

Foundations of Physical Science, 3rd Edition

Standard	Description	Volume 1 Student Text		Volume 2 Investigation Manual	
1.1.1	Skills and Processes	33	measure volume of regular and irregular objects using several methods	35	interpret observations
	The student will explain why curiosity, honesty, openness, and skepticism are highly regarded in science.	121	seeing connections between classroom learning and real life	96	interpret observations
	The student will recognize that real problems have more than one solution and decisions to accept one solution over another are made on the basis of many issues.				
1.1.2	Skills and Processes	43	making graphical model from data	3	how close were predictions
	The student will explain why curiosity, honesty, openness, and skepticism are highly regarded in science.	46	constructing graph from data	19	analyze scientific hypothesis based on scientific evidence
	The student will modify or affirm scientific ideas according to accumulated evidence.	61	review scientific hypothesis based on comparison with evidence	24	test your prediction
		64	analyze hypothesis based on data	25	predict what graph will look like
		87	graphs	27	compare prediction to graph
		88	making and evaluating graphs	32	analyze hypothesis based on comparison with evidence
		559	harmonic motion graphs	36	analyze hypothesis based on data
				59	compare prediction to results
			97	perform the experiment you designed	
			97	do the data support the hypothesis	
			97	review your hypothesis	
			129	investigate variables that affect the period of a pendulum	
1.1.3					

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Standard	Description	Volume 1 Student Text		Volume 2 Investigation Manual	
1.1.3	Skills and Processes	64	analyze hypothesis based on data	19	analyze scientific hypothesis based on scientific evidence
	The student will explain why curiosity, honesty, openness, and skepticism are highly regarded in science.	312	analyzing nutrition labels	32	analyze hypothesis based on comparison with evidence
		387	read food label and look for ingredients (sidebar)	36	analyze hypothesis based on data
	The student will critique arguments that are based on faulty, misleading data or on the incomplete use of numbers.	493	reading an extension cord label	71	does the graph support hypothesis
		514	electrical appliances and power-rating label	97	do the data support the hypothesis
		515	analyze label on back of television ("your turn" part b.)	129	evaluate statistical significance
			130	analyze watch manufacturer's claims	
1.1.4	Skills and Processes	18	significant digits	19	analysis of errors
	The student will explain why curiosity, honesty, openness, and skepticism are highly regarded in science.	20	accuracy and precision and resolution	24	calculate percent error
		21	finding estimated error	71	does the graph support hypothesis
	The student will recognize data that are biased.			129	evaluate statistical significance
				161	estimating error
1.1.5	Skills and Processes	21	significant differences	71	does the graph support hypothesis
	The student will explain why curiosity, honesty, openness, and skepticism are highly regarded in science.	64	recognizing and controlling variables in observations and experiments	129	evaluate statistical significance
	The student will explain factors that produce biased data (incomplete data, using data inappropriately, conflicts of interest, etc.).				
1.2.1					

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Standard	Description	Volume 1 Student Text	Volume 2 Investigation Manual
1.2.1	Skills and Processes	58 asking scientific questions	0 each investigation begins with a Key Question
	The student will pose scientific questions and suggest investigative approaches to provide answers to questions.	58 asking scientific questions	69 conduct scientific inquiry
		67 phrase a formal question for this experiment	129 perform self-designed experiment
	The student will identify meaningful, answerable scientific questions.	297 why is Earth's atmosphere different from other planets	
1.2.2	Skills and Processes	58 asking scientific questions	0 each investigation begins with a Key Question
	The student will pose scientific questions and suggest investigative approaches to provide answers to questions.	67 phrase a formal question for this experiment	69 conduct scientific inquiry
		297 why is Earth's atmosphere different from other planets	97 design experiment to find out if mass is conserved
	The student will pose meaningful, answerable scientific questions.(NTB)		97 design experiment to find out if mass is conserved
			129 design pendulum experiment
			129 perform self-designed experiment
			129 design pendulum experiment
1.2.3	Skills and Processes	63 formulate a testable hypothesis	18 formulate a testable hypothesis
	The student will pose scientific questions and suggest investigative approaches to provide answers to questions.		21 make a hypothesis
			31 formulate a testable hypothesis
	The student will formulate a working hypothesis.		69 conduct scientific inquiry
			129 plan three experiments to determine which variable affects the period of a pendulum
		129 perform self-designed experiment	
1.2.4			

