

Correlation to Arkansas Science Curriculum Framework: Physical Systems
Integrated Science: An Investigative Approach
Student Text and Investigation Manual

Standard #: Grade	Strand	Standard	Student Learning Expectation	Volume 1 Student Text page	Volume 2 Investigation Manual page
ESS.08.8.01 8	Earth and Space Science	Earth Systems	Analyze the causes and predict the consequences of global warming on the following: <ul style="list-style-type: none"> •weather •temperature •ocean water levels 	487 greenhouse effect and greenhouse gasses 491 computer modeling to predict greenhouse effects 502 descriptions of ocean currents and their effects on climate	185 effect of ocean on carbon dioxide levels in the atmosphere 202 investigate the temperature effects of greenhouse gases 207 research how large bodies of water affect climate 215 understanding the Atlantic gyre
ESS.08.8.02 8	Earth and Space Science	Earth Systems	Investigate how global patterns of water currents influence local weather: <ul style="list-style-type: none"> •Gulf Stream •Atlantic Currents •California Current 	499 convection currents in the atmosphere 502 descriptions of ocean currents and their effects on climate 503 water in the atmosphere affects weather patterns	207 research how large bodies of water affect climate 213 exploring how temperature-dependent layering creates currents 215 understanding the Atlantic gyre

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ESS.08.8.03 8	Earth and Space Science	Earth Systems	Conduct investigations to compare and contrast different landforms found on Earth: <ul style="list-style-type: none"> •mountains •plateaus •plains 	516 using maps to identify mountain ranges 534 predicting what Earth might look like in 50 million years 540 land features resulting from divergent plate boundaries 541 resulting land features from subduction 542 land features resulting from transform plate boundaries 553 predict separation of North America and Europe in 75 million years 554 predict effects of divergent plate boundaries on Great Rift Valley 559 using a map to identify volcanoes 569 mountain-building 570 changes in land features due to erosion 572 effect of glaciers on land	229 using a globe to identify mountain ranges 230 predicting plate movement over 50 million years and the resultant land features

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ESS.08.8.04 8	Earth and Space Science	Earth Systems	Synthesize and model the result of both constructive and destructive forces on land forms: <ul style="list-style-type: none"> •deposition •erosion •weathering •crustal deformation 	534	predicting what Earth might look like in 50 million years	230	predicting plate movement over 50 million years and the resultant land features
				540	land features resulting from divergent plate boundaries	240	estimating the effects of meteor impacts on Earth
				541	resulting land features from subduction	241	identifying which geologic features on Earth were caused by meteors
				542	land features resulting from transform plate boundaries		
				553	predict separation of North America and Europe in 75 million years		
				554	predict effects of divergent plate boundaries on Great Rift Valley		
				561	formation of Hawaiian Islands due to volcanic activity		
				564	volcanoes shape the Earth		
				568	constructive and destructive processes		
				569	constructive process of mountain building		
			569	mountain-building			

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				570 changes in land features due to erosion	
				570 the destructive process of erosion	
				571 wind erosion	
				571 formation of soil	
				572 effect of glaciers on land	
				582 the rock cycle	
ESS.08.8.05 8	Earth and Space Science	Earth Systems	Compare and contrast the different landforms caused by Earth's external forces: <ul style="list-style-type: none"> •plains •canyons •deltas •valleys •swamps 	561 formation of Hawaiian Islands due to volcanic activity	240 estimating the effects of meteor impacts on Earth
				564 volcanoes shape the Earth	241 identifying which geologic features on Earth were caused by meteors
				569 constructive process of mountain building	
				570 the destructive process of erosion	
				571 wind erosion	

