

Physical, Earth, and Space Science, 1st Edition

Standard	Description	Volume 1 Student Text	Volume 2 Investigation Manual	
1.1.1	Skills and Processes	34	recognizing that scientific knowledge is a process of learning	
	The student will explain why curiosity, honesty, openness, and skepticism are highly regarded in science.	111	seeing connections between classroom learning and real life	
	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.	117	seeing connections between what is learned in science and observations of real world	
		457	interpreting observations	
		727	limits of what science can answer	
				13 interpreting observations
				17 interpret observations and propose explanations
				34 interpret observations
				51 interpret observations
				62 interpret observations
				78 build models of Na and Cl and use them to explain bonding
				84 interpret observations
				110 interpret observations and pose explanations
				114 interpreting observations
				124 interpret observations
			127 interpret observations	
			145 interpret observations	
			216 interpret observations	
			253 interpret observations	
			255 interpret observations	
			257 seeing connections between what has been learned in class to the real world	
			268 interpret observations	
			268 see connections between classroom and real life	
1.1.2				

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Standard	Description	Volume 1 Student Text		Volume 2 Investigation Manual	
		1.1.2	Skills and Processes	35	construct explanations supported by direct and indirect evidence
	The student will explain why curiosity, honesty, openness, and skepticism are highly regarded in science.	37	review scientific hypothesis based on comparison with evidence	8	testing explanations against observations
	The student will modify or affirm scientific ideas according to accumulated evidence.	40	analyze hypothesis based on data	13	analyze scientific hypothesis based on scientific evidence
				23	test your prediction
				26	compare prediction to graph
				31	analyze hypothesis based on comparison with evidence
				35	analyze hypothesis based on data
				48	compare prediction to results
				85	perform the experiment you designed
				85	do the data support the hypothesis
				85	review your hypothesis
				91	testing hypothesis
				155	investigate variables that affect the period of a pendulum
				241	analyze hypothesis based on data
1.1.3	Skills and Processes	40	analyze hypothesis based on data	13	analyze scientific hypothesis based on scientific evidence
	The student will explain why curiosity, honesty, openness, and skepticism are highly regarded in science.			31	analyze hypothesis based on comparison with evidence
	The student will critique arguments that are based on faulty, misleading data or on the incomplete use of numbers.			35	analyze hypothesis based on data
				85	do the data support the hypothesis
				155	evaluate statistical significance
				156	analyze watch manufacturer's claims
				241	analyze hypothesis based on data
1.1.4					

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Standard	Description	Volume 1 Student Text		Volume 2 Investigation Manual	
		1.1.4	Skills and Processes	10	accuracy, precision, resolution
	The student will explain why curiosity, honesty, openness, and skepticism are highly regarded in science.	21	significant digits	23	calculate percent error
		41	good experimental technique	155	evaluate statistical significance
	The student will recognize data that are biased.				
1.1.5	Skills and Processes	7	measuring with SI units	155	evaluate statistical significance
	The student will explain why curiosity, honesty, openness, and skepticism are highly regarded in science.	24	interpretation of patterns from graphs and tables		
		29	interpretation of patterns in data		
	The student will explain factors that produce biased data (incomplete data, using data inappropriately, conflicts of interest, etc.).	82	interpretations of patterns in data		
		437	interpretation of data from graphs and charts		
1.2.1	Skills and Processes	34	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.	247	why is Earth's atmosphere different from other planets	8	conducting scientific inquiry by asking questions and formulating hypotheses
				60	conduct scientific inquiry
	The student will identify meaningful, answerable scientific questions.			91	scientific inquiry
				155	perform self-designed experiment
1.2.2					

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Standard	Description	Volume 1 Student Text		Volume 2 Investigation Manual	
		1.2.2	Skills and Processes	34	asking scientific questions
1.2.3	The student will pose scientific questions and suggest investigative approaches to provide answers to questions.	247	why is Earth's atmosphere different from other planets	8	conducting scientific inquiry by asking questions and formulating hypotheses
	The student will pose meaningful, answerable scientific questions.(NTB)			60	conduct scientific inquiry
				85	design experiment to find out if mass is conserved
				85	design experiment to find out if mass is conserved
				91	scientific inquiry
				155	design pendulum experiment
				155	perform self-designed experiment
				155	design pendulum experiment
				263	design scientific investigations
				263	design scientific investigations

