

**Correlation to Illinois Learning Standards for Science  
CPO Science Earth Science (Middle School)  
Student Text and Investigation Manual**

<b>Standard #: Area</b>	<b>State Goal</b>	<b>Learning Standard</b>	<b>Learning Expectation</b>	<b>Volume 1 Student Text Page</b>		<b>Volume 2 Investigation Manual Page</b>	
11.A.3a Scientific Investigation	Understand the processes of scientific inquiry and technological design to investigate questions, conduct experiments and solve problems.	Know and apply the concepts, principles and processes of scientific inquiry.	Formulate hypotheses that can be tested by collecting data.	4	pose questions and state hypothesis baed on prior experiences	5	formulate hypothesis
				4	making a hypothesis	6	make hypothesis
				8	make testable hypothesis	6	testing explanations against observations
				10	interpreting observations and proposing explanations	20	interpret observations
				13	making hypothesis	21	contruction reasonable explanations based on direct and indirect data
				15	formulate testable hypothesis	36	interpret observations
				15	making hypothesis based on prior experiences	47	design scientific investigations
				20	interpreting observation and proposing explanations	50	formulate testable hypothesis
				21	making testable hypothesis	51	construct reasonable explanations based on scientific evidence
				22	interpreting observations and posing explanations	53	interpret observations and propose explanations
				37	pose questions and state hypothesis	63	interpret observations
				37	create testable hypothesis	64	interpret observations and pose explanations
				40	design scientific experiments	64	formulate testable hypothesis
				50	interpret observations and pose explanations	67	interpreting observations
				52	create testable hypothesis	68	interpreting observations
				78	interpret observations		
						81	interpret observations

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				80	interpret observations	
				80	pose questions and state hypothesis based on prior experiences	
				100	construct reasonable explanations supported by evidence	
				100	why is Earth's atmosphere different from other planets	
				114	construct explanations based on evidence	
				114	interpret observations and propose explanations	
				150	interpret observations	
				150	proposing explanations	
				180	proposing explanations	
				209	interpreting observations	
				211	interpreting observations	
				213	interpret observations	
				218	formulate testable hypothesis	
				218	interpreting observations	
				219	interpreting observations	
				220	interpreting observations	
				366	interpret observations	
				366	what is in your tap water	
				372	proposing explanations	
				372	interpreting observation and proposing explanations	
				373	make explanations	
				373	construct explanations based on observations	
				373	making testable hypothesis	
				444	make reasonable explanation based on data	
				444	proposing explanations	
					129	formulate testable hypothesis
					129	use observations to construct explanations
					133	use observations to construct explanations

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11.A.3b Scientific Investigation	Understand the processes of scientific inquiry and technological design to investigate questions, conduct experiments and solve problems.	Know and apply the concepts, principles and processes of scientific inquiry.	Conduct scientific experiments that control all but one variable.	15	cause and effect relationships	6	conducting scientific inquiry by asking questions and formulating hypotheses
				36	recognizing and controlling variables in observations and experiments	9	recognizing and controlling variables
				37	recognizing and controlling variables	34	identifying relationships between air pressure and weather
				40	recognizing and controlling variables in an experiment	47	design scientific investigations
				40	design scientific experiments	90	identify cause and effect relationships
				41	recognizing variables	100	identifying cause and effect relationships
				43	recognizing variables		
				45	recognizing variables	114	recognize and control variables
				50	recognizing variables		
				52	design experiment as part of a team over one week		
				52	recognize variables		
				52	conduct scientific inquiry through lab investigations		
				394	recognize controlling variables		

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11.A.3c Scientific Investigation	Understand the processes of scientific inquiry and technological design to investigate questions, conduct experiments and solve problems.	Know and apply the concepts, principles and processes of scientific inquiry.	Collect and record data accurately using consistent measuring and recording techniques and media.	23	English and metric ruler	1	measuring
				24	English and metric rulers	1	timers
				24	measurements—including appropriate tools and units	4	measuring including use of appropriate tools
				25	measurements—units	10	metric rulers
				26	measurement	10	measuring and choosing tools
				26	metric rulers	11	measuring
				28	measurement—choosing appropriate units	12	rulers
				28	balances	13	measuring
				29	beakers and graduated cylinders	14	design experiment including selecting equipment
				31	measurement—including correct units	64	collect observational data
				32	thermometers and temperature-measuring instruments	66	making measurements
				33	thermometers and temperature-measuring instruments	73	measurements
				33	thermometers and temperature-measuring instruments	82	measurements
				34	temperature measuring instruments	96	measurement
				34	temperature measuring instruments	96	thermometers
				34	collect data with precision	121	measuring
				34	collect data with precision	124	timers
35	rulers	124	measurement				
35	thermometers	125	measurement				
35	timers	125	metric and English rulers				
				125	timers		