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ESS.08.8.06 8	Earth and Space Science	Earth Systems	Research local, regional, and state landforms created by external forces on Earth: <ul style="list-style-type: none"> •Gulf Coastal Plain •Arkansas River Valley •Mississippi Alluvial Plain, including the delta region •Crowley's Ridge 	featured in ancillary component	featured in ancillary component
ESS.08.8.07 8	Earth and Space Science	Earth Systems	Use topographic maps to identify surface features of Earth		237 plot locations of volcanoes using latitude and longitude
ESS.08.8.08 8	Earth and Space Science	Earth Systems	Demonstrate an understanding of the agents of erosion: <ul style="list-style-type: none"> •gravity •water •ice •wind •animals, including humans 	561 formation of Hawaiian Islands due to volcanic activity 564 volcanoes shape the Earth 569 constructive process of mountain building 570 landforms shaped by water 570 the destructive process of erosion 571 wind erosion	240 estimating the effects of meteor impacts on Earth 241 identifying which geologic features on Earth were caused by meteors

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ESS.08.8.09 8	Earth and Space Science	Earth Systems	Using models of rivers, predict changes when variables, such as load, slope, amount of water, or the composition of a stream bed, are changed through erosion or deposition	561 formation of Hawaiian Islands due to volcanic activity 564 volcanoes shape the Earth 569 constructive process of mountain building 570 landforms shaped by water 570 the destructive process of erosion 571 wind erosion	240 estimating the effects of meteor impacts on Earth 241 identifying which geologic features on Earth were caused by meteors
ESS.08.8.10 8	Earth and Space Science	Earth Systems	Explain how weathering and erosion affect the oceans' salinity	447 sources of salts in the ocean 448 composition of seawater	212 investigate how the ocean's salinity affects its density
ESS.08.8.11 8	Earth and Space Science	Earth Systems	Investigate careers, scientists, and historical breakthroughs related to external forces that change the Earth	featured in ancillary component	featured in ancillary component
ESS.08.8.12 8	Earth and Space Science	Earth Systems	Investigate the types of weathering involved in the breakdown of organic and inorganic components of Earth's surface	568 constructive and destructive processes 571 formation of soil 582 the rock cycle	

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ESS.08.8.13 8	Earth and Space Science	Earth Systems	Illustrate soil profiles	568 571 582	constructive and destructive processes formation of soil the rock cycle
ESS.08.8.14 8	Earth and Space Science	Earth Systems	Apply knowledge of soil profiles to local soil samples	568 571 582	constructive and destructive processes formation of soil the rock cycle
ESS.08.8.15 8	Earth and Space Science	Earth Systems	Investigate the formation of soil types	568 571 582	constructive and destructive processes formation of soil the rock cycle
ESS.08.8.16 8	Earth and Space Science	Earth Systems	Identify components of soil as inorganic or organic through investigations	568 571 582	constructive and destructive processes formation of soil the rock cycle
ESS.08.8.17 8	Earth and Space Science	Earth Systems	Identify the basic nutrients needed by plants that are present in soils: •nitrogen •phosphorous •potassium	568 571 582	constructive and destructive processes formation of soil the rock cycle

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ESS.08.8.18 8	Earth and Space Science	Earth Systems	Identify ways plants use organic and inorganic components in the soil	568 571 582	constructive and destructive processes formation of soil the rock cycle	
ESS.08.8.19 8	Earth and Space Science	Earth Systems	Investigate and analyze the composition of a variety of soils	568 571 582	constructive and destructive processes formation of soil the rock cycle	
ESS.08.8.20 8	Earth and Space Science	Earth Systems	Conduct investigations on soil permeability	568 571 582	constructive and destructive processes formation of soil the rock cycle	

