	Matter: Structure and Properties	Quantifies mass, weight, volume, density, conductivity, and temperature as physical properties of objects in the learner's environment.	Measures and records in appropriate units, the quantifiable physical properties identified.	78 121 281 295	use and understand mass measurements electrical conductivity explained volume and mass contrasted relationship between mass volume and density	49 116 116 124 126 128	conductivity of aluminum vs. copper measuring mass mass and volume measurements build a density column investigating buoyancy with clay boats use CPO viscometer to study viscosity
PS05.2 Physical Science	Matter: Structure and Properties	Quantifies mass, weight, volume, density, conductivity, and temperature as physical properties of objects in the learner's environment.	Distinguishes physical from chemical properties.	353 355 372	physical and chemical changes and digestion physical and chemical changes in tire recycling determine if changes are chemical or physical	146	investigate and observe chemical and physical changes in the lab

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PS06.0 Physical Science	Matter: Structure and Properties	dentifies chemical or physical changes conceptually in a laboratory setting.	dentifies chemical or physical changes conceptually in a laboratory setting.	284	changes of state	119	energy and phase changes
				353	physical and chemical changes and digestion		
				355	physical and chemical changes in tire recycling		
				357	combustion reaction		
				361	heartburn reaction		
				372	determine if changes are chemical or physical		
				406	molecular motion and dissolving rate		
				406	molecular motion and dissolving rate		
407	surface area and dissolving rate	146	investigate and observe chemical and physical changes in the lab				
						166	design experiments to explore dissolving rate

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PS06.1 Physical Science	Matter: Structure and Properties	Identifies chemical or physical changes conceptually in a laboratory setting.	Differentiates chemical from physical changes in the following laboratory investigations: combustion, fermentation, melting, dissolving, metabolism, boiling, and electrolysis.	284 353 355 357 361 372 406 406 407	changes of state physical and chemical changes and digestion physical and chemical changes in tire recycling combustion reaction heartburn reaction determine if changes are chemical or physical molecular motion and dissolving rate molecular motion and dissolving rate surface area and dissolving rate	119 146 166	energy and phase changes investigate and observe chemical and physical changes in the lab design experiments to explore dissolving rate
PS07.0 Physical Science	Atomic Theory and Patterns of Reactivity in the Periodic Table	Describes the basic structure of the atoms as protons, neutrons and electrons in specific arrangements.	Describes the basic structure of the atoms as protons, neutrons and electrons in specific arrangements.	311 311 318	protons/neutrons/electrons location/size/charge of subatomic particles proton/electron attraction	132 133 133 136 137 140	building atom models location of electrons in atom protons and neutrons model stable and neutral atoms build atomic models review subatomic particles

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PS07.1 Physical Science	Atomic Theory and Patterns of Reactivity in the Periodic Table	Describes the basic structure of the atoms as protons, neutrons and electrons in specific arrangements.	Identifies relative location, size, and charge of subatomic particles.	311 311 318	protons/neutrons/electrons location/size/charge of subatomic particles proton/electron attraction	132 133 133 136 137 140	building atom models location of electrons in atom protons and neutrons model stable and neutral atoms build atomic models review subatomic particles
PS07.2 Physical Science	Atomic Theory and Patterns of Reactivity in the Periodic Table	Describes the basic structure of the atoms as protons, neutrons and electrons in specific arrangements.	Relates the relative number of protons and electrons to chemical charge and reactivity.	321 329 330 332 335	groups of elements and valence shells periodic table columns and valence electrons bonding and periodic table position periodic table and electronegativities periodic table and oxidation numbers	136 141 141 142	ions build model of Na and Cl atoms and explain why they bond to form a molecule when an atom ionizes arrangement of electrons and groups of elements

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PS07.3 Physical Science	Atomic Theory and Patterns of Reactivity in the Periodic Table	Describes the basic structure of the atoms as protons, neutrons and electrons in specific arrangements.	Defines radioactivity and describe the properties of radioactive elements and isotopes. Relates their importance to everyday life as in medicine, pollution, industry and electrical power.	387 393 393 400	fusion and fission explained carbon dating radioisotopes in science and medicine research pros and cons of nuclear technology	138 160 161	fusion and fission radioactive decay research pros and cons of uses for radioactive elements
PS08.0 Physical Science	Atomic Theory and Patterns of Reactivity in the Periodic Table	Identifies the symbol, atomic number and mass of each of the first 20 elements in the periodic table.	identifies the symbol, atomic number and mass of each of the first 20 elements in the periodic table.	315 316 322 322 322 322	atomic number discussed mass number discussed atomic mass on the periodic table mass number on the periodic table atomic number on the periodic table chemical symbols and element names	133 133 133 136 136	identify element symbol and name identify atomic number identify mass number atomic number mass number