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Standard	Description	Volume 1 Student Text		Volume 2 Investigation Manual	
1.2.4	Skills and Processes	61	review scientific hypothesis based on comparison with evidence	24	test your prediction
	The student will pose scientific questions and suggest investigative approaches to provide answers to questions.	64	analyze hypothesis based on data	97	perform the experiment you designed
				129	investigate variables that affect the period of a pendulum
	The student will test a working hypothesis.(NTB)				
1.2.5	Skills and Processes	4	measurement and units	1	selecting tools of measurement
	The student will pose scientific questions and suggest investigative approaches to provide answers to questions.	10	measurement	233	measuring
				234	measuring
	The student will select appropriate instruments and materials to conduct an investigation.			235	measuring
				236	measuring
				239	measurements
				240	measurements
			241	measurements	
1.2.6	Skills and Processes	20	accuracy and precision and resolution	3	precision and accuracy
	The student will pose scientific questions and suggest investigative approaches to provide answers to questions.	59	recognize that repeatability of investigations is necessary	9	precision
		63	recognize repeatability of investigation is necessary for verification of evidence	129	collect mass and amplitude data
	The student will identify appropriate methods for conducting an investigation (independent and dependent variables, proper controls, repeat trials, appropriate sample size, etc.).	65	writing lab procedures	230	design experiment that someone else can follow
		68	importance of repeatability		
1.2.7					

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Standard	Description	Volume 1 Student Text	Volume 2 Investigation Manual
1.2.7	Skills and Processes	121 seeing connections between classroom learning and real life	53 demonstrate how simple machines work—mechanical advantage
	The student will pose scientific questions and suggest investigative approaches to provide answers to questions.	127 seeing connections between what is learned in science and observations of real world	
	The student will use relationships discovered in the lab to explain phenomena observed outside the laboratory.		
1.2.8	Skills and Processes	59 recognize that repeatability of investigations is necessary	51 analyze lever equilibrium data
	The student will pose scientific questions and suggest investigative approaches to provide answers to questions.	63 recognize repeatability of investigation is necessary for verification of evidence	64 collect observational data
		68 importance of repeatability	156 analyzing measurement data
	The student will defend the need for verifiable data.		159 looking for significant differences in data sets
1.3.1	Skills and Processes	33 graduated cylinder	15 timers
	The student will carry out scientific investigations effectively and employ the instruments, systems of measurement, and materials of science appropriately.	78 photogates	15 Data Collector and probes
		82 timers	16 timers and photogates
		83 maps	16 Data Collector and probes
	The student will develop and demonstrate skills in using lab and field equipment to perform investigative techniques.(NTB)	237 how thermometers work	19 photogates and timers
		484 using a multimeter to measure current	21 Data Collector and probes
			28 balances
			28 force scales
			29 balances
		30 timers and photogates	
		31 photogates	

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Standard	Description	Volume 1 Student Text	Volume 2 Investigation Manual
1.3.2			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
			71 Data Collector and gas pressure sensor
			95 using balances
			118 use a multimeter
			146 use a laser and mirror to study law of reflection
			176 force scales
			207 use the multimeter
			226 goggles
			227 goggles and aprons
			228 goggles
			237 temperature measuring devices
			238 beakers
			238 thermometers
			243 graduated cylinders
			244 balances
	245 balances		
	246 balances		

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Standard	Description	Volume 1 Student Text	Volume 2 Investigation Manual
1.3.2	Skills and Processes	0 Extensive lab safety guidelines, safety quiz, and safety contract are found in investigation manual on pages 224 - 229.	226 goggles
	The student will carry out scientific investigations effectively and employ the instruments, systems of measurement, and materials of science appropriately.		227 goggles and aprons
	The student will recognize safe laboratory procedures.	0 Lab safety symbols and instructions are found in investigation manual on the page before TOC.	228 goggles
1.3.3	Skills and Processes	0 Extensive lab safety guidelines, safety quiz, and safety contract are found in investigation manual on pages 224 - 229.	44 ropes and pulley safety
	The student will carry out scientific investigations effectively and employ the instruments, systems of measurement, and materials of science appropriately.		174 ropes and pulley safety
			224 lab safety
	The student will demonstrate safe handling of the chemicals and materials of science.(NTB)	0 Lab safety symbols and instructions are found in investigation manual on the page before TOC.	225 lab safety
			226 goggles
			226 lab safety
			227 goggles and aprons
			227 lab safety
			228 goggles
			228 lab safety
	229 lab safety		
1.3.4	Skills and Processes	237 how thermometers work	15 Data Collector and probes
	The student will carry out scientific investigations effectively and employ the instruments, systems of measurement, and materials of science appropriately.		16 Data Collector and probes
			21 Data Collector and probes
			28 force scales
	The student will learn the use of new instruments and equipment by following instructions in a manual or from oral direction.(NTB)		28 balances
			29 balances
		39 Data Collector and photogates	