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				35	balances	129	measurements
				35	beakers and graduated cylinders	145	goggles
				40	collect data with precision	146	goggles and aprons
				40	select appropriate equipment	147	goggles
				48	measurement—including selecting appropriate tools	150	thermometers
				48	measurement—including selecting appropriate tools	152	metric and English rulers
				49	measure—select units	152	measuring
				49	measure—select units	153	measuring
				51	making measurements	153	metric rulers
				60	thermometers	154	measuring
				68	beakers and graduated cylinders	154	metric rulers
				68	beakers and graduated cylinders	155	metric rulers
				205	making measurements	156	temperature measuring devices
				345	measuring	157	thermometers
						157	beakers
						158	measuring
						158	rulers
						159	measuring
						160	measuring
						161	measuring
						162	graduated cylinder
						163	balances

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					164 balances 165 balances
11.A.3d Scientific Investigation	Understand the processes of scientific inquiry and technological design to investigate questions, conduct experiments and solve problems.	Know and apply the concepts, principles and processes of scientific inquiry.	Explain the existence of unexpected results in a data set.	9 use arguments of percent to describe scientific observations and conclusions 34 analysis of errors in measurement	11 analysis of errors 11 analysis of errors in measurement 12 errors in measurement 13 errors in measurement 33 graphing and drawing a trend line for atmospheric pressure data 34 calculating error between your barometer and a commercial barometer

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11.A.3e Scientific Investigation	Understand the processes of scientific inquiry and technological design to investigate questions, conduct experiments and solve problems.	Know and apply the concepts, principles and processes of scientific inquiry.	Use data manipulation tools and quantitative (e.g., mean, mode, simple equations) and representational methods (e.g., simulations, image processing) to analyze measurements.	9	use arguments of percent to describe scientific observations and conclusions	9	constructing and evaluating a graphical model
				34	analysis of errors in measurement	9	interpretation of pattern in data from observation
				39	creating and using an algebraic model	11	analysis of errors in measurement
				39	graphical models	12	errors in measurement
				41	making graphs from data	13	errors in measurement
				42	making graphical model from data	29	determining relationship between temperature of the atmosphere and relative humidity
				43	how to make graphical model from data	33	constructing a graph from atmospheric pressure data
				44	making graphical model from data	34	calculating error between your barometer and a commercial barometer
				45	constructing a graph		
				51	constructing graphical models	36	constructing and evaluating graphical models from data
				52	making graphs		
				52	interpret patterns from data	40	interpret patterns in data
				74	making and interpreting graphs	43	construct graphical model from data and evaluate
				378	interpretation of patterns in data	51	construct and evaluate a quantitative graphical model
				380	interpretation of data from graphs and charts	57	interpretation of data

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				394 create and evaluate graph	67 creating and evaluating graphical model from data
				412 interpret patterns in data from tables	68 interpretation of patterns from data
				420 interpretation of data from tables	113 construct and evaluate graphical models
				444 construct and evaluate data from graphical model	116 renewable resources
				444 interpretation of patterns from data	127 construct graphical model from data and evaluate
					136 construct graphical model from data and evaluate
					166 lab notebook
					167 making graphs



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11.A.3f Scientific Investigation	Understand the processes of scientific inquiry and technological design to investigate questions, conduct experiments and solve problems.	Know and apply the concepts, principles and processes of scientific inquiry.	Interpret and represent results of analysis to produce findings.	11	using data tables	2	data tables
				20	using and making data tables	2	averages
				31	using data tables	3	trends from data
				35	data tables	3	bar graphs
				41	creating line, pie, and bar graphs	3	bar graphs
				42	making and using data tables	4	data tables
				42	making a graph	4	bar graph
				43	creating and using data tables	7	data tables
				43	making graphs—pie, line, and bar	8	data tables
				44	making line graph	8	graphs
				45	making pie, bar, and line graphs	9	data tables
				48	using data tables	9	interpretation of pattern in data from observation
				51	line, pie, and bar graphs	9	line graphs
				51	using data tables	12	data tables
				52	interpret patterns from data	22	data tables
				110	data tables	24	data tables
				276	analyze trends from data	24	trends from data
		26	data tables				
		29	determining relationship between temperature of the atmosphere and relative humidity				
		36	using data tables				
		38	data tables				
		39	data tables				

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				298	40	interpret patterns in data
					40	analyze trends from data
				378	40	create line graphs
					51	data tables
				380	57	interpretation of data
					58	making graphs
				394	59	data tables
				394	66	data tables
				412	68	interpretation of patterns from data
				420	68	analyze trends from data
				444	69	data tables
					72	data tables
				444	72	data tables
				444	74	data tables
					78	data tables
					85	data tables
					86	data tables
					90	data tables
					92	data tables
					95	data tables
					100	data tables
					100	make an oral presentation about results