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Standard	Description	Volume 1 Student Text		Volume 2 Investigation Manual	
		1.2.3	Skills and Processes The student will pose scientific questions and suggest investigative approaches to provide answers to questions. The student will formulate a working hypothesis.	39	formulate a testable hypothesis
				8	make hypothesis
				8	conducting scientific inquiry by asking questions and formulating hypotheses
				12	formulate a testable hypothesis
				20	make a hypothesis
				30	formulate a testable hypothesis
				60	conduct scientific inquiry
				91	scientific inquiry
				110	formulate testable hypothesis
				155	plan three experiments to determine which variable affects the period of a pendulum
				155	perform self-designed experiment
				171	make a hypothesis
				202	formulate testable hypothesis
				239	formulate testable hypothesis
				240	formulate testable hypothesis
1.2.4	Skills and Processes The student will pose scientific questions and suggest investigative approaches to provide answers to questions. The student will test a working hypothesis.(NTB)			8	testing explanations against observations
				23	test your prediction
				85	perform the experiment you designed
				91	testing hypothesis
				155	investigate variables that affect the period of a pendulum
1.2.5					

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Standard	Description	Volume 1 Student Text		Volume 2 Investigation Manual	
		1.2.5	Skills and Processes	6	measurement and units
	The student will pose scientific questions and suggest investigative approaches to provide answers to questions.	13	measurement	24	selecting ramp and photogates
		391	measuring current with a multimeter	27	understand the sensitivity of a measuring tool
		394	measuring resistance	85	plan procedures and select materials
	The student will select appropriate instruments and materials to conduct an investigation.			85	select materials from list
1.2.6	Skills and Processes	35	recognize that repeatability of investigations is necessary	3	precision and accuracy
	The student will pose scientific questions and suggest investigative approaches to provide answers to questions.	39	recognize repeatability of investigation is necessary for verification of evidence	7	recognize that repeatability is necessary
		41	writing lab procedures	9	repeatability of investigations is necessary
	The student will identify appropriate methods for conducting an investigation (independent and dependent variables, proper controls, repeat trials, appropriate sample size, etc.).	44	importance of repeatability	15	design a procedure others can follow
				155	collect mass and amplitude data
1.2.7	Skills and Processes	111	seeing connections between classroom learning and real life	257	seeing connections between what has been learned in class to the real world
	The student will pose scientific questions and suggest investigative approaches to provide answers to questions.	117	seeing connections between what is learned in science and observations of real world	268	see connections between classroom and real life
	The student will use relationships discovered in the lab to explain phenomena observed outside the laboratory.				
1.2.8					

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Standard	Description	Volume 1 Student Text		Volume 2 Investigation Manual	
		1.2.8	Skills and Processes	35	recognize that repeatability of investigations is necessary
	The student will pose scientific questions and suggest investigative approaches to provide answers to questions.	39	recognize repeatability of investigation is necessary for verification of evidence	9	repeatability of investigations is necessary
		44	importance of repeatability	17	interpret observations and propose explanations
	The student will defend the need for verifiable data.			30	compare speeds of cars
1.3.1	Skills and Processes	51	maps	4	timers
	The student will carry out scientific investigations effectively and employ the instruments, systems of measurement, and materials of science appropriately.	52	photogates	4	Data Collector and probes
		52	photogates	5	timers and photogates
	The student will develop and demonstrate skills in using lab and field equipment to perform investigative techniques.(NTB)	54	maps	5	Data Collector and probes
		57	maps	13	photogates and timers
		58	maps	20	Data Collector and probes
		60	maps	27	balances
		62	maps	27	force scales
		64	maps	28	balances
		66	maps	29	timers and photogates
		67	maps	30	photogates
		67	sound generating equipment	38	Data Collector and photogates
		78	timers	43	Data Collector and temperature probe
		265	maps	48	Data Collector and temperature probe
		391	using a multimeter to measure current	83	using balances
				122	maps
				123	maps
				124	maps
				127	safety devices

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Standard	Description	Volume 1 Student Text	Volume 2 Investigation Manual	
1.3.2	<p>Skills and Processes</p> <p>The student will carry out scientific investigations effectively and employ the instruments, systems of measurement, and materials of science appropriately.</p> <p>The student will recognize safe laboratory procedures.</p>	<p>0 Extensive lab safety guidelines, safety quiz, and safety contract are found in ancillary materials.</p>	134	balances
			134	graduated cylinders
			164	use a laser and mirror to study law of reflection
			187	telescopes
			190	telescopes
			208	maps
			220	Data Collector and temperature probe
			245	use a multimeter
			256	thermometers
			1.3.3	<p>Skills and Processes</p> <p>The student will carry out scientific investigations effectively and employ the instruments, systems of measurement, and materials of science appropriately.</p> <p>The student will demonstrate safe handling of the chemicals and materials of science.(NTB)</p>
1	general lab safety guidelines			
43	chemical safety			
47	heat safety			
89	chemical safety			
231	chemical safety			
0	Lab Safety symbols and instructions are found in the investigation manual on the page before the TOC			
1	general lab safety guidelines			
43	chemical safety			
47	heat safety			
89	chemical safety			
127	safety devices			
231	chemical safety			