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Standard	Description	Volume 1 Student Text	Volume 2 Investigation Manual
1.4.1			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
			71 Data Collector and gas pressure sensor
			95 using balances
			146 use a laser and mirror to study law of reflection
			176 force scales
			226 goggles
			226 goggles
			227 goggles and aprons
			227 goggles and aprons
			228 goggles
			228 goggles
			237 temperature measuring devices
			238 thermometers
			244 balances
			245 balances
			246 balances
1.4.1	Skills and Processes	43 making graphical model from data	2 data table
	The student will demonstrate that data analysis is a vital aspect of the process of scientific inquiry and communication.	43 using data tables	7 unit canceling
		44 creating graphical model from data	11 graph mass vs. volume
		46 constructing graph from data	12 data table

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Standard	Description	Volume 1 Student Text		Volume 2 Investigation Manual	
	The student will organize data appropriately using techniques such as tables, graphs, and webs	47	constructing a graph	13	data tables
		87	graphs	17	data tables
		88	making and evaluating graphs	19	data tables
		114	using algebraic formulas	23	create a graph
		128	using algebraic model	23	data table
		145	using algebraic models	25	predict what graph will look like
		170	kinetic energy formula	26	data tables
		192	kinetic energy formula	29	make graph from data
		197	the power equation	29	analyze trends from data
		256	the heat equation	29	data tables
		271	density formula	31	data tables
		304	pressure and temperature relationship	35	graphical models
		488	equation for Ohm's law	35	data tables
		559	harmonic motion graphs	42	create a graph
		564	calculating wave speeds	42	derive a formula
				45	create a mathematical model
				51	find math rule for lever equilibrium
				57	sketch the shape of the graph
				69	data tables
				71	graph pressure vs volume
			71	derive Boyles law	
			73	graph pressure vs temperature	
			95	data tables	
			97	design a data table	
			99	study the graph	

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Standard	Description	Volume 1 Student Text	Volume 2 Investigation Manual		
1.4.2			104 create a solubility curve		
			133 give an equation that describes your observations		
			157 using geometry to answer a question		
			163 create a graph of your data		
			170 useful algebraic relationships for data interpretation		
			204 make a graph of mass vs. temperature		
			232 data tables		
			236 data tables		
			248 lab notebook		
			248 data tables		
			249 making graphs		
			Skills and Processes	21 significant differences	10 how do results compare
			The student will demonstrate that data analysis is a vital aspect of the process of scientific inquiry and communication.	42 interpretation of patterns from graphs and tables	11 graph mass vs. volume
			The student will analyze data to make predictions, decisions, or draw conclusions.	43 making graphical model from data	12 use graph to predict mass of six objects
		44 creating graphical model from data	14 make predictions based on observations		
		45 analysis of trends from data	18 make predictions		
		46 constructing graph from data	23 create a graph		
		46 make predictions	23 explain any differences you see		
		47 interpretation of patterns in data	23 use graph to make prediction		
		47 analyze trends from data	25 predict what graph will look like		
		47 constructing a graph	25 predict what graph will look like		
		59 construct explanations supported by direct and indirect evidence	29 make graph from data		
		61 review scientific hypothesis based on comparison with evidence	35 analyze trends from data		
			35 graphical models		

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Standard	Description	Volume 1 Student Text	Volume 2 Investigation Manual
1.4.3		62 scientific theories	36 construct reasonable explanations back by scientific evidence
		87 graphs	42 create a graph
		88 interpretations of patterns in data	45 analyze block and tackle data
		88 analyze trends from data	51 analyze lever equilibrium data
		88 making and evaluating graphs	53 make predictions based on data
		136 interpret patterns in data from tables	69 make predictions on observed data
		559 harmonic motion graphs	71 graph pressure vs volume
			71 predict the pressure
			73 graph pressure vs temperature
			97 review your hypothesis
			99 study the graph
			104 create a solubility curve
			125 constructing explanations
			129 analyze pendulum data
			130 use data to predict best string length for a pendulum clock
			156 analyzing measurement data
			163 create a graph of your data
			193 make predictions based on inferences from data
			204 make a graph of mass vs. temperature
			208 predict the effect of changing a resistor
	248 lab notebook		
	249 making graphs		

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Standard	Description	Volume 1 Student Text	Volume 2 Investigation Manual
1.4.3	Skills and Processes	59 recognize that repeatability of investigations is necessary	24 test your prediction
	The student will demonstrate that data analysis is a vital aspect of the process of scientific inquiry and communication.	63 recognize repeatability of investigation is necessary for verification of evidence	97 perform the experiment you designed
		68 importance of repeatability	129 investigate variables that affect the period of a pendulum
	The student will use experimental data from various investigators to validate results.		
1.4.4	Skills and Processes	114 using algebraic formulas	7 unit canceling
	The student will demonstrate that data analysis is a vital aspect of the process of scientific inquiry and communication.	128 using algebraic model	42 derive a formula
		145 using algebraic models	45 create a mathematical model
	The student will determine the relationships between quantities and develop the mathematical model that describes these relationships.	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	157 using geometry to answer a question
		271 density formula	170 useful algebraic relationships for data interpretation
		304 pressure and temperature relationship	
		488 equation for Ohm's law	
	564 calculating wave speeds		
1.4.5			