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					100 data tables 108 data tables 118 data tables 122 data tables 123 data tables 131 data tables 137 data tables 151 data tables 151 analyze trends from data 155 data tables 167 data tables 168 data tables

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11.A.3g Scientific Investigation	Understand the processes of scientific inquiry and technological design to investigate questions, conduct experiments and solve problems.	Know and apply the concepts, principles and processes of scientific inquiry.	Report and display the process and results of a scientific investigation.	15	formal lab report	3	bar graphs
				15	communication—written	4	bar graph
				19	writing up scientific results	8	graphs
				19	communicating is key to scientific process	9	line graphs
				22	writing up scientific results	20	communication
				22	explaining through discussion	40	create line graphs
				30	written communication	58	making graphs
				35	communication written	69	communicating
				41	creating line, pie, and bar graphs	100	make an oral presentation about results
				42	making a graph	149	formal lab report
				43	making graphs—pie, line, and bar	150	communicating results is essential to science
				44	making line graph	150	lab report
				45	making pie, bar, and line graphs	151	writing up results
				51	line, pie, and bar graphs	151	lab report
				224	explaining—scientific ideas are made clear through discussion	167	lab reports
				266	communicating	167	making graphs
				281	communication	168	formal lab report

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				298 making an oral presentation of scientific objects 376 explaining 429 communicating written scientific notation 471 effectively conveying written info is essential to science	
11.B.3a Technological Design	Understand the processes of scientific inquiry and technological design to investigate questions, conduct experiments and solve problems.	Know and apply the concepts, principles and processes of scientific inquiry.	Identify an actual design problem and establish criteria for determining the success of a solution.	40 design scientific experiments	14 design experiment including selecting equipment 47 design scientific investigations 64 collect observational data

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11.B.3b Technological Design	Understand the processes of scientific inquiry and technological design to investigate questions, conduct experiments and solve problems.	Know and apply the concepts, principles and processes of scientific inquiry.	Sketch, propose and compare design solutions to the problem considering available materials, tools, cost effectiveness and safety	30 40 194 200 222	dimensional drawings select appropriate equipment creating dimensional sketches creating dimensional drawings dimensioned drawings	14 27 64 99 143 144 145 146 147 148	design experiment including selecting equipment safety in swinging thermometers collect observational data dimensioned drawings safety skills safety skills safety quiz safety quiz safety quiz safety contract
11.B.3c Technological Design	Understand the processes of scientific inquiry and technological design to investigate questions, conduct experiments and solve problems.	Know and apply the concepts, principles and processes of scientific inquiry.	Select the most appropriate design and build a prototype or simulation.	222	modify tested solution and document change in performance	120	design models

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11.B.3d Technological Design	Understand the processes of scientific inquiry and technological design to investigate questions, conduct experiments and solve problems.	Know and apply the concepts, principles and processes of scientific inquiry.	Test the prototype using available materials, instruments and technology and record the data.	9	making observational data	1	timers
				12	collect observational data	10	metric rulers
				13	collecting qualitative data	12	rulers
				21	collect observational data	19	observational data
				22	collect observational data	28	collecting wet and dry bulb temperature readings
				22	collect qualitative data	50	collect quantitative data
				23	English and metric ruler	63	observational data
				24	English and metric rulers	66	collect quantitative data
				26	metric rulers	85	collect quantitative data
				28	balances	94	collect observational data
				29	beakers and graduated cylinders	95	collect observational data
				32	thermometers and temperature-measuring instruments	96	thermometers
				33	thermometers and temperature-measuring instruments	96	collect qualitative data
				33	thermometers and temperature-measuring instruments	96	collect observational data
				34	temperature measuring instruments	116	collect quantitative data
				34	temperature measuring instruments	124	timers
				34	temperature measuring instruments	125	metric and English rulers
				35	balances	125	timers
				35	timers	145	goggles
				35	thermometers	146	goggles and aprons
				35	beakers and graduated cylinders	147	goggles
				35	rulers	150	thermometers

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				48 collecting quantitative data 60 thermometers 63 collect observational evidence 68 beakers and graduated cylinders 85 making observational data 222 modify tested solution and document change in performance	152 metric and English rulers 153 metric rulers 154 metric rulers 155 metric rulers 156 temperature measuring devices 157 thermometers 157 beakers 158 rulers 162 graduated cylinder 163 balances 164 balances 165 balances
11.B.3e Technological Design	Understand the processes of scientific inquiry and technological design to investigate questions, conduct experiments and solve problems.	Know and apply the concepts, principles and processes of scientific inquiry.	Evaluate the test results based on established criteria, note sources of error and recommend improvements.	9 use arguments of percent to describe scientific observations and conclusions 34 analysis of errors in measurement 222 modify tested solution and document change in performance	11 analysis of errors 11 analysis of errors in measurement 12 errors in measurement 13 errors in measurement 34 calculating error between your barometer and a commercial barometer