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Standard	Description	Volume 1 Student Text		Volume 2 Investigation Manual	
		1.3.4	<p>Skills and Processes</p> <p>The student will carry out scientific investigations effectively and employ the instruments, systems of measurement, and materials of science appropriately.</p> <p>The student will learn the use of new instruments and equipment by following instructions in a manual or from oral direction.(NTB)</p>	67	sound generating equipment
				5	Data Collector and probes
				20	Data Collector and probes
				27	force scales
				27	balances
				28	balances
				38	Data Collector and photogates
				43	Data Collector and temperature probe
				48	Data Collector and temperature probe
				83	using balances
				127	safety devices
				127	safety devices
				134	balances
				164	use a laser and mirror to study law of reflection
				187	telescopes
				190	telescopes
				220	Data Collector and temperature probe
				256	thermometers
1.4.1	<p>Skills and Processes</p> <p>The student will demonstrate that data analysis is a vital aspect of the process of scientific inquiry and communication.</p> <p>The student will organize data appropriately using techniques such as tables, graphs, and webs</p>	25	making graphical model from data	2	data table
		25	using data tables	6	data tables
		26	creating graphical model from data	9	data tables
		28	constructing graph from data	10	data tables
		29	constructing a graph	11	making and evaluating a graphical model
		81	graphs	11	data tables

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Standard	Description	Volume 1 Student Text	Volume 2 Investigation Manual
		82 making and evaluating graphs	13 data tables
		104 using algebraic formulas	14 data tables
		118 using algebraic model	22 create a graph
		133 using algebraic models	22 data table
		161 kinetic energy formula	24 predict what graph will look like
		170 the power equation	25 data tables
		204 the heat equation	28 make graph from data
		239 pressure and temperature relationship	28 analyze trends from data
		395 equation for Ohm's law	30 data tables
		610 harmonic motion graphs	34 graphical models
		614 calculating wave speeds	34 data tables
			44 sketch the shape of the graph
			53 graph mass vs. volume
			54 data table
			55 data table
			59 data tables
			62 constructing and evaluating graphical models from data
			62 using data tables
			64 data tables
			65 data tables
			83 data tables
			84 data tables
			85 design a data table
			91 data tables
			112 data tables

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Standard	Description	Volume 1 Student Text	Volume 2 Investigation Manual
			113 creating and evaluating graphical model from data
			119 data tables
			123 data tables
			128 data tables
			129 data tables
			133 data tables
			134 data tables
			137 create a solubility curve
			143 data tables
			146 data tables
			190 construct graphical model from data and evaluate
			191 data tables
			201 unit canceling
			203 construct and evaluate a quantitative graphical model
			203 data tables
			208 data tables
			218 create a graph
			218 derive a formula
			226 data tables
			230 construct graphical model from data and evaluate
			240 construct and evaluate graphical models
			255 data tables
			279 data tables

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Standard	Description	Volume 1 Student Text		Volume 2 Investigation Manual	
1.4.2	Skills and Processes	24	interpretation of patterns from graphs and tables	11	interpretation of data patterns from observation
		25	making graphical model from data	11	making and evaluating a graphical model
	The student will demonstrate that data analysis is a vital aspect of the process of scientific inquiry and communication.	26	creating graphical model from data	12	make predictions
		27	analysis of trends from data	22	create a graph
	The student will analyze data to make predictions, decisions, or draw conclusions.	28	constructing graph from data	22	explain any differences you see
		28	make predictions	22	use graph to make prediction
		29	interpretation of patterns in data	24	predict what graph will look like
		29	analyze trends from data	24	predict what graph will look like
		29	constructing a graph	28	make graph from data
		35	construct explanations supported by direct and indirect evidence	34	analyze trends from data
		37	review scientific hypothesis based on comparison with evidence	34	graphical models
		81	graphs	35	construct reasonable explanations back by scientific evidence
		82	interpretations of patterns in data	52	contruction reasonable explanations based on direct and indirect data
		82	analyze trends from data	53	graph mass vs. volume
		82	making and evaluating graphs	54	use graph to predict mass of six objects
		124	interpret patterns in data from tables	56	make predictions based on observations
		437	interpretation of data from graphs and charts	60	make predictions on observed data
		610	harmonic motion graphs	62	constructing and evaluating graphical models from data
				62	make predictions baesd on observed data

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Standard	Description	Volume 1 Student Text	Volume 2 Investigation Manual
			66 interpret patterns in data
			66 analyze trends from data
			85 review your hypothesis
			89 explanation based on data
			108 constructing explanations
			113 creating and evaluating graphical model from data
			114 interpretation of patterns from data
			114 analyze trends from data
			114 make predictions from observations
			130 construct reasonable explanations supported by evidence
			132 construct explanations based on evidence
			137 create a solubility curve
			146 construct explanations supported by evidence
			148 making predictions
			155 analyze pendulum data
			156 use data to predict best string length for a pendulum clock
			190 construct graphical model from data and evaluate
			203 construct and evaluate a quantitative graphical model
			203 construct reasonable explanations based on scientific evidence
			206 interpretation of data
			206 make predictions based on data