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ESS.09.8.01 8	Earth and Space Science	Earth's History	Explain processes that have changed Earth's surface that have resulted from sudden events (e.g., earthquakes and volcanoes) and gradual changes (e.g., uplift, erosion, and weathering)	543	causes and descriptions of earthquakes	228	reading a bathymetric map
				543	earthquakes and plate tectonics	229	using a geologic hazard map of frequent earthquakes
				545	earthquakes rating scales	236	understanding the Volcanic Explosivity Index
				546	where earthquakes occur	237	finding a pattern of volcanoes related to the locations of plate boundaries
				547	earthquake hazard map	240	estimating the effects of meteor impacts on Earth
				557	structure of a volcano	241	identifying which geologic features on Earth were caused by meteors
				558	geologic basis for volcanic eruptions		
				558	formation of magma in Earth's mantle		
				559	where volcanic activity occurs		
				560	figure showing structure of different types of volcanoes		
				560	types and shapes of volcanoes		
				561	formation of shield volcanoes due to hot spots		
				561	formation of Hawaiian Islands due to volcanic activity		
				561	geologic basis for shield volcanoes		
561	shield volcanoes						

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				562	
					formation of stratovolcanoes due to subduction
				562	geologic basis for stratovolcanoes
				562	stratovolcanoes
				563	geologic bases for cinder cone volcanoes
				564	volcanoes shape the Earth
				569	constructive process of mountain building
				570	the destructive process of erosion
				571	wind erosion
				573	geologic hazard maps
				586	using a geologic hazard map

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ESS.09.8.02 8	Earth and Space Science	Earth's History	Analyze how rock sequences may be disturbed by the following: <ul style="list-style-type: none"> •erosion •deposition •igneous intrusion •folding •faulting •uplifting 	579 formation of igneous and sedimentary and metamorphic rocks 581 identifying igneous and sedimentary and metamorphic rocks	242 understanding how igneous rocks are formed and growing crystals to investigate their formation 244 understanding how sedimentary rocks are formed and creating sedimentary deposits to investigate them 246 understanding and investigating how metamorphic rocks are formed 247 interpreting how different rock formations were formed
ESS.09.8.03 8	Earth and Space Science	Earth's History	Explain how scientists determine the relative ages of fossils found in layers of sedimentary rock: <ul style="list-style-type: none"> •law of superposition •law of cross-cutting 	528 relative dating 529 interpreting rock formations 575 studying moon rocks on Earth	225 determining the relative ages of rock formations 226 sequencing events in a geologic cross-section
ESS.09.8.04 8	Earth and Space Science	Earth's History	Apply geologic laws of superposition and cross-cutting to determine the relative age of rock in a cross section	528 relative dating 529 interpreting rock formations 575 studying moon rocks on Earth	225 determining the relative ages of rock formations 226 sequencing events in a geologic cross-section

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ESS.10.8.01 8	Earth and Space Science	Object's in the Universe	Summarize the effects of gravity on bodies in space	618	Johannes Kepler	256 simulate an object in orbit and investigate how orbital period varies within distance
				618	orbits of planets around the sun	
				619	Kepler's elliptically shaped orbits	
				625	asteroids and comets	
				626	meteors and meteorites and the Kuiper Belt	
ESS.10.8.02 8	Earth and Space Science	Object's in the Universe	Identify variables that affect the amount of gravitational force between two objects: <ul style="list-style-type: none"> •mass of the objects •distance between the objects 	52	gravity depends on mass	20 investigate effect of gravity on motion
				52	the effect of gravity	257 relating the relationship between orbital speed and distance to the equation of universal gravitation
				54	Newton's law of universal gravitation	
				55	calculating gravitational force between objects	
				612	Newton's law of universal gravitation	

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ESS.10.8.03 8	Earth and Space Science	Object's in the Universe	Relate the effects of the moon's gravitational force on Earth's ocean tides	590 the lunar cycle 594 lunar eclipses 595 solar eclipses 613 properties of the moon 614 the moon as a satellite of Earth 615 the moon's effect on tides on Earth 616 the Earth-moon system 617 giant impact theory	238 why studying the moon's surface is useful for understanding Earth 250 modeling the lunar cycle 251 constructing a lunar calendar
ESS.10.8.04 8	Earth and Space Science	Object's in the Universe	Identify the causes of the following: •high tides •low tides •spring tides •neap tides	590 the lunar cycle 594 lunar eclipses 595 solar eclipses 613 properties of the moon 614 the moon as a satellite of Earth 615 the moon's effect on tides on Earth 616 the Earth-moon system 617 giant impact theory	238 why studying the moon's surface is useful for understanding Earth 250 modeling the lunar cycle 251 constructing a lunar calendar