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PS08.1 Physical Science	Atomic Theory and Patterns of Reactivity in the Periodic Table	Identifies the symbol, atomic number and mass of each of the first 20 elements in the periodic table.	Compares trends of chemical properties of periods and groups in the periodic chart.	321 329 330 332 335	groups of elements and valence shells periodic table columns and valence electrons bonding and periodic table position periodic table and electronegativities periodic table and oxidation numbers	141 142	build model of Na and Cl atoms and explain why they bond to form a molecule arrangement of electrons and groups of elements
PS09.0 Physical Science	Atomic Theory and Patterns of Reactivity in the Periodic Table	Applies the law of definite proportions to predict mole quantities of chemicals that combine.	Applies the law of definite proportions to predict mole quantities of chemicals that combine.	343	mole quantities	144	show ratios in which elements combine to form a compound
PS09.1 Physical Science	Atomic Theory and Patterns of Reactivity in the Periodic Table	Applies the law of definite proportions to predict mole quantities of chemicals that combine.	Predicts whether two elements will chemically combine based on their position in the periodic chart.	321 329 330 332 335	groups of elements and valence shells periodic table columns and valence electrons bonding and periodic table position periodic table and electronegativities periodic table and oxidation numbers	141 142	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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PS09.2 Physical Science	Atomic Theory and Patterns of Reactivity in the Periodic Table	Applies the law of definite proportions to predict mole quantities of chemicals that combine.	Applies rules for writing formulas of simple chemical compounds.	336 338	writing a chemical formula summary of chemical formula writing rules	143 145	predict chemical formulas determine empirical formula
PS09.3 Physical Science	Atomic Theory and Patterns of Reactivity in the Periodic Table	Applies the law of definite proportions to predict mole quantities of chemicals that combine.	Applies rules for naming simple chemical compounds.	339	naming compounds	143	name chemical compounds
PS09.4 Physical Science	Atomic Theory and Patterns of Reactivity in the Periodic Table	Applies the law of definite proportions to predict mole quantities of chemicals that combine.	Classifies compounds as ionic or covalent.	330 331 332	ionic bonds covalent bonds distinguishing between ionic and covalent bonds	143	classify ionic compounds
PS10.0 Physical Science	Chemical Reactions	Classifies common chemical reaction types as syntheses, decomposition, or single or double displacement.	Classifies common chemical reaction types as syntheses, decomposition, or single or double displacement.	375 376 377 377	synthesis or addition reactions decomposition reactions single displacement reactions double displacement reactions	156	investigate double displacement reactions

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PS10.1 Physical Science	Chemical Reactions	Classifies common chemical reaction types as syntheses, decomposition, or single or double displacement.	Distinguishes chemical reactions as endothermic and exothermic.	381 382	exothermic reactions and MREs endothermic reactions and cold packs	158 158	investigate energy changes in chemical reactions measure energy changes in 3 different reactions
PS10.2 Physical Science	Chemical Reactions	Classifies common chemical reaction types as syntheses, decomposition, or single or double displacement.	Writes balanced chemical equations giving names of reactants and products.	359 371	balancing chemical equations which of the equations is balanced?	148 149 149 152 152 157	reactants and products balance these equations practice balancing equations write the balanced equation predict how much product formed given the reactants predict the products of double displacement reactions
PS11.0 Physical Science	Organic and Biochemistry	Names and identifies the structure of simple groups of organic compounds.	Names and identifies the structure of simple groups of organic compounds.	364 394 395	carbon chains photosynthesis and carbon reactions fossil fuels and carbon reactions	162 162 162	carbon reactions and the environment structure of fossil fuels importance of fossil fuels
PS11.1 Physical Science	Organic and Biochemistry	Names and identifies the structure of simple groups of organic compounds.	Describes the importance of organic and biochemical compounds to everyday life.	394 395	photosynthesis and carbon reactions fossil fuels and carbon reactions	162 162	structure of fossil fuels importance of fossil fuels