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Standard	Description	Volume 1 Student Text	Volume 2 Investigation Manual		
1.4.3	<p>Skills and Processes</p> <p>The student will demonstrate that data analysis is a vital aspect of the process of scientific inquiry and communication.</p> <p>The student will use experimental data from various investigators to validate results.</p>	35	recognize that repeatability of investigations is necessary	7	recognize that repeatability is necessary
		39	recognize repeatability of investigation is necessary for verification of evidence	8	testing explanations against observations
		44	importance of repeatability	9	repeatability of investigations is necessary
				23	test your prediction
				85	perform the experiment you designed
				91	testing hypothesis
				155	investigate variables that affect the period of a pendulum
1.4.4					

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Standard	Description	Volume 1 Student Text		Volume 2 Investigation Manual	
		1.4.4	Skills and Processes	104	using algebraic formulas
1.4.4	The student will demonstrate that data analysis is a vital aspect of the process of scientific inquiry and communication.	118	using algebraic model	218	derive a formula
		133	using algebraic models		
	The student will determine the relationships between quantities and develop the mathematical model that describes these relationships.	161	kinetic energy formula		
		170	the power equation		
		204	the heat equation		
		239	pressure and temperature relationship		
		395	equation for Ohm's law		
		614	calculating wave speeds		
1.4.5	Skills and Processes	24	interpretation of patterns from graphs and tables	11	interpretation of data patterns from observation
The student will demonstrate that data analysis is a vital aspect of the process of scientific inquiry and communication.	27	reading graphs and charts and tables	66	interpret patterns in data	
	114	interpretation of patterns from data			
The student will check graphs to determine that they do not misrepresent results.	28	estimating from a graph	206	interpretation of data	
	29	interpretation of patterns in data	252	reading tables	
	29	reading graphs and charts and tables			
	82	interpretations of patterns in data			
	124	interpret patterns in data from tables			
	437	interpretation of data from graphs and charts			
1.4.6					

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Standard	Description	Volume 1 Student Text		Volume 2 Investigation Manual	
		1.4.6	Skills and Processes	24	interpretation of patterns from graphs and tables
	The student will demonstrate that data analysis is a vital aspect of the process of scientific inquiry and communication.	27	analysis of trends from data	34	analyze trends from data
		29	interpretation of patterns in data	66	interpret patterns in data
	The student will describe trends revealed by data.	29	analyze trends from data	66	analyze trends from data
		82	interpretations of patterns in data	114	interpretation of patterns from data
		82	analyze trends from data	114	analyze trends from data
		124	interpret patterns in data from tables	155	analyze pendulum data
		437	interpretation of data from graphs and charts	206	interpretation of data
1.4.7	Skills and Processes	10	accuracy, precision, resolution	13	analysis of errors
	The student will demonstrate that data analysis is a vital aspect of the process of scientific inquiry and communication.	21	significant digits	23	calculate percent error
		41	good experimental technique		
	The student will determine the sources of error that limit the accuracy or precision of experimental results.				
1.4.8	Skills and Processes	28	know that scientific knowledge can be in the form of models	52	human arm model
	The student will demonstrate that data analysis is a vital aspect of the process of scientific inquiry and communication.	279	design and test model	75	modeling an atom
		286	Bohr's model of the atom	86	modeling a chemical bond
	The student will use models and computer simulations to extend his/her understanding of scientific concepts. (NTB)			96	modeling a reaction
				119	science is often in the form of models
				219	which model is supported?
1.4.9					

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Standard	Description	Volume 1 Student Text		Volume 2 Investigation Manual	
		1.4.9	Skills and Processes	37	review scientific hypothesis based on comparison with evidence
	The student will demonstrate that data analysis is a vital aspect of the process of scientific inquiry and communication.	40	analyze hypothesis based on data	13	analyze scientific hypothesis based on scientific evidence
	The student will use analyzed data to confirm, modify, or reject a hypothesis.			23	test your prediction
				31	analyze hypothesis based on comparison with evidence
				35	analyze hypothesis based on data
				85	perform the experiment you designed
				85	review your hypothesis
				85	do the data support the hypothesis
				85	present results to the class
				91	testing hypothesis
				155	investigate variables that affect the period of a pendulum
				241	analyze hypothesis based on data
1.5.1	Skills and Processes	25	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.	41	lab report	6	data tables
		332	communicating with graphs	9	data tables
	The student will demonstrate the ability to summarize data (measurements/observations).			10	data tables
				11	data tables
				13	data tables
				14	data tables
				22	data table
				25	data tables
				28	analyze trends from data
				30	data tables