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ESS.10.8.05 8	Earth and Space Science	Object's in the Universe	Define the terms galaxy and universe	597 characteristics of the universe 639 what is a star? 648 what is a galaxy? 649 the structure of the Milky Way Galaxy 658 research and describe astronomical objects	
ESS.10.8.06 8	Earth and Space Science	Object's in the Universe	Illustrate the appearance of galaxies as seen through a telescope: •clarity •shape	600 history of the telescope 601 types and uses of telescopes 602 photo from the Very Large Array 602 types and uses of telescopes 603 satellites as tools of astronomy 604 spacecraft as tools of astronomy 640 the use of spectroscopy to analyze stars	264 understand why spectroscopy is an important tool of astronomers 268 measuring apparent brightness to calculate the distance to stars and galaxies
ESS.10.8.07 8	Earth and Space Science	Object's in the Universe	Compare and contrast the Milky Way Galaxy to other galaxies	649 the structure of the Milky Way Galaxy	

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ESS.10.8.08 8	Earth and Space Science	Object's in the Universe	Illustrate the position of our solar system within the Milky Way Galaxy	649 the structure of the Milky Way Galaxy	
ESS.10.8.09 8	Earth and Space Science	Object's in the Universe	Investigate careers, scientists, and historical breakthroughs related to gravity, galaxies, and the universe	featured in ancillary component	featured in ancillary component
LS.02.8.01 8	Life Science	Living Systems: Characteristics, Structure, and Function	Illustrate the hierarchical relationships of cells, tissues, organs, organ systems, and organisms	Found on CD-ROM "Human Body"	
LS.02.8.02 8	Life Science	Living Systems: Characteristics, Structure, and Function	Identify different types of single- celled organisms: •protists •bacteria	Found on CD-ROM "Viruses and Bacteria"	
LS.02.8.03 8	Life Science	Living Systems: Characteristics, Structure, and Function	Relate the effect of bacteria on oral health	Found on CD-ROM "Viruses and Bacteria"	
LS.02.8.04 8	Life Science	Living Systems: Characteristics, Structure, and Function	Describe and illustrate single- celled organisms fou	Found on CD-ROM "A Closer Look at Pond Life"	

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LS.02.8.05 8	Life Science	Living Systems: Characteristics, Structure, and Function	Use a dichotomous key to classify organisms found in pond water	Found on CD-ROM "A Closer Look at Pond Life"	
LS.02.8.06 8	Life Science	Living Systems: Characteristics, Structure, and Function	Compare and contrast characteristics of unicellular organisms and multi-cellular organisms	Found on CD-ROM "A Closer Look at Pond Life"	
LS.02.8.07 8	Life Science	Living Systems: Characteristics, Structure, and Function	Classify cells as eukaryotic or prokaryotic	Found on CD-ROM "Viruses and Bacteria"	
LS.02.8.08 8	Life Science	Living Systems: Characteristics, Structure, and Function	Identify and describe similarities and differences among organisms of different, but closely related taxa (e.g., pine trees, big cats, rodents, ungulates)	Found on Video "Evolution of Plants"	
LS.02.8.09 8	Life Science	Living Systems: Characteristics, Structure, and Function	Investigate careers, scientists, and historical breakthroughs related to organisms	featured in ancillary component	featured in ancillary component