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11.B.3f Technological Design	Understand the processes of scientific inquiry and technological design to investigate questions, conduct experiments and solve problems.	Know and apply the concepts, principles and processes of scientific inquiry.	Using available technology, report the relative success of the design based on the test results and criteria.	15	communication—written	3	bar graphs
				15	formal lab report	4	bar graph
				19	communicating is key to scientific process	8	graphs
				22	explaining through discussion	9	line graphs
				30	written communication	20	communication
				35	communication written	40	create line graphs
				41	creating line, pie, and bar graphs	58	making graphs
				42	making a graph	69	communicating
				43	making graphs—pie, line, and bar	149	formal lab report
				44	making line graph	150	communicating results is essential to science
				45	making pie, bar, and line graphs	150	lab report
				51	line, pie, and bar graphs	151	lab report
				224	explaining—scientific ideas are made clear through discussion	167	lab reports
				266	communicating	168	formal lab report
				281	communication		
				376	explaining		
				429	communicating written scientific notation		

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				471 effectively conveying written info is essential to science	

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12.E.3a Earth Science	Understand the fundamental concepts, principles and interconnections of the life, physical and earth/space sciences.	Know and apply concepts that describe the features and processes of the Earth and its resources.	Analyze and explain large-scale dynamic forces, events and processes that affect the Earth's land, water and atmospheric systems (e.g., jetstream, hurricanes, plate tectonics).	5	explain factors that helped shape Earth—volcanism	25	explain relationship between solar energy and precipitation and rivers and oceans
				16	plate tectonics		
				18	recognize forces that shape Earth—volcanoes	26	understand relationship between solar energy and water cycle
				87	relationship between sun and precipitation	30	changes in weather
				98	discuss atmosphere	30	major Earth systems such as atmosphere
				99	relationships between sun and water cycle	40	describe changes in weather
				105	atmosphere	42	causes for tornadoes
				106	Earth's atmosphere	44	hurricanes
				107	atmosphere structure	45	investigate ocean currents
				111	weather and climate are based on heat transfer	48	differential heating causes circulation of currents
				112	relationships between Earth's rotation and currents	50	investigate wave speed
				114	general cause of seasons	70	types of features found along plate boundaries
				116	hurricanes	74	mountain building
				117	how oceans affect weather	76	three types of plate boundaries and features associated with them
				117	hurricanes		
				117	differential heating of oceans	77	students know why earthquakes occur
				118	evolution of land features from gradual changes	78	geologic basis for earthquakes

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				122	differential heating of Earth causes circulation	78	students know the structures that form at plate boundaries
				122	weather involves transfer of energy	78	structures that form at certain plate boundaries
				122	changes in and causes for weather	78	types of features at plate boundaries
				122	large scale movement of air and how it affects weather	80	plate tectonics
				123	large movements of air	81	plate tectonics
				124	Coriolis effect	82	students know why earthquakes occur
				124	how differential heating of Earth causes air movements	82	students know geologic basis for earthquakes
				124	know the relationship between rotation of Earth and the circular motion of air currents	82	students know why earthquakes occur
				125	Coriolis effect	85	students understand how earthquakes occur
				125	how air movement affects weather	87	theory of plate tectonics
				125	differential heating of Earth results in circulation of air	88	students know why and how earthquakes occur and the scales used to measure their intensity
				126	water cycle related to weather	89	students know structures that form at the three different plate boundaries
				126	movement of air affects weather	89	know what forms at different types of plate boundaries
						100	rivers and streams

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				126	how water cycle affects weather	101	rivers and streams
				128	how climate is related to transfer of energy	102	predict evolution of land features resulting from erosion
				130	describe changes in weather (i.e. clouds)	104	predict results of erosion
				131	atmosphere	105	predict results of erosion
				131	reasons for changes in weather		
				132	changes in weather		
				132	how water cycle relates to weather		
				133	changes in weather		
				133	large scale movement of air causes weather changes		
				134	reasons for changes in weather		
				134	movement of air affects weather		
				135	weather is due to energy transfer		
				135	Coriolis effect		
				135	differential heating of Earth leads to distribution of heat		
				136	causes of severe weather		