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Standard	Description	Volume 1 Student Text	Volume 2 Investigation Manual
1.4.5	Skills and Processes	21 significant differences	163 create a best fit line on your graph and analyze
	The student will demonstrate that data analysis is a vital aspect of the process of scientific inquiry and communication.	42 interpretation of patterns from graphs and tables	204 create a best fit line
		45 reading graphs and tables	249 reading graphs
	The student will check graphs to determine that they do not misrepresent results.	46 estimating from a graph	
		47 interpretation of patterns in data	
		47 reading graphs and tables	
		88 interpretations of patterns in data	
		136 interpret patterns in data from tables	
1.4.6	Skills and Processes	21 significant differences	35 analyze trends from data
	The student will demonstrate that data analysis is a vital aspect of the process of scientific inquiry and communication.	42 interpretation of patterns from graphs and tables	45 analyze block and tackle data
		45 analysis of trends from data	51 analyze lever equilibrium data
	The student will describe trends revealed by data.	47 interpretation of patterns in data	129 analyze pendulum data
		47 analyze trends from data	156 analyzing measurement data
		88 interpretations of patterns in data	
		88 analyze trends from data	
		136 interpret patterns in data from tables	
1.4.7	Skills and Processes	21 finding estimated error	19 analysis of errors
	The student will demonstrate that data analysis is a vital aspect of the process of scientific inquiry and communication.		24 calculate percent error
			161 estimating error
	The student will determine the sources of error that limit the accuracy or precision of experimental results.		
1.4.8			

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Standard	Description	Volume 1 Student Text	Volume 2 Investigation Manual
1.4.8	Skills and Processes	46 know that scientific knowledge can be in the form of models	15 Data Collector and probes
	The student will demonstrate that data analysis is a vital aspect of the process of scientific inquiry and communication.	70 prototypes as working models	16 Data Collector and probes
		119 a model for friction	21 Data Collector and probes
	The student will use models and computer simulations to extend his/her understanding of scientific concepts. (NTB)	220 prosthetic models	39 Data Collector and photogates
		264 energy study models	54 Data Collector and temperature probe
		315 atomic models	56 Data Collector and temperature probe
		614 RGB color model	59 Data Collector and temperature probe
			71 Data Collector and gas pressure sensor
1.4.9	Skills and Processes	61 review scientific hypothesis based on comparison with evidence	19 analyze scientific hypothesis based on scientific evidence
	The student will demonstrate that data analysis is a vital aspect of the process of scientific inquiry and communication.	64 analyze hypothesis based on data	24 test your prediction
			32 analyze hypothesis based on comparison with evidence
	The student will use analyzed data to confirm, modify, or reject a hypothesis.		36 analyze hypothesis based on data
			97 perform the experiment you designed
			97 review your hypothesis
			97 do the data support the hypothesis
			97 present results to the class
		129 investigate variables that affect the period of a pendulum	
1.5.1			

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Standard	Description	Volume 1 Student Text		Volume 2 Investigation Manual	
1.5.1	Skills and Processes	43	using data tables	2	data table
	The student will use appropriate methods for communicating in writing and orally the processes and results of scientific investigation.	65	lab report	12	data table
		68	scientific journals	13	data tables
		381	communicating—graphs	17	data tables
	The student will demonstrate the ability to summarize data (measurements/observations).			19	data tables
				23	data table
				26	data tables
				29	analyze trends from data
				29	data tables
				31	data tables
				35	data tables
				57	sketch the shape of the graph
				69	data tables
				95	data tables
				97	design a data table
				230	formal lab report
				231	communicating results is essential to science
			231	lab reports	
			232	data tables	
			232	lab report	
			236	data tables	
			248	data tables	
			248	lab report	
1.5.2					

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Standard	Description	Volume 1 Student Text	Volume 2 Investigation Manual
1.5.2	Skills and Processes	65 write up results	38 diagrams
	The student will use appropriate methods for communicating in writing and orally the processes and results of scientific investigation.	65 lab report	50 drawings and diagrams
		68 scientific journals	53 making sketches and diagrams
		150 diagrams	215 sketches
	The student will explain scientific concepts and processes through drawing, writing, and/or oral communication.	381 communicating—graphs	230 formal lab report
			231 writing up results
			231 lab reports
			231 communicating results is essential to science
			232 writing up results
			232 lab report
		248 lab report	
		249 making graphs	
1.5.3	Skills and Processes	43 making graphs	15 Data Collector and probes
	The student will use appropriate methods for communicating in writing and orally the processes and results of scientific investigation.		16 Data Collector and probes
			21 Data Collector and probes
	The student will use computers and/or graphing calculators to produce the visual materials (tables, graphs, and spreadsheets) that will be used for communicating results.(NTB)		39 Data Collector and photogates
			54 Data Collector and temperature probe
			56 Data Collector and temperature probe
			59 Data Collector and temperature probe
		71 Data Collector and gas pressure sensor	
1.5.4			

