Correlation to National Science Education Standards with Inquiry

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Content Area	Topic	Fundamental Concept	Volume 1 Student Text page		Volume 2 Investigation Manual page	
INQ01.1 Inquiry	Abilities Necessary to do Scientific Inquiry	Identify questions and concepts that guide scientific investigations	62	describe steps of the scientific method	69	conduct scientific inquiry
			65	writing lab procedures	97	design experiment to find out if mass is conserved
			297	why is Earth's atmosphere different from other planets	129	design pendulum experiment
			469	scientific method	129	perform self-designed experiment
					230	design experiment that someone else can follow

Correlation to National Science Education Standards with Inquiry

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Content Area	Topic	Fundamental Concept	Volume 1 Student Text page		Volume 2 Investigation Manual page	
INQ01.2 Inquiry	Abilities Necessary to do Scientific Inquiry	Design and conduct scientific investigations	46	identifying cause and effect relationships	17	identify cause and effect relationships
			64	recognizing and controlling variables in observations and experiments	19	interpreting observations
					19	recognizing controlling variables
			78	variables	19	cause and effect relationships
			88	identify cause and effect relationships	24	test your prediction
			469	design experiment—including choosing equipment	25	selecting ramp and photogates
					35	recognizing and controlling variables
					35	interpret observations
					36	construct algebraic model from data
					45	collect force data
					46	rigging block and tackle
					50	controlling variables
					50	controlling variables
					64	collect observational data
					69	conduct scientific inquiry
					71	does the graph support hypothesis
					87	build models of Na and Cl and use them to explain bonding
					96	interpret observations

Standard #: Content Area	Topic	Fundamental Concept	Volume 1 Student Text page	Volume 2 Investigation Manual page
				97 perform the experiment you designed 97 plan procedures and select materials 97 select materials from list 97 design experiment to find out if mass is conserved 129 perform self-designed experiment 129 plan three experiments to determine which variable affects the period of a pendulum 129 investigate variables that affect the period of a pendulum 129 design pendulum experiment 129 evaluate statistical significance 168 interpret observations 176 rigging block and tackle 193 background research

Correlation to National Science Education Standards with Inquiry

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Content Area	Topic	Fundamental Concept	Volume 1 Student Text page		Volume 2 Investigation Manual page	
INQ01.3 Inquiry	Abilities Necessary to do Scientific Inquiry	Use technology and mathematics to improve investigations and communications	4	measurement and units	1	selecting tools of measurement
			10	measurement	2	data table
			20	accuracy and precision and resolution	3	precision and accuracy
			21	finding estimated error	9	precision
			21	significant differences	12	slope of line
			42	interpretation of patterns from graphs and tables	12	data table
					13	data table
			43	using data tables	13	data tables
			45	analysis of trends from data	15	find average time
			46	estimating from a graph	17	data tables
			47	analyze trends from data	17	data tables
			47	interpretation of patterns in data	19	analysis of errors
					19	data tables
			88	interpretations of patterns in data	23	data table
					24	calculate percent error
			88	analyze trends from data	26	data tables
			89	determining slope of a line	29	analyze trends from data
			91	determining slope	29	data tables
			136	interpret patterns in data from tables	31	data tables
					35	data tables
					35	data tables
					35	analyze trends from data

Standard #: Content Area	Topic	Fundamental Concept	Volume 1 Student Text page	Volume 2 Investigation Manual page
				45 analyze block and tackle data 51 analyze trends from data 51 analyze lever equilibrium data 57 sketch the shape of the graph 69 data tables 95 data tables 96 data tables 97 design a data table 129 collect mass and amplitude data 129 analyze pendulum data 232 data tables 233 measuring 234 measuring 235 measuring 236 data tables 236 measuring 239 measurements 240 measurements 241 measurements 248 data tables