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Standard	Description	Volume 1 Student Text	Volume 2 Investigation Manual
			34 data tables
			44 sketch the shape of the graph
			51 communication
			54 data table
			55 data table
			59 data tables
			62 using data tables
			64 data tables
			65 data tables
			83 data tables
			84 data tables
			85 design a data table
			91 data tables
			112 data tables
			119 data tables
			119 communicating
			123 data tables
			128 data tables
			129 data tables
			133 data tables
			134 data tables
			143 data tables
			146 data tables
			191 data tables
			203 data tables

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Standard	Description	Volume 1 Student Text		Volume 2 Investigation Manual	
1.5.2	Skills and Processes	41	write up results	17	drawings and diagrams
	The student will use appropriate methods for communicating in writing and orally the processes and results of scientific investigation.	41	lab report	37	diagrams
		138	diagrams	51	diagrams
		262	diagrams	51	communication
	The student will explain scientific concepts and processes through drawing, writing, and/or oral communication.	332	communicating with graphs	119	communicating
				143	creating sketches and diagrams
			145	making sketches	
			146	make an oral presentation about results	
			149	drawing sketches	
			150	drawing sketches	
			159	sketches	
			256	sketches	
			267	making sketches	
	1.5.3				

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Standard	Description	Volume 1 Student Text		Volume 2 Investigation Manual	
		1.5.3	Skills and Processes	25	making line and pie and and bar graphs
	The student will use appropriate methods for communicating in writing and orally the processes and results of scientific investigation.			5	Data Collector and probes
				10	graphs
	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)			11	line graphs
				20	Data Collector and probes
				38	Data Collector and photogates
				43	Data Collector and temperature probe
				48	Data Collector and temperature probe
				66	create line graphs
				207	making graphs
				220	Data Collector and temperature probe
1.5.4	Skills and Processes	25	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.	25	making line and pie and and bar graphs	6	data tables
		138	diagrams	9	data tables
		262	diagrams	10	data tables
	The student will use tables, graphs, and displays to support arguments and claims in both written and oral communication.			10	graphs
				11	data tables
				11	line graphs
				13	data tables
				14	data tables
				17	drawings and diagrams
				22	data table
				25	data tables
				28	analyze trends from data
				30	data tables

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Standard	Description	Volume 1 Student Text	Volume 2 Investigation Manual
			34 data tables
			37 diagrams
			44 sketch the shape of the graph
			51 diagrams
			54 data table
			55 data table
			59 data tables
			62 using data tables
			64 data tables
			65 data tables
			66 create line graphs
			83 data tables
			84 data tables
			85 design a data table
			85 present results to the class
			91 data tables
			112 data tables
			119 data tables
			123 data tables
			128 data tables
			129 data tables
			133 data tables
			134 data tables
			143 data tables
			143 creating sketches and diagrams

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Standard	Description	Volume 1 Student Text	Volume 2 Investigation Manual
1.5.5			145 making sketches
			146 data tables
			149 drawing sketches
			150 drawing sketches
			159 sketches
			191 data tables
			203 data tables
			207 making graphs
			208 data tables
			226 data tables
			255 data tables
			256 sketches
			267 making sketches
			279 data tables
			280 data tables
			284 data tables
			284 data tables

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Standard	Description	Volume 1 Student Text		Volume 2 Investigation Manual	
		1.5.5	Skills and Processes	138	diagrams
1.5.5	The student will use appropriate methods for communicating in writing and orally the processes and results of scientific investigation. The student will create and/or interpret graphics. (scale drawings, photographs, digital images, field of view, etc.)	262	diagrams	37	diagrams
				51	diagrams
				110	observational skills
				143	creating sketches and diagrams
				145	making sketches
				149	drawing sketches
				150	drawing sketches
				159	sketches
				256	sketches
				267	making sketches
1.5.6	Skills and Processes	271	Internet research	3	Internet search
	The student will use appropriate methods for communicating in writing and orally the processes and results of scientific investigation. The student will read a technical selection and interpret it appropriately.	275	Internet research	234	Internet research
				235	background research
				241	doing background research
				253	Internet research
1.5.7					