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Standard	Description	Volume 1 Student Text		Volume 2 Investigation Manual	
1.5.4	Skills and Processes	43	using data tables	2	data table
	The student will use appropriate methods for communicating in writing and orally the processes and results of scientific investigation.	43	making graphs	12	data table
		150	diagrams	13	data tables
	The student will use tables, graphs, and displays to support arguments and claims in both written and oral communication.			17	data tables
				19	data tables
				23	data table
				26	data tables
				29	analyze trends from data
				29	data tables
				31	data tables
				35	data tables
				38	diagrams
				50	drawings and diagrams
			53	making sketches and diagrams	
			57	sketch the shape of the graph	
			69	data tables	
			95	data tables	
		97	design a data table		
		97	present results to the class		
		215	sketches		
		232	data tables		
		236	data tables		
		248	data tables		
1.5.5					

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Standard	Description	Volume 1 Student Text	Volume 2 Investigation Manual
1.5.5	Skills and Processes	150 diagrams	38 diagrams
	The student will use appropriate methods for communicating in writing and orally the processes and results of scientific investigation.		50 drawings and diagrams
			53 making sketches and diagrams
			64 skills of observation
	The student will create and/or interpret graphics. (scale drawings, photographs, digital images, field of view, etc.)		215 sketches
1.5.6	Skills and Processes	53 researching ocean currents	3 Internet search
	The student will use appropriate methods for communicating in writing and orally the processes and results of scientific investigation.	56 cite your references	192 Internet research
		68 scientific journals	193 background research
	The student will read a technical selection and interpret it appropriately.		
1.5.7	Skills and Processes	347 classify by chemical and physical properties	98 exothermic and endothermic reactions
	The student will use appropriate methods for communicating in writing and orally the processes and results of scientific investigation.	398 synthesis or addition reactions	99 exothermic and endothermic reactions
		399 decomposition reactions	195 investigate and classify chemical reactions
		400 single displacement reactions	
	The student will use, explain, and/or construct various classification systems.	400 double displacement reactions	
1.5.8			

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Standard	Description	Volume 1 Student Text	Volume 2 Investigation Manual
1.5.8	Skills and Processes	58 recognizing that scientific knowledge is a process of learning	19 analyze scientific hypothesis based on scientific evidence
	The student will use appropriate methods for communicating in writing and orally the processes and results of scientific investigation.	58 scientific laws	32 analyze hypothesis based on comparison with evidence
		60 review theories based on observations	36 analyze hypothesis based on data
	The student will describe similarities and differences when explaining concepts and/or principles.	61 review scientific hypothesis based on comparison with evidence	97 do the data support the hypothesis
		62 recognition that science is a process	97 review your hypothesis
	64 analyze hypothesis based on data		
1.5.9	Skills and Processes	46 identifying cause and effect relationships	10 how do results compare
	The student will use appropriate methods for communicating in writing and orally the processes and results of scientific investigation.	48 creativity and problem solving	17 identify cause and effect relationships
		50 design problems and creativity	19 interpreting observations
		59 construct explanations supported by direct and indirect evidence	19 cause and effect relationships
	The student will communicate conclusions derived through a synthesis of ideas.	62 evaluate how research shapes scientific knowledge	23 explain any differences you see
		62 evaluate how research shapes scientific knowledge	35 interpret observations
		88 identify cause and effect relationships	36 construct reasonable explanations back by scientific evidence
		182 creativity and collaboration	87 build models of Na and Cl and use them to explain bonding
		96 interpret observations	
		125 constructing explanations	
		168 interpret observations	
1.6.1	Skills and Processes	15 dimensional analysis	4 dimensional analysis
	The student will use mathematical processes.	89 determining slope of a line	12 slope of line
		91 determining slope	236 scientific notation
	The student will use ratio and proportion in appropriate situations to solve problems.		