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				137	
					know weather is the result of energy transfers
				137	
					water cycle affects weather
				137	
					movement of air affects weather
				137	
					Coriolis effect
				137	
					changes in weather and causes for storms
				138	
					reasons for tornadoes
				138	
					know weather has to do with energy transfer
				139	
					how oceans affect weather including El Nino
				141	
					movement of air affects climate
				141	
					water affects climates
				141	
					oceans affect climate
				142	
					know that climate is based on energy transfer
				142	
					relationship between solar energy and precipitation
				143	
					water affects temperature
				156	
					how sun and oceans interact
				158	
					relationship between sun and oceans

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				158	
					how water cycle relates to weather patterns
				158	
					oceans affect climate
				158	
					movements of air affect weather patterns
				159	
					ocean currents
				159	
					Coriolis effect
				160	
					ocean currents
				165	
					geologic basis for natural hazards
				178	
					ocean currents
				179	
					ocean currents
				183	
					Coriolis effect
				198	
					students know that ocean floor gives evidence for plate tectonics
				231	
					major Earth systems
				234	
					know features of ocean floor
				235	
					behavior of Earth's crust
				236	
					interaction of major Earth systems
				238	
					features of ocean floor
				239	
					cause of earthquakes
				242	
					major systems of Earth
				246	
					theory of plate tectonics

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				247	
					plate tectonics explains surface features of Earth
				248	plate tectonics
				249	features of ocean floor that give evidence for plate tectonics
				250	know features of ocean floor as evidence for plate tectonics
				253	plate tectonics
				253	evolution of land features resulting from gradual changes
				253	know geologic basis for volcanoes
				253	structures that form at plate boundaries
				254	plate tectonics
				254	plate boundaries
				254	features of ocean floor that give evidence for plate tectonics
				255	plate boundaries
				256	features of ocean floor that provide evidence for plate tectonics
				256	plate boundaries



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				258	
					predict results of gradual changes—mountain building
				259	plate boundaries
				259	know how earthquakes occur
				260	structures that form at plate boundaries
				260	geologic basis for earthquakes
				261	plate boundaries
				262	location of volcanoes and earthquakes
				262	ocean floor as evidence for plate tectonics
				263	plate boundaries
				264	geologic basis for volcanoes
				264	principal structures that form at plate boundaries
				265	volcanoes are caused by hot spots
				266	plate boundaries
				267	ocean floor features give evidence for plate tectonics
				267	plate tectonics
				267	plate boundaries

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Standard #: Area	State Goal	Learning Standard	Learning Expectation	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
				268	plate tectonics
				268	plate boundaries
				269	plate tectonics
				270	basis of geologic hazards like earthquakes
				270	why and how earthquakes occur
				271	major Earth systems
				271	know geologic basis for earthquakes
				272	students know geologic basis for earthquakes
				273	know why and how earthquakes occur
				273	plate tectonics
				274	major Earth systems—lithosphere
				274	students know why and how earthquakes occur
				275	geologic basis of earthquakes
				278	scale for measuring earthquakes
				279	earthquake scale
				280	scale for earthquakes
				280	geologic basis for earthquakes

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Standard #: Area	State Goal	Learning Standard	Learning Expectation	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
				280	
					types of features at plate boundaries
				281	
					know scales used to measure intensity of earthquakes
				282	
					explain the inner structure of a volcano
				283	
					how volcanoes shape Earth's surface
				284	
					volcanoes shape Earth's surface
				285	
					inner workings of a volcano
				287	
					geologic basis for volcanoes
				287	
					describe inner workings of volcanoes
				288	
					geologic basis for volcanoes
				289	
					geologic basis for volcanoes
				289	
					workings of a volcano
				290	
					geologic basis for volcanoes
				290	
					sea floor characteristics are evidence of plate tectonics
				290	
					structures that form at plate boundaries

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Standard #: Area	State Goal	Learning Standard	Learning Expectation	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
				291	geologic basis for volcanoes
				292	geologic basis for volcanoes
				292	forces such as erosion and volcanism that shape Earth's surface
				292	forces such as erosion and volcanism that shape Earth's surface
				293	volcanic islands appear at plate boundaries
				293	diagram structure of volcano
				294	islands form at plate boundaries
				297	know geologic basis of natural hazards
				304	forces that shape Earth's surface (i.e. volcanism)
				308	forces that shape Earth (erosion)
				310	types of plate boundaries
				312	how volcanoes help shape Earth
				317	types of formations found at different plate boundaries

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Standard #: Area	State Goal	Learning Standard	Learning Expectation	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
				317	
					sea floor characteristics show evidence of plate tectonics
				318	
					forces like volcanoes and erosion form and shape Earth
				318	
					structures formed at types of plate boundaries
				318	
					plate tectonics
				319	
					plate boundaries
				326	
					predict evolution of land features resulting from gradual changes
				330	
					forces that shape Earth's surface—erosion
				332	
					forces that shape Earth's surface—erosion
				334	
					rivers streams erosion and deposition
				339	
					evolution of land features from gradual changes
				340	
					explain relationship between hydrosphere, climate, and human activity
				341	
					forces that shape Earth such as erosion