Correlation to National Science Education Standards with Inquiry

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Content Area	Topic	Fundamental Concept	Volume 1 Student Text page		Volume 2 Investigation Manual page	
INQ01.4 Inquiry	Abilities Necessary to do Scientific Inquiry	Formulate and revise scientific explanations and models using logic and evidence	43	making graphical model from data	3	how close were predictions
			44	creating graphical model from data	7	unit canceling
			46	constructing graph from data	10	how do results compare
			46	know that scientific knowledge can be in the form of models	11	graph mass vs. volume
			47	constructing a graph	19	analyze scientific hypothesis based on scientific evidence
			59	construct explanations supported by direct and indirect evidence	23	create a graph
			64	analyze hypothesis based on data	23	explain any differences you see
			87	graphs	25	predict what graph will look like
			88	making and evaluating graphs	27	compare prediction to graph
			114	using algebraic formulas	29	make graph from data
			128	using algebraic model	32	analyze hypothesis based on comparison with evidence
			145	using algebraic models	35	graphical models
			170	kinetic energy formula	36	analyze hypothesis based on data
			192	kinetic energy formula	36	construct reasonable explanations back by scientific evidence
			197	the power equation	42	derive a formula
			256	the heat equation	42	create a graph
			271	density formula		

Standard #: Content Area	Topic	Fundamental Concept	Volume 1 Student Text page		Volume 2 Investigation Manual page	
			304	pressure and temperature relationship	45	create a mathematical model
			488	equation for Ohm's law	51	find math rule for lever equilibrium
			559	harmonic motion graphs	59	compare prediction to results
			564	calculating wave speeds	71	derive Boyles law
					71	graph pressure vs volume
					73	graph pressure vs temperature
					97	do the data support the hypothesis
					99	study the graph
					104	create a solubility curve
					125	constructing explanations
					133	give an equation that describes your observations
					248	lab notebook
					249	making graphs
INQ01.5 Inquiry	Abilities Necessary to do Scientific Inquiry	Recognize and analyze alternative explanations and models	60	review theories based on observations	97	review your hypothesis
			61	review scientific hypothesis based on comparison with evidence		
			63	critique based on evidence		

Correlation to National Science Education Standards with Inquiry

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Content Area	Topic	Fundamental Concept	Volume 1 Student Text page		Volume 2 Investigation Manual page	
INQ01.6 Inquiry	Abilities Necessary to do Scientific Inquiry	Communicate and defend a scientific argument	45	reading graphs and tables	38	diagrams
			47	reading graphs and tables	50	drawings and diagrams
			65	lab report	53	making sketches and diagrams
			65	write up results	97	present results to the class
			150	diagrams	215	sketches
					230	formal lab report
					231	lab reports
					231	writing up results
					232	lab report
					232	writing up results
					248	lab report
					249	reading graphs
					249	making graphs

Correlation to National Science Education Standards with Inquiry

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Content Area	Topic	Fundamental Concept	Volume 1 Student Text page		Volume 2 Investigation Manual page
INQ02.1 Inquiry	Understandings About Scientific Inquiry	Scientists usually inquire about how physical, living, or designed systems function. Conceptual principles and knowledge guide scientific inquiries. Historical and current scientific knowledge influence the design and interpretation of investigations…	60	historical context and perspective of discoveries	
			62	evaluate how research shapes scientific knowledge	
			228	Robert Brown and Brownian motion	
			315	history of chemistry	
			323	atomic theory of matter development	
			324	contributions of Heisenberg	
			388	history of law of conservation of mass	
INQ02.2 Inquiry	Understandings About Scientific Inquiry	Scientists conduct investigations for a wide variety of reasons. For example, they may wish to discover new aspects of the natural world, explain recently observed phenomena, or test the conclusions of prior investigations or the predictions of current…	58	recognizing that scientific knowledge is a process of learning	
			62	recognition that science is a process	
			121	seeing connections between classroom learning and real life	
			127	seeing connections between what is learned in science and observations of real world	

Correlation to National Science Education Standards with Inquiry

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Content Area	Topic	Fundamental Concept	Volume 1 Student Text page		Volume 2 Investigation Manual page	
INQ02.3 Inquiry	Understandings About Scientific Inquiry	Scientists rely on technology to enhance the gathering and manipulation of data. New techniques and tools provide new evidence to guide inquiry and new methods to gather data, thereby contributing to the advance of science. The accuracy and precision of..	4	measurement and units	1	selecting tools of measurement
			10	measurement	3	precision and accuracy
			20	accuracy and precision and resolution	9	precision
			78	photogates	15	timers
			82	timers	15	Data Collector and probes
			484	using a multimeter to measure current	16	timers and photogates
					16	Data Collector and probes
					19	photogates and timers
					21	Data Collector and probes
					28	force scales
					28	balances
					29	balances
					30	timers and photogates
					31	photogates
					39	Data Collector and photogates
					47	use force scale
					52	force scales
					54	Data Collector and temperature probe
					56	Data Collector and temperature probe
					59	Data Collector and temperature probe