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LS.03.8.01 8	Life Science	Life Cycles, Reproduction, and Heredity	Identify and explain why inherited characteristics of living things depend on genes	Found on CD-ROM "Genetics and Heredity"	
LS.03.8.02 8	Life Science	Life Cycles, Reproduction, and Heredity	Differentiate between dominant and recessive traits	Found on CD-ROM "Genetics and Heredity"	
LS.03.8.03 8	Life Science	Life Cycles, Reproduction, and Heredity	Observe and classify traits as dominant or recessive: <ul style="list-style-type: none"> •tongue rolling •detached earlobes •widow's peak •hitchhiker's thumb •dimples •unibrow 	Found on CD-ROM "Genetics and Heredity"	
LS.03.8.04 8	Life Science	Life Cycles, Reproduction, and Heredity	Differentiate among observed inherited traits and acquired traits of plants and animals	Found on CD-ROM "Genetics and Heredity"	
LS.03.8.05 8	Life Science	Life Cycles, Reproduction, and Heredity	Interpret simple genetic crosses using Punnett Squares	Found on CD-ROM "Genetics and Heredity"	
LS.03.8.06 8	Life Science	Life Cycles, Reproduction, and Heredity	Predict patterns that emerge from simple genetic crosses	Found on CD-ROM "Genetics and Heredity"	

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LS.03.8.07 8	Life Science	Life Cycles, Reproduction, and Heredity	Conduct investigations demonstrating that the phenotype of a genetic trait is the result of genotype	Found on CD-ROM "Genetics and Heredity"	
LS.03.8.08 8	Life Science	Life Cycles, Reproduction, and Heredity	Explain how genetic variation within a species is a result of dominant traits and recessive traits	Found on CD-ROM "Genetics and Heredity"	
LS.03.8.09 8	Life Science	Life Cycles, Reproduction, and Heredity	Compare and contrast patterns of embryological development for all vertebrates, including humans	Found on CD-ROM "Genetics and Heredity"	
LS.03.8.10 8	Life Science	Life Cycles, Reproduction, and Heredity	Distinguish between characteristics of plants and animals through selective breeding	Found on CD-ROM "Genetics and Heredity"	
LS.03.8.11 8	Life Science	Life Cycles, Reproduction, and Heredity	Investigate careers, scientists, and historical breakthroughs related to genetics	Found on CD-ROM "Genetics and Heredity"	

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LS.03.8.12 8	Life Science	Life Cycles, Reproduction, and Heredity	Compare the theory of evolution to the characteristics of a scientific theory	Found on Video "Evolution of Plants"	
LS.03.8.13 8	Life Science	Life Cycles, Reproduction, and Heredity	Identify basic ideas related to biological evolution: <ul style="list-style-type: none"> •diversity of species •variations within species •adaptations •natural selection •extinction of a species 	Found on Video "Evolution of Plants"	
LS.03.8.14 8	Life Science	Life Cycles, Reproduction, and Heredity	Explain that the fossil record provides evidence of life forms' appearance, diversification, and extinction	Found on Video "Evolution of Plants"	
LS.03.8.15 8	Life Science	Life Cycles, Reproduction, and Heredity	Explain that the fossil record provides evidence of life forms' appearance, diversification, and extinction	Found on Video "Evolution of Plants"	

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LS.03.8.16 8	Life Science	Life Cycles, Reproduction, and Heredity	Identify genetic traits that make organisms more likely to survive and reproduce in a particular environment	Found on Video "Evolution of Plants"	
LS.03.8.17 8	Life Science	Life Cycles, Reproduction, and Heredity	Investigate careers, scientists, and historical breakthroughs related to natural selection and the fossil record	Found on Video "Evolution of Plants"	
LS.04.8.01 8	Life Science	Populations and Ecosystems	Analyze the effect of changes in environmental conditions on the survival of individual organisms and entire species	Found on Video "Evolution of Plants"	