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Standard #: Area	State Goal	Learning Standard	Learning Expectation	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
				342	
					predict evolution of land features because of erosion
				343	
					streams and erosion
				357	
					major Earth systems hydrosphere and atmosphere and biosphere and geosphere
				358	
					forces that change Earth's surface (erosion)
				358	
					major Earth systems
				358	
					forces that change Earth's surface erosion
				359	
					evolution of land features from erosion
				360	
					major systems hydrosphere and biosphere and geosphere
				362	
					evolution of land features by erosion
				365	
					relationship between hydrosphere and human activity
				366	
					relationship between hydrosphere and human activity
				367	
					relationship between humans and hydrosphere

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Standard #: Area	State Goal	Learning Standard	Learning Expectation	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
				384	
					how human activity affects renewable and nonrenewable resources
				390	
					significance of greenhouse effect
				392	
					volcanism
				392	
					volcanism

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<b>Standard #: Area</b>	<b>State Goal</b>	<b>Learning Standard</b>	<b>Learning Expectation</b>	<b>Volume 1 Student Text Page</b>		<b>Volume 2 Investigation Manual Page</b>	
12.E.3b Earth Science	Understand the fundamental concepts, principles and interconnections of the life, physical and earth/space sciences.	Know and apply concepts that describe the features and processes of the Earth and its resources.	Describe interactions between solid earth, oceans, atmosphere and organisms that have resulted in ongoing changes of Earth (e.g., erosion, El Nino).	74	know the rate of solar radiation	25	explain relationship between solar energy and precipitation and rivers and oceans
				87	relationship between sun and precipitation	26	understand relationship between solar energy and water cycle
				92	how water cycle is related to erosion	30	major Earth systems such as atmosphere
				93	water cycle is related to erosion	30	changes in weather
				98	discuss atmosphere	40	describe changes in weather
				99	relationships between sun and water cycle	42	causes for tornadoes
				105	atmosphere	44	hurricanes
				106	Earth's atmosphere	45	investigate ocean currents
				107	fate of incoming solar radiation	50	investigate wave speed
				107	atmosphere structure	61	how rock cycle is related to erosion
				108	fate of incoming solar radiation	74	mountain building
				111	weather and climate are based on heat transfer	90	how rocks are formed
				111	fate of incoming solar radiation	94	explain how rocks are formed
				112	relationships between Earth's rotation and currents	98	explain how water is related to erosion
				116	hurricanes	100	water cycle related to erosion
				117	how oceans affect weather	100	types of rocks and how they are formed



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Standard #: Area	State Goal	Learning Standard	Learning Expectation	Volume 1 Student Text Page	Volume 2 Investigation Manual Page		
				117	hurricanes	101	running water shapes the landscape
				118	evolution of land features from gradual changes	102	water running causes erosion
				122	weather involves transfer of energy	102	predict evolution of land features resulting from erosion
				122	changes in and causes for weather	104	predict results of erosion
				122	large scale movement of air and how it affects weather	105	predict results of erosion
				123	large movements of air		
				124	Coriolis effect		
				124	know the relationship between rotation of Earth and the circular motion of air currents		
				125	Coriolis effect		
				125	how air movement affects weather		
				126	movement of air affects weather		
				128	how climate is related to transfer of energy		
				130	describe changes in weather (i.e. clouds)		
				131	atmosphere		
				131	reasons for changes in weather		

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Standard #: Area	State Goal	Learning Standard	Learning Expectation	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
				132	
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Standard #: Area	State Goal	Learning Standard	Learning Expectation	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
				141	
				oceans affect climate	
				142	
				fate of incoming solar radiation	
				142	
				interaction of wind, ocean currents, and mountains results in distribution of biomes	
				142	
				know that climate is based on energy transfer	
				142	
				relationship between solar energy and precipitation	
				145	
				distribution of deserts and rain forests because of oceans	
				156	
				how sun and oceans interact	
				158	
				relationship between sun and oceans	
				158	
				movements of air affect weather patterns	
				158	
				oceans affect climate	
				159	
				Coriolis effect	
				159	
				interaction of wind patterns and ocean currents	
				159	
				ocean currents	
				160	
				ocean currents	

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Standard #: Area	State Goal	Learning Standard	Learning Expectation	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
				168	
					how water cycle is related to erosion
				169	
					explain how rocks are broken down by the action of water
				170	
					how rocks are broken down and how surface features are affected by water
				171	
					erosion and how surface features change
				172	
					how water is cycle is related to erosion
				175	
					how water cycle is related to erosion
				178	
					ocean currents
				179	
					ocean currents
				183	
					Coriolis effect
				198	
					students know that ocean floor gives evidence for plate tectonics
				199	
					types of rock and how they are formed
				209	
					explain how water cycle is related to erosion
				210	
					how rocks are broken down and surface features change due to action of water