Standard #: Content Area	Topic	Fundamental Concept	Volume 1 Student Text page	Volume 2 Investigation Manual page
				71 Data Collector and gas pressure sensor 95 using balances 118 use a multimeter 129 collect mass and amplitude data 146 use a laser and mirror to study law of reflection 176 force scales 207 use the multimeter 233 measuring 234 measuring 235 measuring 236 measuring 237 temperature measuring devices 238 thermometers 239 measurements 240 measurements 241 measurements 244 balances 245 balances 246 balances

Correlation to National Science Education Standards with Inquiry

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Content Area	Topic	Fundamental Concept	Volume 1 Student Text page		Volume 2 Investigation Manual page	
INQ02.4 Inquiry	Understandings About Scientific Inquiry	Mathematics is essential in scientific inquiry. Mathematical tools and models guide and improve the posing of questions, gathering data, constructing explanations and communicating results.	114	using algebraic formulas	7	unit canceling
			128	using algebraic model	42	derive a formula
			145	using algebraic models	45	create a mathematical model
			170	kinetic energy formula	51	find math rule for lever equilibrium
			192	kinetic energy formula	71	derive Boyles law
			197	the power equation	133	give an equation that describes your observations
			256	the heat equation		
			271	density formula		
			304	pressure and temperature relationship		
			488	equation for Ohm's law		
			564	calculating wave speeds		

Correlation to National Science Education Standards with Inquiry

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Content Area	Topic	Fundamental Concept	Volume 1 Student Text page		Volume 2 Investigation Manual page	
INQ02.5 Inquiry	Understandings About Scientific Inquiry	Scientific explanations must adhere to criteria such as: a proposed explanation must be logically consistent; it must abide by the rules of evidence; it must be open to questions and possible modification; and it must be based on historical and current…	46	make predictions	10	how do results compare
			59	construct explanations supported by direct and indirect evidence	12	use graph to predict mass of six objects
			64	analyze hypothesis based on data	14	make predictions based on observations
					18	make predictions
					19	analyze scientific hypothesis based on scientific evidence
					23	use graph to make prediction
					23	explain any differences you see
					25	predict what graph will look like
					32	analyze hypothesis based on comparison with evidence
					36	construct reasonable explanations back by scientific evidence
					36	analyze hypothesis based on data
					53	make predictions based on data
					69	make predictions on observed data
					71	does the graph support hypothesis

Correlation to National Science Education Standards with Inquiry

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Content Area	Topic	Fundamental Concept	Volume 1 Student Text page		Volume 2 Investigation Manual page	
					71	predict the pressure
					97	do the data support the hypothesis
					125	constructing explanations
					129	evaluate statistical significance
					130	use data to predict best string length for a pendulum clock
					193	make predictions based on inferences from data
INQ02.6 Inquiry	Understandings About Scientific Inquiry	Results of scientific inquiry-new knowledge and methods-emerge from different types of investigations and public communication among scientists. In communicating and defending the results of scientific inquiry, arguments must be logical and demonstrate…	46	know that scientific knowledge can be in the form of models	231	communicating results is essential to science
			59	recognize that repeatability of investigations is necessary		
			63	recognize repeatability of investigation is necessary for verification of evidence		
			68	scientific journals		
			68	science and peer review		
			68	importance of repeatability		
			381	communicating—graphically		

Correlation to National Science Education Standards with Inquiry

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Content Area	Topic	Fundamental Concept	Volume 1 Student Text page		Volume 2 Investigation Manual page	
PS01.1 Physical Science	Structure of Atoms	Matter is made of minute particles called atoms, and atoms are composed of even smaller components. These components have measurable properties, such as mass and electrical charge…	228	matter is composed of atoms	75	understand the structure of an atom based on protons and neutrons and electrons
			229	definition of atom	78	understand the structure of an atom based on protons and neutrons and electrons
			314	atoms are made up of protons and neutrons and electrons	78	structure of an atom
			315	protons neutrons and electrons	85	review subatomic particles
			316	basic properties of an atom and the three subatomic particles	201	build atomic models
			317	compare and contrast the strong force and the electromagnetic force		
			319	calculate mass of a specific isotope		
			319	structure of an atom and three smaller particles		
			321	three subatomic particles and their charge		
			337	calculate average atomic mass of an isotope and how average atomic mass is determined		
			472	atoms are the source of electric charge		
			473	matter is made of atoms		