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Standard	Description	Volume 1 Student Text		Volume 2 Investigation Manual	
		1.5.7	Skills and Processes The student will use appropriate methods for communicating in writing and orally the processes and results of scientific investigation. The student will use, explain, and/or construct various classification systems.	303	classify by chemical and physical properties
		303	melting and boiling points	45	physical properties and freezing point
		343	synthesis or addition reactions	83	chemical properties and conservation of mass
		344	decomposition reactions	135	physical properties and solubility
		345	single displacement reactions	231	chemical properties and changes of a metal series
		345	double displacement reactions	233	carbon and its chemical changes
		437	classify resources as renewable or nonrenewable	235	types of chemical reactions
		439	research and classify resources as renewable or nonrenewable		
1.5.8	Skills and Processes The student will use appropriate methods for communicating in writing and orally the processes and results of scientific investigation. The student will describe similarities and differences when explaining concepts and/or principles.	34	recognizing that scientific knowledge is a process of learning	13	analyze scientific hypothesis based on scientific evidence
		36	review theories based on observations	31	analyze hypothesis based on comparison with evidence
		37	review scientific hypothesis based on comparison with evidence	35	analyze hypothesis based on data
		38	recognition that science is a process	85	do the data support the hypothesis
		40	analyze hypothesis based on data	85	review your hypothesis
		64	science is a process of investigation of learning about the natural world	241	analyze hypothesis based on data
		671	relative amount of solar radiation		
		676	theories of origin of the moon		
1.5.9	Skills and Processes The student will use appropriate methods for communicating in writing and orally the processes and results of scientific investigation. The student will communicate conclusions derived through a synthesis of ideas.	28	identifying cause and effect relationships	6	identify cause and effect relationships
		35	construct explanations supported by direct and indirect evidence	13	interpreting observations
		38	evaluate how research shapes scientific knowledge	13	cause and effect relationships
		82	identify cause and effect relationships—real and hypothesized	17	interpret observations and propose explanations
				22	explain any differences you see

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Standard	Description	Volume 1 Student Text	Volume 2 Investigation Manual
		457 interpreting observations	34 interpret observations
			35 construct reasonable explanations back by scientific evidence
			51 interpret observations
			52 construction reasonable explanations based on direct and indirect data
			62 interpret observations
			78 build models of Na and Cl and use them to explain bonding
			84 interpret observations
			89 explanation based on data
			108 constructing explanations
			110 interpret observations and pose explanations
			114 interpreting observations
			115 sequencing events
			124 interpret observations
			127 interpret observations
			130 construct reasonable explanations supported by evidence
			132 construct explanations based on evidence
			133 identify cause and effect relationships
			145 interpret observations
			146 construct explanations supported by evidence
			146 identifying cause and effect relationships
		203 construct reasonable explanations based on scientific evidence	

Physical, Earth, and Space Science, 1st Edition

Standard	Description	Volume 1 Student Text		Volume 2 Investigation Manual	
1.6.1				216	interpret observations
				253	interpret observations
				255	interpret observations
				257	construct explanations supported by scientific evidence
				268	interpret observations
				280	make explanations
1.6.1	Skills and Processes	19	dimensional analysis	54	slope of line
	The student will use mathematical processes.	83	determining slope of a line	198	dimensional analysis
	The student will use ratio and proportion in appropriate situations to solve problems.	85	determining slope	277	perform dimensional analysis
				279	dimensional analysis
1.6.2	Skills and Processes			4	Data Collector and probes
	The student will use mathematical processes.			5	Data Collector and probes
	The student will use computers and/or graphing calculators to perform calculations for tables, graphs, or spreadsheets.(NTB)			20	Data Collector and probes
				38	Data Collector and photogates
				43	Data Collector and temperature probe
				48	Data Collector and temperature probe
				220	Data Collector and temperature probe
1.6.3					

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Standard	Description	Volume 1 Student Text		Volume 2 Investigation Manual	
		1.6.3	Skills and Processes	15	calculating light year using scientific notation
	The student will use mathematical processes.	675	scientific notation		
	The student will express and/or compare small and large quantities using scientific notation and relative order of magnitude.	708	astronomic numbers expressed in scientific notation		
		733	converting numbers to scientific notation		
1.6.4	Skills and Processes	104	using algebraic formulas	201	unit canceling
	The student will use mathematical processes.	118	using algebraic model	218	derive a formula
		133	using algebraic models		
	The student will manipulate quantities and/or numerical values in algebraic equations.	161	kinetic energy formula		
		170	the power equation		
		204	the heat equation		
		229	Bernouilli's principle		
		239	pressure and temperature relationship		
		395	equation for Ohm's law		
		614	calculating wave speeds		
1.6.5					

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Standard	Description	Volume 1		Volume 2	
			Student Text		Investigation Manual
1.6.5	Skills and Processes	36	review theories based on observations	11	making and evaluating a graphical model
	The student will use mathematical processes.	40	analyze hypothesis based on data	13	analyze scientific hypothesis based on scientific evidence
	The student will judge the reasonableness of an answer.	82	making and evaluating graphs	22	create a graph
		676	theories of origin of the moon	24	predict what graph will look like
				28	make graph from data
				31	analyze hypothesis based on comparison with evidence
				34	graphical models
				35	analyze hypothesis based on data
				53	graph mass vs. volume
				62	constructing and evaluating graphical models from data
				85	do the data support the hypothesis
				113	creating and evaluating graphical model from data
				137	create a solubility curve
				190	construct graphical model from data and evaluate
			203	construct and evaluate a quantitative graphical model	
			218	create a graph	
			230	construct graphical model from data and evaluate	
			240	construct and evaluate graphical models	
			241	analyze hypothesis based on data	
1.7.1					