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PS12.0 Physical Science	Energy	Analyze different types of energy in terms of sources, limits and uses, and environmental impact.	Analyze different types of energy in terms of sources, limits and uses, and environmental impact.	172 391 391 400 444	generating electric power nuclear vs. fossil fuels impact of nuclear energy reducing pollution impact of using fossil fuels	52	the cost of using electrical appliances
PS12.1 Physical Science	Energy	Analyze different types of energy in terms of sources, limits and uses, and environmental impact.	Describes some sources and uses of energy such as chemical, thermonuclear, photoelectric, and electromagnetic, etc.	172 391 400	generating electric power impact of nuclear energy reducing pollution	52	the cost of using electrical appliances
PS12.2 Physical Science	Energy	Analyze different types of energy in terms of sources, limits and uses, and environmental impact.	Describes the law of conservation of energy	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	36 37 38 188	energy conservation and the roller coaster investigating conservation of energy with rollercoaster conservation of energy and energy transformations specific heat and conservation of energy

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PS12.3 Physical Science	Energy	Analyze different types of energy in terms of sources, limits and uses, and environmental impact.	Compares the effectiveness of various methods of energy conversion.	91	energy conversions	38 201	explore energy transformations investigate different methods of generating electricity
PS12.4 Physical Science	Energy	Analyze different types of energy in terms of sources, limits and uses, and environmental impact.	Identifies and analyzes the nature of heat transfer in the learner's environment and describes and classifies heat transfer as conduction, convection and radiation.	468 468 470 470 472 476 478 481	heat transfer through air densely packed solids are good conductors of heat warming hands over candle convection currents and weather convection currents in water solid road surface emits radiation apply knowledge of heat transfer to different situations global warming and heat transfer by radiation	190 192 194 194	investigate conduction through all states of matter investigate convection in liquids investigate radiation emitted by solids investigate radiation emitted by liquids
PS12.5 Physical Science	Energy	Analyze different types of energy in terms of sources, limits and uses, and environmental impact.	Experimentally compares the relative role of conductors and insulators in heat conductivity.	469	thermal conductivity explained	190	investigate and rank materials for thermal conductivity

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PS13.0 Physical Science	Interaction of Force and Motion	Identifies gravity as a force that is dependent upon mass and the distance between objects.	Identifies gravity as a force that is dependent upon mass and the distance between objects.	52 54 55	gravity depends on mass Newton's law of universal gravitation calculating gravitational force between objects		
PS13.1 Physical Science	Interaction of Force and Motion	Identifies gravity as a force that is dependent upon mass and the distance between objects.	Distinguishes among mechanical, atomic, gravitational, and electromagnetic forces.	52 69 71 78 79 389 389 389	the effect of gravity how to calculate mechanical advantage how a lever works set up a lever with MA greater than 1 calculate mechanical advantage forces in the nucleus electromagnetic force strong nuclear force	20 25 27 136	investigate effect of gravity on motion discover mechanical advantage of ropes and pulleys set up a lever that has mechanical advantage strong force
PS13.2 Physical Science	Interaction of Force and Motion	Identifies gravity as a force that is dependent upon mass and the distance between objects.	Identifies and measures everyday forces such as gravity, rolling and sliding frictions, and other mechanical forces using common laboratory devices.	52 56 64	the effect of gravity friction explained research effect of friction on human joints	20 21	investigate effect of gravity on motion effect of friction on the car

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Standard #: Course	Topic	Standard	Benchmark	student text pg	detail	investigation pg	detail
PS14.0 Physical Science	Interaction of Force and Motion	Measures and compares relationships among speed, velocity and acceleration.	Measures and compares relationships among speed, velocity and acceleration.	14 20 20 24 32 32 33 36 42	how to calculate speed calculate speed of car find speed of bumblebee accurate speed measurements average speed vs. instantaneous average speed discussed understanding acceleration examples of acceleration calculate speed from distance/time graph	8 9 10 12 14 14 17 36	calculating speed collect data and calculate speed of car calculate speed of the car find speed of car at different positions acceleration is the rate at which speed changes calculate speed of car at two places on the ramp calculate speed of car find speed of marble
PS14.1 Physical Science	Interaction of Force and Motion	Measures and compares relationships among speed, velocity and acceleration.	Describes experimentally the effect of unbalanced forces in overcoming inertia, including the effect of sliding, static and rolling friction.	46 49 51 56 64	force has potential to change motion force is related to acceleration balanced and unbalanced forces friction explained research effect of friction on human joints	14 16 19 21	exploring acceleration on a ramp unbalanced forces and acceleration of car find correct relationship between force mass and acceleration effect of friction on the car