Correlation to National Science Education Standards with Inquiry

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Content Area	Topic	Fundamental Concept	Volume 1 Student Text page		Volume 2 Investigation Manual page	
PS01.2 Physical Science	Structure of Atoms	The atom's nucleus is composed of protons and neutrons, which are much more massive than electrons. When an element has atoms that differ in the number of neutrons, these atoms are called different isotopes of the element.	314	atoms are made up of protons and neutrons and electrons	75	what isotopes are
			318	understand how atomic structure determines the identity of elements—atomic number	75	atomic symbol and atomic number and mass number
			319	structure of an atom and three smaller particles	75	understand the structure of an atom based on protons and neutrons and electrons
			320	explain what isotopes are	78	understand the structure of an atom based on protons and neutrons and electrons
			321	explain what isotopes are	78	structure of an atom
			335	idea of atomic mass	79	what isotopes are
			337	explain what isotopes are	79	identify symbols and atomic number and mass number
			337	atomic number on the periodic table	82	identify symbol and atomic number and mass number of elements
					85	review subatomic particles
					201	build atomic models

Correlation to National Science Education Standards with Inquiry

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Content Area	Topic	Fundamental Concept	Volume 1 Student Text page		Volume 2 Investigation Manual page	
PS01.3 Physical Science	Structure of Atoms	The nuclear forces that hold the nucleus of an atom together, at nuclear distances, are usually stronger than the electric forces that would make it fly apart. Fission is the splitting of a large nucleus, Fusion is the joining of two nuclei…	317 320 321 422 423 424	compare and contrast the strong force and the electromagnetic force basic concepts of radioactivity and decay radioactivity nuclear reactions radioactivity fusion and fission	76 79	radioactivity radioactivity
PS01.4 Physical Science	Structure of Atoms	Radioactive isotopes are unstable and undergo spontaneous nuclear reactions, emitting particles and/or wavelike radiation. The decay of any one nucleus cannot be predicted…	320 320 321 422 423 427	know types of radioactive decay basic concepts of radioactivity and decay radioactivity nuclear reactions radioactivity radioisotopes in science and medicine	76 79	radioactivity radioactivity

Correlation to National Science Education Standards with Inquiry

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Content Area	Topic	Fundamental Concept	Volume 1 Student Text page		Volume 2 Investigation Manual page	
PS02.1 Physical Science	Structure and Properties of Matter	Atoms interact with one another by transferring or sharing electrons that are furthest from the nucleus. These outer electrons govern the chemical properties of the element.	326	electron shells	75	Bohr model
			335	common chemical properties in relation to the periodic table	86	build model of Na and Cl atoms and explain why they bond to form a molecule
			338	common chemical properties of elements based on relation to periodic table		
			339	explain common chemical properties in relation to placement on periodic table		
			342	how electron interactions create bonds		
			342	properties in relation to periodic table		
			343	chemical properties in relation to periodic table		
			347	describe characteristics based on place in periodic table		
			354	how electrons are involved in bonds		
			355	difference between ionic and covalent bonds		
			355	how ions are formed		
			355	how electrons are involved in bonds		

Standard #: Content Area	Topic	Fundamental Concept	Volume 1 Student Text page		Volume 2 Investigation Manual page
			356	properties of elements in relation to the periodic table	
			356	how electron interactions help create chemical bonds	
			357	explain the chemical properties of elements in relation to periodic table	
			357	how electrons are involved in bonds	
			358	explain chemical properties based on location in periodic table	
			358	how electrons are involved in bonding	
			359	how electrons are involved in bonding	
			361	electron transfer and oxidation number	
			362	chemical bonding and the periodic table	
			362	periodic table and oxidation numbers	
			363	explain why ions are formed	
			368	qualitative understanding of how electron interactions create bonds	
			456	how ions are formed	