Physical, Earth, and Space Science, 1st Edition

Standard	Description	Volume 1 Student Text		Volume 2 Investigation Manual
		1.7.1	<p>Skills and Processes</p> <p>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.</p> <p>The student will apply the skills, processes, and concepts of biology, chemistry, physics, or earth science to societal issues.</p>	111
		279	history of atomic theory	
		286	atomic theory of matter development	
1.7.2	<p>Skills and Processes</p> <p>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.</p> <p>The student will identify and evaluate the impact of scientific ideas and/or advancements in technology on society.</p>	9	bytes and SI prefixes	
		45	science and technology	
		110	relationship between science and technology—maglev trains	
		111	relationship between science and applied technology	
1.7.3				

Physical, Earth, and Space Science, 1st Edition

Standard	Description	Volume 1 Student Text		Volume 2 Investigation Manual	
		1.7.3	Skills and Processes	622	acoustics
	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.	624	wavelength of sound		
	The student will describe the role of science in the development of literature, art, and music.(NTB)				
1.7.4	Skills and Processes	28	know that scientific knowledge can be in the form of models	192	measuring apparent brightness to calculate the distance to stars and galaxies
	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.	87	difference between basic and derived units	218	derive a formula
	The student will recognize mathematics as an integral part of the scientific process.(NTB)	104	using algebraic formulas	282	calculate the power output of a photovoltaic cell
		114	resolving vectors into their perpendicular components		
		150	calculating mechanical advantage		
		161	kinetic energy formula		
		170	the power equation		
		287	understanding the uncertainty principle		
		323	rules for writing formulas		
		721	inverse square law		
1.7.5					

Physical, Earth, and Space Science, 1st Edition

Standard	Description	Volume 1 Student Text	Volume 2 Investigation Manual
1.7.5	<p>Skills and Processes</p> <p>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.</p> <p>The student will investigate career possibilities in the various areas of science.(NTB)</p>		
1.7.6	<p>Skills and Processes</p> <p>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.</p> <p>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.</p>	<p>45 science and technology</p> <p>110 economic value of applied technology</p> <p>111 relationship between science and applied technology</p> <p>627 electromagnetic waves in common technology (i.e. radar)</p>	<p>207 application of echolocation</p> <p>228 use of electromagnetic waves in common technology</p> <p>229 use of electromagnetic waves in common technology</p>
2.1.1			

Physical, Earth, and Space Science, 1st Edition

Standard	Description	Volume 1 Student Text		Volume 2 Investigation Manual	
		2.1.1	Concepts of Earth and Space Science The student will identify and describe techniques used to investigate the universe and Earth. The student will describe the purpose and advantage of current tools, delivery systems and techniques used to study the universe.	681 how astronomical instruments help us understand the universe 712 history of the telescope 713 types and uses of telescopes 716 spacecraft as tools of astronomy 719 how astronomical instruments helped us learn about the universe 724 astronomical instruments	192 measuring apparent brightness to calculate the distance to stars and galaxies
2.1.2	Concepts Of Earth/Space Science The student will identify and describe techniques used to investigate the universe and Earth. The student will describe the purpose and advantage of current tools, delivery systems and techniques used to study the atmosphere, land and water on Earth.	59 use maps to identify major features such as mountains and rivers 249 measuring atmospheric pressure with barometers 506 earthquake scale	64 use techniques for atmospheric measurement 65 use techniques for atmospheric measurement 122 students know why earthquakes occur 125 students know why earthquakes occur 128 students understand how earthquakes occur 131 students know why and how earthquakes occur and the scales used to measure their intensity 228 techniques of atmospheric measurement		
2.2.1					

Physical, Earth, and Space Science, 1st Edition

Standard	Description	Volume 1		Volume 2		
		Student Text		Investigation Manual		
2.2.1	Concepts Of Earth/Space Science	90	effect of gravity on motion	178	stars and spectroscopy	
	The student will describe and apply the concept of natural forces and apply them to the study of Earth/Space Science.	92	projectile explained	191	astronomy and light	
		103	effect of gravity on objects			
		116	effects of gravity			
	The student will explain the role of forces in the formation and operation of the universe.	672	role of gravity in solar system			
		672	gravity causes orbits			
		675	role of gravity in solar system			
		694	classifying stars			
		695	using temperature and color to classify stars			
		696	using brightness and luminosity to classify stars			
		696	brightness of a star			
	2.2.2		697	H-R diagrams		
			697	temperature and luminosity of stars		
			720	effect of gravity		