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Standard #: Course	Topic	Standard	Benchmark	student text pg	detail	investigation pg	detail
PS15.0 Physical Science	Work and Power	Measures and/or calculates work and power using several examples from the learner's environment.	Measures and/or calculates work and power using several examples from the learner's environment.	68	compound machines	29	design and construct complex gear machines
				83	how to calculate work		
				84	work input and output		
				86	how to calculate power		
				86	power explained		
				96	calculate work done		
				96	decide whether or not work is done		
				97	calculate power		
				97	analyze power of motor		
				97	compare different amounts of work done		
				97	calculate work accomplished by a motor		
				97	calculate power of two different machines		
				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	31	calculate work done on block				
		31	work output vs. work input				
		31	work = force X distance				

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Standard #: Course	Topic	Standard	Benchmark	student text pg	detail	investigation pg	detail
PS15.1 Physical Science	Work and Power	Measures and/or calculates work and power using several examples from the learner's environment.	Calculates the work done by simple machines and compares the force or direction of force applied.	83 96 96 97 97 488 488 491	how to calculate work calculate work done decide whether or not work is done compare different amounts of work done calculate work accomplished by a motor work vs. calories used by the body work vs. calories used by the body work and mechanical systems	31 31	calculate work done on block work = force X distance

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Standard #: Course	Topic	Standard	Benchmark	student text pg	detail	investigation pg	detail
PS15.2 Physical Science	Work and Power	Measures and/or calculates work and power using several examples from the learner's environment.	Calculates mechanical advantage and efficiency of simple machines.	67	how simple machines manipulate forces	185	find efficiency of water heater
				70	mechanical advantage of block and tackle		
				71	parts of a lever		
				71	the human body and simple machines		
				72	mechanical advantage of a lever		
				75	how gears work		
				80	analyze block and tackle machine on a sailboat		
				80	analyzing the jaw as a lever		
				85	efficiency explained		
				85	efficiency and bicycles		
				97	find the efficiency of a machine		
				97	calculate work output from efficiency data		
PS15.3 Physical Science	Work and Power	Measures and/or calculates work and power using several examples from the learner's environment.	Identifies compound machines as combinations of simple machines and describes how the work is done.	68	compound machines	29	design and construct complex gear machines

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Standard #: Course	Topic	Standard	Benchmark	student text pg	detail	investigation pg	detail
PS16.0 Physical Science	Waves and Energy Transfer	Relates frequency and energy of the electromagnetic spectrum.	Relates frequency and energy of the electromagnetic spectrum.	237 237	light waves and the electromagnetic spectrum visible light and the electromagnetic spectrum	134	investigating visible light with a spectrometer
PS16.1 Physical Science	Waves and Energy Transfer	Relates frequency and energy of the electromagnetic spectrum.	Uses wave and particle theory to describe transmission, absorption, reflection, and refraction of light in the visible spectrum.	258 260 263 263 476	refraction in optical systems reflection and mirrors index of refraction index of refraction absorption and emission	107 107 108	investigate reflection of light plot reflected rays from a mirror tracing incident and refracted rays

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Standard #: Course	Topic	Standard	Benchmark	student text pg	detail	investigation pg	detail
PS16.2 Physical Science	Waves and Energy Transfer	Relates frequency and energy of the electromagnetic spectrum.	Experimentally develops how light interacts with lenses, mirrors, prisms, lasers and optical fibers.	258	forming images with lenses	101	observing white light through diffraction grating
				258	forming images with lenses	101	observing white light through diffraction grating
				268	total internal reflection and fiber optics	107	investigate how light interacts with mirrors
				268	total internal reflection and fiber optics	108	explore refraction with lenses
				270	what is a laser?	108	investigate how light interacts with a prism
				270	what is a laser?	108	explore refraction with lenses
						108	investigate how light interacts with a prism
						110	finding focal point and focal length of a lens
						110	finding focal point and focal length of a lens
						111	plotting images formed when light is refracted by a lens
						111	plotting images formed when light is refracted by a lens
						113	observe internal reflection and relate to fiber optics
						113	observe internal reflection and relate to fiber optics