Correlation to National Science Education Standards with Inquiry

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Content Area	Topic	Fundamental Concept	Volume 1 Student Text page		Volume 2 Investigation Manual page	
PS02.2 Physical Science	Structure and Properties of Matter	An element is composed of a single type of atom. When elements are listed in order according to the number of protons (called the atomic number), repeating patterns of physical and chemical properties identify families of elements with similar…	335	common chemical properties in relation to the periodic table	86	build model of Na and Cl atoms and explain why they bond to form a molecule
			338	common chemical properties of elements based on relation to periodic table		
			339	explain common chemical properties in relation to placement on periodic table		
			342	properties in relation to periodic table		
			343	chemical properties in relation to periodic table		
			347	describe characteristics based on place in periodic table		
			356	properties of elements in relation to the periodic table		
			357	explain the chemical properties of elements in relation to periodic table		
			358	explain chemical properties based on location in periodic table		
			362	periodic table and oxidation numbers		

Correlation to National Science Education Standards with Inquiry

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Content Area	Topic	Fundamental Concept	Volume 1 Student Text page		Volume 2 Investigation Manual page	
PS02.3 Physical Science	Structure and Properties of Matter	Bonds between atoms are created when electrons are paired up by being transferred or shared. A substance composed of a single kind of atom is called an element…	342	how electron interactions create bonds	89	predict chemical formulas
			354	difference between covalent and ionic bonds	90	name chemical compounds
			354	how electrons are involved in bonds	192	explain how special bonding properties of carbon make possible the great variety and complexity of biomolecules
			355	how ions are formed		
			355	how electrons are involved in bonds		
			355	understand that elements combine in constant proportions to form compounds		
			355	difference between ionic and covalent bonds		
			356	how electron interactions help create chemical bonds		
			357	how electrons are involved in bonds		
			358	how electrons are involved in bonding		
			359	how electrons are involved in bonding		
			361	electron transfer and oxidation number		
			362	chemical bonding and the periodic table		

Standard #: Content Area	Topic	Fundamental Concept	Volume 1 Student Text page		Volume 2 Investigation Manual page
			363	distinguish between ionic compounds and covalent molecules	
			363	explain why ions are formed	
			364	apply rules for writing formulas of simple chemical compounds	
			368	qualitative understanding of how electron interactions create bonds	
			369	rules for writing formulas	
			375	how special properties of carbon make the great variety of biomolecules	
			440	compare covalent and ionic bonds	
			456	how ions are formed	

Correlation to National Science Education Standards with Inquiry

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Content Area	Topic	Fundamental Concept	Volume 1 Student Text page		Volume 2 Investigation Manual page
PS02.4 Physical Science	Structure and Properties of Matter	The physical properties of compounds reflect the nature of the interactions among its molecules. These interactions are determined by the structure of the molecule, including the constituent atoms and the distances and angles between them.	436	a water molecule is v shaped	
			436	water structure and its function as a solvent	
			453	water as universal solvent	
			456	water as universal solvent	

Correlation to National Science Education Standards with Inquiry

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Content Area	Topic	Fundamental Concept	Volume 1 Student Text page		Volume 2 Investigation Manual page	
PS02.5 Physical Science	Structure and Properties of Matter	Solids, liquids, and gases differ in the distances and angles between molecules or atoms and therefore the energy that binds them together. In solids the structure is nearly rigid; in liquids molecules or atoms move around each other but…	38	physical differences between states of matter	64	colloidal suspension
			126	relationship between real materials and concepts of atoms	64	compare solids and liquids
			240	physical differences between phases of matter		
			240	phases of matter		
			277	explain matter states based on arrangement of atoms		
			341	relationship between materials and idea of atoms and molecules		
			344	relationship between real materials and arrangement of atoms		
			345	relationship between real materials and arrangements of atoms		

Correlation to National Science Education Standards with Inquiry

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Content Area	Topic	Fundamental Concept	Volume 1 Student Text page		Volume 2 Investigation Manual page	
PS02.6 Physical Science	Structure and Properties of Matter	Carbon atoms can bond to one another in chains, rings, and branching networks to form a variety of structures, including synthetic polymers, oils, and the large molecules essential to life	375	how special properties of carbon make the great variety of biomolecules	192	explain how special bonding properties of carbon make possible the great variety and complexity of biomolecules
PS03.1 Physical Science	Chemical Reactions	Chemical reactions occur all around us, for example in health care, cooking, cosmetics, and automobiles. Complex chemical reactions involving carbon-based molecules take place constantly in every cell in our bodies.	394	chemical reactions in living systems	92	chemical equations