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Standard	Description	Volume 1 Student Text	Volume 2 Investigation Manual
1.6.2	Skills and Processes		15 Data Collector and probes
	The student will use mathematical processes.		16 Data Collector and probes
	The student will use computers and/or graphing calculators to perform calculations for tables, graphs, or spreadsheets.(NTB)		21 Data Collector and probes
			39 Data Collector and photogates
			54 Data Collector and temperature probe
			56 Data Collector and temperature probe
			59 Data Collector and temperature probe
			71 Data Collector and gas pressure sensor
1.6.3	Skills and Processes	6 understanding units for length and mass	236 scientific notation
	The student will use mathematical processes.	7 bytes and SI prefixes	
	The student will express and/or compare small and large quantities using scientific notation and relative order of magnitude.		
1.6.4			

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Standard	Description	Volume 1 Student Text		Volume 2 Investigation Manual	
1.6.4	Skills and Processes	114	using algebraic formulas	7	unit canceling
	The student will use mathematical processes.	128	using algebraic model	42	derive a formula
		145	using algebraic models	45	create a mathematical model
	The student will manipulate quantities and/or numerical values in algebraic equations.	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	157	using geometry to answer a question	
	279	Bernouilli's principle	170	useful algebraic relationships for data interpretation	
	304	pressure and temperature relationship			
	488	equation for Ohm's law			
	564	calculating wave speeds			
	1.6.5				

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Standard	Description	Volume 1 Student Text		Volume 2 Investigation Manual	
1.6.5	Skills and Processes	43	making graphical model from data	11	graph mass vs. volume
	The student will use mathematical processes.	44	creating graphical model from data	19	analyze scientific hypothesis based on scientific evidence
		46	constructing graph from data	23	
	The student will judge the reasonableness of an answer.	47	constructing a graph	25	predict what graph will look like
		60	review theories based on observations	29	make graph from data
		64	analyze hypothesis based on data	32	analyze hypothesis based on comparison with evidence
		87	graphs	35	
		88	making and evaluating graphs	36	analyze hypothesis based on data
		559	harmonic motion graphs	42	create a graph
				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
				163	create a graph of your data
				204	make a graph of mass vs. temperature
			248	lab notebook	
			249	making graphs	
1.7.1					

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Standard	Description	Volume 1 Student Text	Volume 2 Investigation Manual	
1.7.1	Skills and Processes	24 nanotechnology		
	The student will show that connections exist both within the various fields of science and among science and other disciplines including mathematics, social studies, language arts, fine arts, and technology.	100 high tech animal trackers		
		130 parabolic flights		
		156 forensic engineering		
		220 prosthetics		
	The student will apply the skills, processes, and concepts of biology, chemistry, physics, or earth science to societal issues.	246 television technology		
		348 silicon technology		
		404 hydrogen-powered cars		
		572 cell phone technology		
1.7.2	Skills and Processes	7 bytes and SI prefixes		
	The student will show that connections exist both within the various fields of science and among science and other disciplines including mathematics, social studies, language arts, fine arts, and technology.	24 nanotechnology		
		69 science and technology		
		100 high tech animal trackers		
		120 relationship between science and technology—maglev trains		
	The student will identify and evaluate the impact of scientific ideas and/or advancements in technology on society.	121 relationship between science and applied technology		
		130 parabolic flights		
			156 forensic engineering	
			220 prosthetics	
			246 television technology	
			348 silicon technology	
			404 hydrogen-powered cars	
			572 cell phone technology	
			582 recording sound	
1.7.3				

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Standard	Description	Volume 1 Student Text	Volume 2 Investigation Manual
1.7.3	Skills and Processes	48	creativity and problem solving
	The student will show that connections exist both within the various fields of science and among science and other disciplines including mathematics, social studies, language arts, fine arts, and technology.	50	design problems and creativity
		182	creativity and collaboration
		598	musician
	The student will describe the role of science in the development of literature, art, and music.(NTB)		
1.7.4	Skills and Processes	46	know that scientific knowledge can be in the form of models
	The student will show that connections exist both within the various fields of science and among science and other disciplines including mathematics, social studies, language arts, fine arts, and technology.	70	prototypes as working models
		119	a model for friction
		220	prosthetic models
		264	energy study models
	The student will recognize mathematics as an integral part of the scientific process.(NTB)	315	atomic models
		614	RGB color model
1.7.5			

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Standard	Description	Volume 1 Student Text	Volume 2 Investigation Manual
1.7.5	Skills and Processes	25	nanomedicine scientist
	The student will show that connections exist both within the various fields of science and among science and other disciplines including mathematics, social studies, language arts, fine arts, and technology.	52	physical oceanographer
		69	scientists and engineers
		72	director of clinical pharmacology
		100	marine scientist
	The student will investigate career possibilities in the various areas of science.(NTB)	130	astronaut
		156	forensic engineer
		156	physics professor
		182	researcher
		183	scientist/virtual lab
		221	physicists and engineers
		221	physicist/engineer
		264	architect
		434	research the field of health physics (#5)
		546	engineer
		598	musician
		626	astrophysicist
	626	astrophysicist	
1.7.6			