Physical, Earth, and Space Science, 1st Edition

Standard	Description	Volume 1		Volume 2	
		Student Text		Investigation Manual	
2.2.2	Concepts Of Earth/Space Science	662	describe compare and explain the orbits of moons and planets	172	phases of the moon
	The student will describe and apply the concept of natural forces and apply them to the study of Earth/Space Science.	666	Earth's rotation and patterns of day and night		
		667	patterns of day and night and years		
	The student will explain the role and interaction of revolution, rotation and gravity on the Sun-Earth-Moon system.	668	phases of the moon		
		669	lunar eclipses		
		670	solar eclipses		
		670	solar eclipses		
		670	solar eclipses		
		672	tides and Earth and moon's relationship		
		673	identify seasons		
		676	giant impact theory		
		681	orbits of other bodies in the solar system		
		682	other bodies in solar system		
		683	orbits on bodies in solar system		

2.3.1

Physical, Earth, and Space Science, 1st Edition

Standard	Description	Volume 1 Student Text		Volume 2 Investigation Manual	
		2.3.1	Concepts Of Earth/Space Science	0	
	The student will explain how the transfer of energy and matter affect Earth systems.	253	weather involves transfer of energy	62	modeling incoming solar radiation
		254	how differential heating of Earth causes air movements	260	global winds and ocean currents
	The student will describe how energy and matter transfer affect Earth systems.	255	differential heating of Earth results in circulation of air	261	exploring salinity and temperature-dependent layering
		265	weather is due to energy transfer	263	understanding the North Atlantic gyre
		265	differential heating of Earth leads to distribution of heat	264	differential heating causes circulation of currents
		270	know weather has to do with energy transfer		
		362	atoms and nuclear energy		
		466	forces like volcanoes and erosion form and shape Earth		
		490	forces like volcanoes and erosion form and shape Earth		
		671	relative amount of solar radiation		
2.3.2	Concepts Of Earth/Space Science	246	nitrogen cycle	96	ocean acidification
	The student will explain how the transfer of energy and matter affect Earth systems.	436	how human activity affects resources—renewable and nonrenewable	150	draw conclusions about effects of human activity on resources
		436	effects of human activity on natural resources	151	draw conclusions about effects of human activity on resources
	The student will explain how global conditions are affected when natural and human-induced change alter the transfer of energy and matter.	550	acid rain	240	oil seeps
		566	depleting Ogallala aquifer		
		567	protecting watersheds		
2.4.1					

Physical, Earth, and Space Science, 1st Edition

Standard	Description	Volume 1 Student Text		Volume 2 Investigation Manual	
		2.4.1	Concepts Of Earth/Space Science	69	types of rock and how they are formed
	The student will analyze the dynamic nature of the geosphere.	466	how rocks are formed	146	types of rocks and how they are formed
	The student will compare the origin and structure of igneous, metamorphic and sedimentary rocks.	490	how rocks are formed		
2.4.2	Concepts Of Earth/Space Science	465	rock cycle	248	exploring the rock cycle
	The student will analyze the dynamic nature of the geosphere.	582	rock cycle	249	modeling rock types to study rock cycle
	The student will explain how the transfer of energy drives the rock cycle.	598	rock cycle	250	geologic transformation scenarios
2.4.3	Concepts Of Earth/Space Science	466	plate tectonics	120	types of features found along plate boundaries
	The student will analyze the dynamic nature of the geosphere.	466	structures formed at types of plate boundaries	121	three types of plate boundaries and features associated with them
	The student will explain changes in Earth's surface using plate tectonics.	478	Alfred Wegener's theory of continental drift	123	structures that form at certain plate boundaries
		481	oceanic and continental crust and lithospheric plates	123	geologic basis for earthquakes
		490	structures formed at types of plate boundaries	124	types of features at plate boundaries
		494	types of formations found at different plate boundaries	125	students know geologic basis for earthquakes
		518	types of plate boundaries	130	theory of plate tectonics
				132	know what forms at different types of plate boundaries
				252	plate tectonics
				253	plate tectonics
2.5.1					

Physical, Earth, and Space Science, 1st Edition

Standard	Description	Volume 1 Student Text		Volume 2 Investigation Manual	
		2.5.1	Concepts Of Earth/Space Science	451	geologic time scale
2.5.1	The student will explain changes in Earth's surface using plate tectonics. The student will investigate methods that geologists use to determine the history of Earth.	453	absolute dating	117	sequencing events in a geologic cross-section
		459	relative dating		
				252	general history on Earth
				253	fossils
2.5.2	Concepts Of Earth/Space Science	451	geologic time scale	252	general history on Earth
	The student will investigate methods that geologists use to determine the history of Earth.	453	absolute dating		
		459	relative dating		
	The student will compare events in Earth's history that have been grouped according to similarities.				