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NS.01.8.01 8	Nature of Science	Characteristics and Processes of Science	Justify conclusions based on appropriate and unbiased observations	20 finding variability in data 81 look at force data and decide the usefulness of a machine 378 observe chemical changes 441 making observations and asking questions 492 observing an aurora	18 use data to describe relationship between force and motion 19 use data to infer correct relationship between variables 21 construct reasonable explanation based on data 30 interpret block and tackle data 35 study data and determine importance of height on speed of marble 45 analyze data and explain a rule 100 observe glow-in-the-dark paper 141 build models of Na and Cl and use them to explain bonding 146 observe evidence of chemical change 146 record detailed observations 158 observe temperature changes in chemical reactions 169 observe Tyndall effect

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					172 observe dissolving process
					179 make observations about local surface water
					182 making hypotheses and testing them against observations
					185 analyzing the results of the buffered acid experiment
					186 sensing temperature with fingers
					192 observing forced convection through liquids
					192 observe convection currents
					193 explaining efficiency of heat transfer based on data
					199 collecting Schönbein strips for detecting ozone
					202 using your hand to sense temperature differences
					202 collecting data of temperature and sensations
					224 reconstruct a series of events from clues

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					<p>235 interpreting how the drumming affects the intensity of the earthquake in the model</p> <p>243 recording observations of crystal growing</p> <p>251 recording the changes in the moon over a month</p>

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NS.01.8.02 8	Nature of Science	Characteristics and Processes of Science	Evaluate the merits of empirical evidence based on experimental design:	11	control and experimental variables	6	predict which car will move fastest
				26	independent and dependent variables	7	doing a controlled experiment
				454	forming a hypothesis and testing through experimentation (#5)	7	test the effect of one other variable
				536	proving hypotheses for sea-floor spreading	7	variables in an experiment
				586	form a hypothesis (#7)	9	devise a hypothesis
				608	identify question, hypothesis, procedure, and results (#1)	21	choose independent and dependent variables for graph
						27	think about the variables
						27	recognize variables
						34	where does the marble move the fastest?
						43	how did A and B tapes acquire different charge?
		75	investigate variables that affect the period of a pendulum				
		151	perform the experiment you designed				
		151	explain how hypothesis compares to results				
		170	devise hypothesis and explain				
		170	devise hypothesis and explain				

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					<p>182 formulate hypothesis</p> <p>190 effect of changing mass on collected data</p> <p>208 testing hypothesis of why seasons occur against your observations in the investigation</p> <p>208 formulate a hypothesis about why the seasons occur</p> <p>211 determining whether distance from light source or axial tilt plays a more significant role in causing the seasons</p>

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NS.01.8.03 8	Nature of Science	Characteristics and Processes of Science	Formulate a testable problem using experimental design	7 experimentation begins with a question 12 writing lab procedures 19 design your own experiment 42 devise an experiment	7 design your own experiment 9 design three experiments using car and ramp 16 decide how to vary the force on the car for this experiment 26 what variables can be changed? 75 design pendulum experiment 93 decision trees and the advantage of doing multiple trials 151 design experiment to find out if mass is conserved 170 what three factors influence dissolving rate? 170 write a procedure 196 writing a procedure for constructing a pointer for an aneroid barometer 214 develop a procedure to create an underwater spring 233 identifying how the earthquake model represents an earthquake

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NS.01.8.04 8	Nature of Science	Characteristics and Processes of Science	Analyze a set of scientific data using mean, median, mode, and range using SI units	11 controlling variables in experiments 19 did you run a controlled experiment? 20 what factors could explain the variability in their data? 42 analyze a speed/distance graph 553 average density (#5) 624 average distance from the sun	6 compare results with other groups 7 what variables should be controlled? 11 analyze speed change of car 11 graph speed vs. position 18 study data table for relationship between force and motion 25 analyze block and tackle data 27 analyze lever equilibrium data 35 does data support hypothesis? 45 did battery voltage change? 76 analyze pendulum data 129 control the height of the liquid 129 find average velocity 147 students analyze chemical change lab results 169 why was plain water tested?