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Standard #: Course	Topic	Standard	Benchmark	student text pg	detail	investigation pg	detail
PS16.3 Physical Science	Waves and Energy Transfer	Relates frequency and energy of the electromagnetic spectrum.	Relates color to frequency of light.	242 243 245	color and frequency of light waves RGB model of color we see color in terms of reflected light	104 105	investigate RGB model of color explore relationship between color and wavelength
PS16.4 Physical Science	Waves and Energy Transfer	Relates frequency and energy of the electromagnetic spectrum.	Relates frequencies of the electromagnetic spectrum outside the visible range to technological advances (e.g. microwave, radiowave).	196 237 237 250 272	waves are all around us microwave ovens radio and television signals identify uses of electromagnetic waves identify uses of electromagnetic waves		
PS16.5 Physical Science	Waves and Energy Transfer	Relates frequency and energy of the electromagnetic spectrum.	Describes and varies properties of sound by changing temperatures or medium.	219 222 222	frequency of sound and pitch effect of medium on speed of sound wave effect of temperature on speed of sound wave	90 94	what is sound and how do we hear it? does sound behave like other waves?
PS17.0 Physical Science	Electricity and Magnetism	Generates an imbalance of electrical charge and experiment with attraction and repulsion of objects.	Generates an imbalance of electrical charge and experiment with attraction and repulsion of objects.	105 106 107 108 108	charge is a fundamental property of matter static charge discussed explanation of coulomb how an electroscope works electroscopes	42	investigate electric charge

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Standard #: Course	Topic	Standard	Benchmark	student text pg	detail	investigation pg	detail
PS17.1 Physical Science	Electricity and Magnetism	Generates an imbalance of electrical charge and experiment with attraction and repulsion of objects.	Demonstrates production of electrical charge in a chemical reaction (e.g. simple cell).	102 103 113	concept of electric circuits circuit diagrams battery uses chemical energy to produce electrical charge	45	battery chemicals and electrical charge
PS17.2 Physical Science	Electricity and Magnetism	Generates an imbalance of electrical charge and experiment with attraction and repulsion of objects.	Evaluates different methods of generating electricity such as electric induction or a simple, peizoelectric, thermoelectric or photoelectric cell.	171	electromagnetic induction explained	73 73	use magnetic induction to create an electric field exploring electric generators

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Standard #: Course	Topic	Standard	Benchmark	student text pg	detail	investigation pg	detail
PS17.3 Physical Science	Electricity and Magnetism	Generates an imbalance of electrical charge and experiment with attraction and repulsion of objects.	Builds series and parallel circuits to perform specific tasks.	102	concept of electric circuits	45	battery chemicals and electrical charge
				103	circuit diagrams	56	build a parallel circuit
				113	battery uses chemical energy to produce electrical charge	56	build a series circuit
				145	holiday lights as series or parallel	57	compare brightness of bulbs in series vs. parallel
				145	single path vs. branching paths	58	build a series circuit and find total resistance
				145	parallel circuit defined	60	parallel circuit and Ohm's law
				145	series circuit defined	61	compare current and voltage and resistance in each type of circuit
				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		

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Standard #: Course	Topic	Standard	Benchmark	student text pg	detail	investigation pg	detail
PS17.4 Physical Science	Electricity and Magnetism	Generates an imbalance of electrical charge and experiment with attraction and repulsion of objects.	Measures and/or calculates current, voltage, and resistance at various points in series or parallel circuits.	114 115 117 119 131 132 145 145	voltage and potential energy how to measure voltage electrical current explained how to measure current Ohm's law explained using Ohm's law to analyze circuits holiday lights as series or parallel single path vs. branching paths	44 50 57 61	investigate concept of voltage Ohm's law compare brightness of bulbs in series vs. parallel compare current and voltage and resistance in each type of circuit
PS17.5 Physical Science	Electricity and Magnetism	Generates an imbalance of electrical charge and experiment with attraction and repulsion of objects.	Illustrates the interactions of electricity and magnetism by using electricity to create a magnetic field and magnetic induction to create an electric field.	168 170 171	how electric motors work dissecting an electric motor electromagnetic induction explained	68 73 73	investigate how an electric motor works use magnetic induction to create an electric field exploring electric generators
PS17.6 Physical Science	Electricity and Magnetism	Generates an imbalance of electrical charge and experiment with attraction and repulsion of objects.	Describes the interplay of electric and magnetic forces as the basis for electric motors, generators, radio, television, computers, and other modern technologies.	168 170	how electric motors work dissecting an electric motor	68	investigate how an electric motor works