Correlation to National Science Education Standards with Inquiry

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Content Area	Topic	Fundamental Concept	Volume 1 Student Text page		Volume 2 Investigation Manual page	
PS03.2 Physical Science	Chemical Reactions	Chemical reactions may release or consume energy. Some reactions such as the burning of fossil fuels release large amounts of energy by losing heat and by emitting light. Light can initiate many chemical reactions such as…	356	energy changes that accompany chemical reactions	98	exothermic and endothermic reactions
			410	explain how energy is manifested in chemical reactions—exothermic and endothermic	99	exothermic and endothermic reactions
			411	analyze energy changes that accompany chemical reactions		
			411	how energy is manifested in chemical reactions		
			413	endothermic reactions		
PS03.3 Physical Science	Chemical Reactions	A large number of important reactions involve the transfer of either electrons (oxidation/reduction reactions) or hydrogen ions (acid/base reactions) between reacting ions, molecules, or atoms. In other reactions, chemical bonds…	454	differentiate between acids and bases	105	create a pH scale
			455	differentiate between acids and bases	105	create a pH scale
			462	acids and bases		
			463	differentiate between acids and bases		

Correlation to National Science Education Standards with Inquiry

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Content Area	Topic	Fundamental Concept	Volume 1 Student Text page		Volume 2 Investigation Manual page
PS03.4 Physical Science	Chemical Reactions	Chemical reactions can take place in time periods ranging from the few femtoseconds (10-15 seconds) required for an atom to move a fraction of a chemical bond distance to geologic time scales of billions of years. Reaction rates depend…	419	reaction rate	
PS03.5 Physical Science	Chemical Reactions	Catalysts, such as metal surfaces, accelerate chemical reactions. Chemical reactions in living systems are catalyzed by protein molecules called enzymes.	419 419	catalysts and inhibitors reaction rate	

Correlation to National Science Education Standards with Inquiry

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Content Area	Topic	Fundamental Concept	Volume 1 Student Text page	Volume 2 Investigation Manual page
PS04.1 Physical Science	Motion and Forces	Objects change their motion only when a net force is applied. Laws of motion are used to calculate precisely the effects of forces on the motion of objects. The magnitude of the change in motion can be calculated using the…	59 difference between weight and mass 78 concept of speed 79 calculating speed 81 speed 87 calculating speed 89 calculating speed 91 calculations for speed 92 conceptual understanding of acceleration as describing change in speed 93 quantitative understanding of acceleration as a rate of change of velocity 99 Newton's second law 108 forces needed to change motion 108 understand force as an action with potential to change motion 109 use of force in units of newtons and pounds 113 use of newtons 116 force in newtons 119 changes in motion require application of force	20 finding speed 22 find speed of car 31 compare speeds of cars 33 calculate speed of car 34 investigate the 2nd law of motion 34 second law of motion 34 qualitative understanding of F = ma 36 conceptual idea of acceleration as change in speed 37 qualitative understanding of Newton's third law 38 Newton's third law—action and reaction 38 Newton's second law 39 find speed of car 168 Newton's third law—action and reaction 168 Newton's second law

Standard #: Content Area	Topic	Fundamental Concept	Volume 1 Student Text page		Volume 2 Investigation Manual page
			125	balanced and unbalanced forces	
			126	change in motion require force	
			127	quantitative understanding of force changing motion	
			127	use concepts of balanced or unbalanced forces	
			129	unbalanced forces cause motion	
			138	changes in motion require force	
			138	conceptual understanding of a force as the action with the potential to change motion	
			139	change in motion requires force	
			141	force is an action with potential to change motion	
			143	Newton's second law	
			143	concept of acceleration	
			144	Newton's second law—qualitative	
			144	Newton's second law—qualitative	
			144	Newton's second law—qualitative	

Standard #: Content Area	Topic	Fundamental Concept	Volume 1 Student Text page		Volume 2 Investigation Manual page
			147	conceptual understanding of acceleration as change in speed	
			148	understand and use concept of balanced and unbalanced forces to create motion	
			149	Newton's third law—action and reaction	
			149	balanced and unbalanced forces	
			150	Newton's third law—qualitative	
			152	Newton's second law—qualitative	
			155	Newton's third law	
			168	understanding of force as the ability to change motion	

Correlation to National Science Education Standards with Inquiry
Foundations of Physical Science Student Text and Investigation Manual