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Standard	Description	Volume 1 Student Text	Volume 2 Investigation Manual
1.7.6	Skills and Processes	24 nanotechnology	
	The student will show that connections exist both within the various fields of science and among science and other disciplines including mathematics, social studies, language arts, fine arts, and technology.	100 high tech animal trackers	
		130 parabolic flights	
		156 forensic engineering	
		220 prosthetics	
	The student will explain how development of scientific knowledge leads to the creation of new technology and how technological advances allow for additional scientific accomplishments.	246 television technology	
		348 silicon technology	
		404 hydrogen-powered cars	
		572 cell phone technology	
	581 electromagnetic waves in common technology (i.e. radar)		
	610 uses of electromagnetic waves		
5.1.1	Concepts of Physics	15 dimensional analysis	4 dimensional analysis
	The student will know and apply the laws of mechanics to explain the behavior of the physical world.	322 identify chemicals by using spectral lines	15 find average time
		327 identify elements by spectral analysis	236 scientific notation
	The student will use analytical techniques appropriate to the study of physics.		
5.1.2	Concepts of Physics	59 difference between weight and mass	27 calculate car's acceleration
	The student will know and apply the laws of mechanics to explain the behavior of the physical world.	81 vectors	28 forces as ability to change motion
		81 vectors and velocity	33 positive and negative acceleration
	The student will use algebraic and geometric concepts to qualitatively and quantitatively describe an object's motion.	82 vectors	36 how does Newton's 1st law apply to the car's motion?
		83 vectors	
		84 vectors	36 quantitative understanding of force as a rate of change of velocity
			36 calculate acceleration

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Standard	Description	Volume 1 Student Text	Volume 2 Investigation Manual
		84 resolve vectors into perpendicular components	38 investigate momentum and the 3rd law of motion
		91 constant velocity	165 calculate acceleration of falling object
		93 quantitative understanding of acceleration as a rate of change of velocity	
		99 quantitative understanding of acceleration as change in speed	
		108 understand force as an action with potential to change motion	
		109 use of force in units of newtons and pounds	
		110 quantitative understanding of force as a vector	
		113 use of newtons	
		116 force in newtons	
		124 compare and contrast constant and changing velocity	
		124 resolving vectors into their perpendicular components	
		125 force as vector	
		127 quantitative understanding of force changing motion	
		138 conceptual understanding of a force as the action with the potential to change motion	
		138 conceptual understanding of force as a vector	
		138 compare and contrast constant and changing velocity	
		141 force is an action with potential to change motion	

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Standard	Description	Volume 1 Student Text	Volume 2 Investigation Manual	
5.1.3		143 acceleration is a rate of change of speed		
		152 momentum defined		
		152 calculating momentum		
		154 solving momentum problems		
		168 understanding of force as the ability to change motion		
		Concepts of Physics	99 Newton's second law	34 qualitative understanding of $F = ma$
		The student will know and apply the laws of mechanics to explain the behavior of the physical world.	108 qualitative understanding of Newton's first law	34 investigate the 2nd law of motion
		The student will analyze and explain how Newton's Laws describe changes in an object's motion.	119 changes in motion require application of force	34 second law of motion
			126 change in motion require force	36 how does Newton's 1st law apply to the car's motion?
			127 quantitative understanding of force changing motion	37 qualitative understanding of Newton's third law
			138 qualitative understanding of Newton's first law	38 Newton's second law
			139 change in motion requires force	38 Newton's third law—action and reaction
			143 Newton's second law	168 Newton's second law
			144 Newton's second law—qualitative	168 apply the 2nd law of motion to data interpretation
			149 Newton's third law—action and reaction	168 apply the 3rd law of motion to data interpretation
		150 Newton's third law—qualitative	168 Newton's third law—action and reaction	
		152 Newton's second law—qualitative		
		155 Newton's third law		
5.1.4				

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Standard	Description	Volume 1 Student Text		Volume 2 Investigation Manual	
5.1.4	Concepts of Physics	124	net force	45	discover mechanical advantage of ropes and pulleys
	The student will know and apply the laws of mechanics to explain the behavior of the physical world.	125	balanced and unbalanced forces	49	investigate how simple machines work
		126	concept of net force	51	investigate simple machines—input and output force
	The student will analyze the behavior of forces.	127	use concepts of balanced or unbalanced forces	52	investigate how simple machines work
		129	unbalanced forces cause motion	52	analyze result of changing force of distance in a lever as demonstrated by arm
		129	net force	176	investigate the operation of rope and pulley system
		139	concept of net force		
		143	concept of net force		
		145	concept of net force		
		147	net force		
		148	understand and use concept of balanced and unbalanced forces to create motion		
		149	balanced and unbalanced forces		
		217	pliers as an example of a lever		
	5.1.5	Concepts of Physics	152	law of conservation of momentum	40
The student will know and apply the laws of mechanics to explain the behavior of the physical world.		153	understanding the law of conservation of momentum	63	conservation of energy
		174	energy transformations and conservation	95	investigate law of conservation of mass
The student will analyze systems with regard to the conservation laws.		181	conservation of energy in a broader context	96	law of conservation of mass
		388	conservation of mass		
		388	history of law of conservation of mass		
5.2.1					