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					169 what does the word control mean?
					171 average dissolving rate

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NS.01.8.05 8	Nature of Science	Characteristics and Processes of Science	Suggest solutions to real world problems by analyzing scientific data in	24	making a graph	11	draw best fit curve
				26	drawing a best fit curve	13	draw best fit curve
				26	creating graphs	13	make a distance vs. time graph
				41	make a graph	13	graph distance vs. time
					15	construct a quantitative graphical model	
					37	organize data into a graph of speed vs. height	
					51	graph voltage vs. current	
					121	graph mass vs. volume	
					147	organize observations into a category table	
					185	constructing a graph of drops of acid vs pH	
					187	draw a line of best fit through temperature data points	
					187	construct a graphical model	
					189	construct a temperature vs. time graph	
					197	graphing and drawing a trend line for atmospheric pressure data	
					197	constructing a graph from atmospheric pressure data	

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NS.01.8.06 8	Nature of Science	Characteristics and Processes of Science	Formulate inferences based on scientific data		203 graphing water and ice temperature readings 206 constructing a graph of time vs. temperature 21 construct reasonable explanation based on data 35 study data and determine importance of height on speed of marble 45 analyze data and explain a rule

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NS.01.8.07 8	Nature of Science	Characteristics and Processes of Science	Communicate results and conclusions from scientific inquiry following peer review	20 explain your reasoning	9 present conclusions to the class 9 reporting on an experiment 15 discuss and test ideas with your group 19 explain how you arrived at your answer 29 discuss what you learned about gears 37 describe the flow of energy based on experimental graph 39 give a brief presentation to the class 47 present and defend an explanation 47 discuss an explanation with your group 129 explain your answer and justify 145 present findings to the class 145 present findings and methods used 151 present results to the class 179 create water quality report

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Standard #: Grade	Strand	Standard	Student Learning Expectation	Volume 1 Student Text page	Volume 2 Investigation Manual page
					181 write paragraph to explain results
					183 write summary of findings

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Standard #: Grade	Strand	Standard	Student Learning Expectation	Volume 1 Student Text page	Volume 2 Investigation Manual page
NS.01.8.08 8	Nature of Science	Characteristics and Processes of Science	Develop and implement strategies for long-term, accurate data collection	5 measuring distance 12 importance of reliable and accurate data collection 441 making observations and asking questions 492 observing an aurora 636 use the data to answer the questions 636 what evidence was used to predict the existence of the Kuiper Belt? 658 analysis with a spectrometer (#4)	4 difference between precise and accurate data 5 measuring metric and english lengths 6 measure time 6 electronic timer and release technique 7 record time interval 9 collect speed data 14 record three different time intervals 16 measure force 17 record times 24 collect weight data 25 collect force data 27 write down the number of weights you use 36 collect precise speed and height data 44 measure voltage 46 measure current 48 measure resistance 75 collect mass and amplitude data 87 measure wavelength 116 measure mass

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Standard #: Grade	Strand	Standard	Student Learning Expectation	Volume 1 Student Text page	Volume 2 Investigation Manual page
					117 measure volume
					146 record detailed observations
					150 record data as you perform experiment
					171 collect time data and record observations
					182 observing daphnia and recording movements and behavior
					182 making detailed observations
					184 collecting pH readings while adding carbon dioxide
					186 collecting temperature data
					186 measure temperature
					189 collecting time and temperature data
					193 collecting and recording time and temperature data
					199 collecting Schönbein strips for detecting ozone
					202 collecting data of temperature and sensations

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Standard #: Grade	Strand	Standard	Student Learning Expectation	Volume 1 Student Text page	Volume 2 Investigation Manual page
					206 collecting temperature and time data 210 collecting qualitative data of light intensity at scale distance from the sun 217 collecting wet and dry bulb temperature readings 243 recording observations of crystal growing 249 using your sundial to collect accurate data 251 recording the changes in the moon over a month 253 calibrating your telescope