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Standard #: Area	State Goal	Learning Standard	Learning Expectation	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
				231	major Earth systems
				234	know features of ocean floor
				236	interaction of major Earth systems
				238	features of ocean floor
				242	major systems of Earth
				249	features of ocean floor that give evidence for plate tectonics
				250	know features of ocean floor as evidence for plate tectonics
				252	major Earth systems—lithosphere
				254	features of ocean floor that give evidence for plate tectonics
				256	features of ocean floor that provide evidence for plate tectonics
				258	predict results of gradual changes—mountain building
				259	plate boundaries
				261	plate boundaries
				262	ocean floor as evidence for plate tectonics

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Standard #: Area	State Goal	Learning Standard	Learning Expectation	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
				263	plate boundaries
				267	ocean floor features give evidence for plate tectonics
				271	major Earth systems
				274	major Earth systems—lithosphere
				278	scale for measuring earthquakes
				283	volcanoes change natural habitat
				290	sea floor characteristics are evidence of plate tectonics
				295	how rocks are formed
				307	types of rocks and how they are made
				308	rock cycle and types of rock
				308	geologic recycling of rock
				308	rock gets broken down into soil
				310	igneous rock formation
				311	how igneous rocks are formed
				312	how rocks are formed
				315	how sedimentary rocks are formed

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Standard #: Area	State Goal	Learning Standard	Learning Expectation	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
				316	
					metamorphic rock formation
				317	
					formation of metamorphic rocks
				317	
					sea floor characteristics show evidence of plate tectonics
				318	
					how rocks are formed
				319	
					plate boundaries
				326	
					predict evolution of land features resulting from gradual changes
				327	
					rock cycle
				327	
					how rocks are broken down
				327	
					water cycle related to erosion
				328	
					water related to weathering
				328	
					running water shapes landscape
				329	
					how rocks are broken down by water and ice
				332	
					how rocks are broken down and turned back into soil
				333	
					how water cycle is related to erosion

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Standard #: Area	State Goal	Learning Standard	Learning Expectation	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
				334	
					water cycle related to erosion
				334	
					water running downhill shapes Earth
				335	
					how water cycle is related to erosion
				336	
					types of rock and how they are formed
				337	
					rocks broken down into soil
				339	
					evolution of land features from gradual changes
				339	
					Earth changes due to landslides
				340	
					landslides change habitats
				340	
					Earth's surface changes because of water
				342	
					predict evolution of land features because of erosion
				343	
					how water cycle relates to erosion
				343	
					water running shapes landscape
				344	
					water cycle related to erosion
				345	
					water cycle related to erosion



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				356	
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Standard #: Area	State Goal	Learning Standard	Learning Expectation	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
				364 how water cycle is related to erosion	
				390 significance of greenhouse effect	

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12.E.3c Earth Science	Understand the fundamental concepts, principles and interconnections of the life, physical and earth/space sciences.	Know and apply concepts that describe the features and processes of the Earth and its resources.	Evaluate the biodegradability of renewable and nonrenewable natural resources.	108	how people affect Earth's atmosphere	104	draw conclusions about effects of human activity on resources
				322	how humans activities affect resources	105	draw conclusions about effects of human activity on resources
				341	how humans affect soil resources	107	how common materials like paper can be recycled
				349	make inferences and draw conclusions about effect of humans activity on Earth's renewable resources	108	how paper and other materials are recycled and disposed of
				350	how humans activities affect resources	109	renewable and non-renewable resources
				356	how human activity affects soil and water resources	112	make inferences and draw conclusions about effects of human activity on renewable and nonrenewable resources
				361	human impact on soil		
				362	draw conclusions about human activity on Earth's resources	115	classify resources as renewable or nonrenewable
				365	effects of human activity on water		
				366	environmental impact of chemical reactions		
				371	human effects on natural resources		
				375	effects of human activity on natural resources		

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Standard #: Area	State Goal	Learning Standard	Learning Expectation	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
				376	
					how human activity affects natural resources
				378	
					conclusions about human activity and effects on Earth's resources
				379	
					how human activity affects resources—renewable and nonrenewable
				380	
					classify resources as renewable or nonrenewable
				382	
					research and classify resources as renewable or nonrenewable
				383	
					classify resources as renewable or nonrenewable
				387	
					how human activity affects renewable and nonrenewable resources
				472	
					how humans activities affect resources