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Standard	Description	Volume 1 Student Text		Volume 2 Investigation Manual	
5.2.1	Concepts of Physics	472	understanding electric charge	108	concept of electrical charge
	The student will know and apply the laws of electricity and magnetism and explain their significant role in nature and technology.	473	charged objects and static electricity	205	investigate electric charge
		530	concept of force fields	206	make an electroscope
	The student will describe the types of electric charges and the forces that exist between them.				
5.2.2	Concepts of Physics	528	what is a magnet	108	concept of electric current
	The student will know and apply the laws of electricity and magnetism and explain their significant role in nature and technology.	530	concept of force fields	124	investigate relationship between magnetism and electricity using electromagnets
		530	concept of magnetic field		
	The student will describe the sources and effects of electric and magnetic fields.	535	what is an electromagnet?		
		537	increased current vs. strength of magnetic field		
		537	building an electromagnet		
5.2.3	Concepts of Physics	543	electromagnetic induction explained	211	explore electromagnetic induction
	The student will know and apply the laws of electricity and magnetism and explain their significant role in nature and technology.				
	The student will qualitatively describe the applications of electromagnetic induction.				
5.3.1					

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Standard	Description	Volume 1 Student Text		Volume 2 Investigation Manual	
5.3.1	Concepts of Physics	174	energy transformations and conservation	40	energy in a system
	The student will recognize and relate the laws of thermodynamics to practical applications.	181	conservation of energy in a broader context	63	conservation of energy
	The student will relate thermodynamics to the balance of energy in a system.	253	heat and work	176	work out cannot be more than work in
				238	temperature changes
5.4.1	Concepts of Physics	562	waves transmit energy	133	waves carry energy from one place to another
	The student will explain and demonstrate how vibrations and waves provide a model for our understanding of various physical phenomena.			215	making circular waves in a ripple tank
	The student will compare qualitatively how waves are propagated and transmit energy.				
5.4.2	Concepts of Physics	559	understanding graphs of harmonic motion	213	wavelength and frequency and speed of waves
	The student will explain and demonstrate how vibrations and waves provide a model for our understanding of various physical phenomena.	563	frequency and amplitude and wavelength of waves	214	wavelength and frequency and speed of waves
		580	speed of sound	218	investigate comparative frequency data
	The student will describe wave characteristics using both diagrams and calculations.	581	wavelength and frequency		
		586	wavelength of sound		
		593	pitch and the musical scale		
5.4.3					

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Standard	Description	Volume 1 Student Text	Volume 2 Investigation Manual
5.4.3	Concepts of Physics	560 resonance explained	131 investigate frequency and wavelength
	The student will explain and demonstrate how vibrations and waves provide a model for our understanding of various physical phenomena.	560 period and natural frequency	132 investigating resonance
		563 frequency and amplitude and wavelength of waves	133 natural frequency and resonance of standing waves on a string
	The student will qualitatively describe the physical behaviors of waves.	568 reflected waves	137 investigating sound resonance
		568 refracted waves	213 wavelength and frequency and speed of waves
		580 speed of sound	213 demonstrate waves using slinky
		581 wavelength and frequency	214 wavelength and frequency and speed of waves
		581 sound as a wave	214 demonstrate waves using slinky
		582 how sound is recorded	214 reflection
		584 sound as a wave	215 wave characteristics through water
		586 wavelength of sound	215 how boundaries affect waves
		587 standing waves and resonance	217 testing the upper frequency limit of the ear
		593 pitch and the musical scale	218 investigate comparative frequency data
		596 harmonics and instruments	
		610 properties of electromagnetic waves with different wavelengths	
		620 wave interactions like reflection	
		620 refraction	
		620 absorption	
5.5.1	Concepts of Physics	357 relate the term quantum theory to the idea that electrons exist at set energy levels	188 investigating atoms and the quantum theory
	The student will investigate certain topics in modern physics.	606 photons	189 photons and lasers game
	The student will cite evidence of the wave/particle duality in the nature of matter.		

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Standard	Description	Volume 1 Student Text		Volume 2 Investigation Manual	
5.5.2	Concepts of Physics	422	nuclear reactions	200	play nuclear reactions game and identify isotopes
	The student will investigate certain topics in modern physics.	424	fusion and fission		
	The student will qualitatively explain the processes associated with nuclear energy and its applications.	427	radioisotopes in science and medicine		