Standard #: Content Area	Topic	Fundamental Concept	Volume 1 Student Text page		Volume 2 Investigation Manual page	
PS04.2 Physical Science	Motion and Forces	Gravitation is a universal force that each mass exerts on any other mass. The strength of the gravitational attractive force between two masses is proportional to the masses and inversely proportional to the square of the distance between them.	96	effect of gravity on motion	67	mass vs weight
			98	projectile explained		
			113	difference between weight and mass		
			113	effect of gravity on objects		
			126	effects of gravity		
			139	difference between weight and mass		
			190	work and gravity		
			284	qualitative understanding of the differences between weight and mass		
			285	qualitative understanding of mass and weight are different		
PS04.3 Physical Science	Motion and Forces	The electric force is a universal force that exists between any two charged objects. Opposite charges attract while like charges repel. The strength of the force is proportional to the charges, and, as with gravitation, inversely proportional…	472	understanding electric charge	108	concept of electrical charge
			473	what causes shocks		
			473	charged objects and static electricity		
			529	using magnetic forces		

Correlation to National Science Education Standards with Inquiry

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Content Area	Topic	Fundamental Concept	Volume 1 Student Text page		Volume 2 Investigation Manual page	
PS04.4 Physical Science	Motion and Forces	Between any two charged particles, electric force is vastly greater than the gravitational force. Most observable forces such as those exerted by a coiled spring or friction may be traced to electric forces acting between atoms and molecules.	96 98 113 126 190 317	effect of gravity on motion projectile explained effect of gravity on objects effects of gravity work and gravity compare and contrast the strong force and the electromagnetic force		
PS04.5 Physical Science	Motion and Forces	Electricity and magnetism are two aspects of a single electromagnetic force. Moving electric charges produce magnetic forces, and moving magnets produce electric forces. These effects help students to understand electric motors and generators.	529 535 537 537 541 542	using magnetic forces what is an electromagnet? increased current vs. strength of magnetic field building an electromagnet how an electric motor works dissecting an electric motor	124	investigate relationship between magnetism and electricity using electromagnets

Correlation to National Science Education Standards with Inquiry

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Content Area	Topic	Fundamental Concept	Volume 1 Student Text page		Volume 2 Investigation Manual page	
PS05.1 Physical Science	Conservation of Energy and the Increase in Disorde	The total energy of the universe is constant. Energy can be transferred by collisions in chemical and nuclear reactions, by light waves and other radiations, and in many other ways. However, it can never be destroyed. As these transfers…	61	basic forms of energy—heat	40	energy in a system
			164	understanding energy	63	conservation of energy
			165	forms of energy	98	chemical reactions and energy
			166	forms of energy	238	temperature changes
			174	energy transformations and conservation		
			181	conservation of energy in a broader context		
			253	heat and work		
PS05.2 Physical Science	Conservation of Energy and the Increase in Disorde	All energy can be considered to be either kinetic energy, which is the energy of motion; potential energy, which depends on relative position; or energy contained by a field, such as electromagnetic waves.	169	potential energy explained	40	energy in a system
			170	kinetic energy explained	41	potential and kinetic energy
			174	energy transformations and conservation	42	conservation of energy
			177	law of conservation of energy	63	conservation of energy
			178	using energy conservation to solve problems		
			181	conservation of energy in a broader context		

Correlation to National Science Education Standards with Inquiry

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Content Area	Topic	Fundamental Concept	Volume 1 Student Text page		Volume 2 Investigation Manual page	
PS05.3 Physical Science	Conservation of Energy and the Increase in Disorde	Heat consists of random motion and the vibrations of atoms, molecules, and ions. The higher the temperature, the greater the atomic or molecular motion.	60	observe and explain that objects at different temperatures reach an intermediate temperature	58	how heat and temperature are different
			252	flow of thermal energy is heat	60	concept of specific heat
			252	understanding the difference between heat and temperature	62	investigate specific heat
			253	heat and work	63	specific heat
			254	specific heat explained	238	temperature changes
			255	specific heat		
			258	thermal equilibrium		
			259	thermal conductivity		
PS05.4 Physical Science	Conservation of Energy and the Increase in Disorde	Everything tends to become less organized and less orderly over time. Thus, in all energy transfers, the overall effect is that the energy is spread out uniformly. Examples are the transfer of energy from hotter to cooler objects by…	60	observe and explain that objects at different temperatures reach an intermediate temperature	176	work out cannot be more than work in
			258	thermal equilibrium		
			258	heat conduction		
			260	natural and forced convection		
			261	thermal radiation		
			262	apply knowledge of heat transfer to different situations		
			439	hydrogen bonding and the gaseous state of water		