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12.F.3a Earth Science	Understand the fundamental concepts, principles and interconnections of the life, physical and earth/space sciences.	Know and apply concepts that explain the composition and structure of the universe and Earth's place in it.	Simulate, analyze and explain the effects of gravitational force in the solar system (e.g., orbital shape and speed, tides, spherical shape of the planets and moons).	16	gravitation	117	orbits of moon and planets
				17	law of gravity	118	orbits of moons and other planets
				22	law of gravity	119	orbits of planets
				27	law of gravity	127	phases of the moon
				113	compare orbits of planets	137	appearance of moon
				324	law of gravity	138	appearance of the moon
				353	law of gravity	138	orbits of planets
				374	law of gravity		
				402	Newton's universal law of gravitation		
				403	orbits of moons and planets		
				411	compare orbits of planets in solar system		
				415	orbits of other bodies in the solar system		
				416	other bodies in solar system		
				418	compare orbits of planets and other bodies in solar system		
				423	orbits of planets and moons		
				423	relationship of Earth and moon		
424	orbits of planets in solar system						

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Standard #: Area	State Goal	Learning Standard	Learning Expectation	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
				425	
				role of gravity in solar system	
				425	
				compare orbits of planets and moon	
				426	
				giant impact theory	
				428	
				role of gravity in solar system	
				428	
				tides and Earth and moon's relationship	
				430	
				explain orbit of Earth	
				432	
				orbit of moon	
				432	
				phases of the moon	
				433	
				phases of moon	
				434	
				lunar eclipses	
				435	
				solar eclipses	

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12.F.3b Earth Science	Understand the fundamental concepts, principles and interconnections of the life, physical and earth/space sciences.	Know and apply concepts that explain the composition and structure of the universe and Earth's place in it.	Describe the organization and physical characteristics of the solar system (e.g., sun, planets, satellites, asteroids, comets).	113	compare orbits of planets	117	orbits of moon and planets
				399	compare planets	117	place of Earth in solar system
				399	general structure of solar system	118	orbits of moons and other planets
				401	general structure of the solar system	118	Earth's position among planets
				403	orbits of moons and planets	119	orbits of planets
				405	general position of Earth	119	Earth's position among the planets
				405	AU	120	use astronomical units
				407	classifying planets	121	position of Earth among planets
				409	classifying the planets	121	general characteristics of universe
				409	classify and compare planets	122	astronomical units
				410	compare planets	138	orbits of planets
				411	compare orbits of planets in solar system		
				412	comparing planets		
				414	other planets in universe		
				415	orbits of other bodies in the solar system		
				416	other bodies in solar system		
				418	compare orbits of planets and other bodies in solar system		

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Standard #: Area	State Goal	Learning Standard	Learning Expectation	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
				418	
				compare planets	
				419	
				compare planets	
				420	
				compare planets	
				423	
				orbits of planets and moons	
				424	
				place of Earth in solar system	
				424	
				orbits of planets in solar system	
				425	
				compare orbits of planets and moon	
				427	
				general structure of solar system	
				430	
				explain orbit of Earth	
				432	
				orbit of moon	
				440	
				features and emissions of the sun	
				442	
				structure of sun	
				443	
				sun as star	
				444	
				Sun as a star	
				447	
				galaxies	
				456	
				compare the Sun to other stars	
				460	
				compare sun to other stars	
				461	
				the existence of other planetary systems	



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				461	
				464	
				465	
				469	
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12.F.3c Earth Science	Understand the fundamental concepts, principles and interconnections of the life, physical and earth/space sciences.	Know and apply concepts that explain the composition and structure of the universe and Earth's place in it.	Compare and contrast the sun as a star with other objects in the Milky Way Galaxy (e.g., nebulae, dust clouds, stars, black holes).	113	compare orbits of planets	117	orbits of moon and planets
				403	orbits of moons and planets	118	orbits of moons and other planets
				411	compare orbits of planets in solar system	119	orbits of planets
				414	other planets in universe	138	orbits of planets
				415	orbits of other bodies in the solar system		
				416	other bodies in solar system		
				418	compare orbits of planets and other bodies in solar system		
				423	orbits of planets and moons		
				424	orbits of planets in solar system		
				425	compare orbits of planets and moon		
				430	explain orbit of Earth		
				432	orbit of moon		
				440	features and emissions of the sun		
				442	structure of sun		
				443	sun as star		
				444	Sun as a star		

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				456	
					compare the Sun to other stars
				456	
					explain how stars form and features of life cycle
				457	
					how stars produce energy
				458	
					brightness of a star
				460	
					compare sun to other stars
				460	
					how stars form
				460	
					stages of star's life are determined by balance between gravitational collapse and nuclear fusion
				461	
					the existence of other planetary systems
				467	
					how stars form
				468	
					star life cycle