Correlation to National Science Education Standards with Inquiry

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Content Area	Topic	Fundamental Concept	Volume 1 Student Text page		Volume 2 Investigation Manual page	
PS06.1 Physical Science	Interactions of Energy and Matter	Waves, including sound and seismic waves, waves on water, and light waves, have energy and can transfer energy when they interact with matter.	560	resonance explained	131	investigate frequency and wavelength
			562	waves transmit energy	132	investigating resonance
			563	frequency and amplitude and wavelength of waves	133	natural frequency and resonance of standing waves on a string
			568	refracted waves	133	waves carry energy from one place to another
			568	reflected waves	136	investigate interference with sound waves
			569	longitudinal waves	137	investigating sound resonance
			569	transverse waves	145	investigate colors of light
			570	destructive interference	213	demonstrate waves using slinky
			580	speed of sound	213	wavelength and frequency and speed of waves
			581	wavelength and frequency	214	reflection
			581	sound as a wave	214	demonstrate waves using slinky
			582	how sound is recorded	214	wavelength and frequency and speed of waves
			584	sound as a wave	215	wave characteristics through water
			586	wavelength of sound	215	categorize waves by how they move
			587	standing waves and resonance	215	making circular waves in a ripple tank
			593	pitch and the musical scale		
			594	frequency of sound and beats		
			607	speed of light		
			608	energy and color of light		

Correlation to National Science Education Standards with Inquiry

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Content Area	Topic	Fundamental Concept	Volume 1 Student Text page		Volume 2 Investigation Manual page
			609	nature of light in terms of waves and energy info flow	
			617	explain how colors of light relate to wavelength	
			620	wave interactions like reflection	
			620	refraction	
			620	absorption	

Correlation to National Science Education Standards with Inquiry

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Content Area	Topic	Fundamental Concept	Volume 1 Student Text page		Volume 2 Investigation Manual page	
PS06.2 Physical Science	Interactions of Energy and Matter	Electromagnetic waves result when a charged object is accelerated or decelerated. Electromagnetic waves include radio waves (the longest wavelength), microwaves, infrared radiation (radiant heat), visible light, ultraviolet radiation…	581	electromagnetic waves in common technology (i.e. radar)	144	investigate RGB and CMYK models of color
			606	white light is a mixture of colors		
			607	speed of light		
			608	wavelength and frequency of visible light		
			609	nature of light in terms of waves and energy info flow		
			609	relationship between electricity and magnetism in the formation of electromagnetic waves		
			610	relationship between electricity and magnetism in making electromagnetic waves		
			610	electromagnetic spectrum		
			610	properties of electromagnetic waves with different wavelengths		
			610	uses of electromagnetic waves		
			614	the RGB color process		
			615	subtractive color process		
			616	the CMYK color process		

Correlation to National Science Education Standards with Inquiry

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Content Area	Topic	Fundamental Concept	Volume 1 Student Text page		Volume 2 Investigation Manual page	
PS06.3 Physical Science	Interactions of Energy and Matter	Each kind of atom or molecule can gain or lose energy only in particular discrete amounts and thus can absorb and emit light only at wavelengths corresponding to these amounts. These wavelengths can be used to identify the substance.	322	identify chemicals by using spectral lines	145	investigate colors of light
			322	qualitative concept of absorption and emission of light by electrons		
			323	qualitative concept of absorption and emission of light by electrons		
			325	quantum theory		
			327	identify elements by spectral analysis		
			327	emission of light by electrons		
			346	concepts of absorption and emission of light by atomic electrons		
			608	energy and color of light		
			617	explain how colors of light relate to wavelength		

Correlation to National Science Education Standards with Inquiry

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Content Area	Topic	Fundamental Concept	Volume 1 Student Text page		Volume 2 Investigation Manual page	
PS06.4 Physical Science	Interactions of Energy and Matter	In some materials, such as metals, electrons flow easily, whereas in insulating materials such as glass they can hardly flow at all. Semiconducting materials have intermediate behavior. At low temperatures some materials become superconductors…	491 491	semiconductors conductors and insulators	109	electrical conductivity of various materials