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Standard #: Grade	Strand	Standard	Student Learning Expectation	Volume 1 Student Text page	Volume 2 Investigation Manual page		
NS.01.8.09 8	Nature of Science	Characteristics and Processes of Science	Generate questions that can and cannot be answered by science	10	the research question and hypothesis	6	asking questions and learning about natural world
				435	why haven't we run out of water	6	how do we ask questions and get answers from nature?
				440	what is in your tap water	215	the food paradox of the oceans
				443	what is acid rain		
				447	why are oceans salty		
				462	asking questions pertaining to specific heat and heat flow		
				478	why is Earth's atmosphere different from other planets		
				479	why do ears pop		
				479	why do ears pop		
				498	why does Earth have seasons		
				507	how does rain form		
				510	meteorologists use atmospheric pressure data to understand movement of weather systems		
				515	how do animals survive in the desert		
				521	what is a carbon sink		
				540	why doesn't Earth get bigger and bigger		

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Standard #: Grade	Strand	Standard	Student Learning Expectation	Volume 1 Student Text page	Volume 2 Investigation Manual page
				594 what causes eclipses 627 is Pluto a planet 654 evidence for Big Bang theory	
NS.01.8.10 8	Nature of Science	Characteristics and Processes of Science	Explain the role of peer review, evidence, and modification in the development of a theory	45 Newton's Principia 55 Newton and the apple legend 75 Leonardo DaVinci 88 James Watt 121 Volta's batteries 135 Georg Ohm's work with circuits 166 Faraday's contributions 338 plate tectonic history 461 contributions of Joule 534 development of plate tectonic theory 535 continental drift theory 535 continental drift theory history 618 changing ideas about the solar system 654 development of Big Bang theory	

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Standard #: Grade	Strand	Standard	Student Learning Expectation	Volume 1 Student Text page	Volume 2 Investigation Manual page		
NS.01.8.11 8	Nature of Science	Characteristics and Processes of Science	Evaluate the merit of hypotheses, laws, and theories	527	relative dating and modern geology based on Steno's theories	39	critique group's explanation of energy transformations
				534	theory of plate tectonics	39	review energy theory in context of everyday scenarios
				535	critiquing Wegener's theories of continental drift	77	show how energy loss data could be applied to designing a real clock
				536	proving hypotheses for sea-floor spreading	170	devise hypothesis and explain
				569	Darwin's theories of the Andes formation	182	formulate hypothesis
				572	what causes ice ages	208	formulate a hypothesis about why the seasons occur
				586	form a hypothesis (#7)		
				617	theories of origin of the moon		
				618	early theories of the solar system		
PS.05.8.01 8	Physical Science	Matter: Properties and Changes	Compare the atomic theory to the characteristics of a scientific theory	319	development of atomic theory	130	investigate Rutherford's gold foil experiment
				330	research and create a poster to illustrate development of atomic model		

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Standard #: Grade	Strand	Standard	Student Learning Expectation	Volume 1 Student Text page	Volume 2 Investigation Manual page		
PS.05.8.02 8	Physical Science	Matter: Properties and Changes	Explain the structure of atoms	317	location/size/charge of subatomic particles	132	atomic number determines what element that atom is
				317	protons/neutrons/electrons	132	building atom models
				321	atoms of same element have same atomic number	133	protons and neutrons
				324	proton/electron attraction	133	location of electrons in atom
				394	showing valence electrons in a diagram	136	model stable and neutral atoms
PS.05.8.03 8	Physical Science	Matter: Properties and Changes	Determine the number of protons, neutrons, and electrons in an atom	137	importance of atomic number	137	importance of atomic number
				137	build atomic models	137	build atomic models
				140	find the number of electrons in outermost level	140	find the number of electrons in outermost level
				140	review subatomic particles	140	review subatomic particles
				321	atomic number discussed	133	exploring isotopes
				322	isotopes explained	133	identify atomic number
				322	mass number discussed	133	identify mass number
				328	atomic mass on the periodic table	133	identify element symbol and name
328	mass number on the periodic table	136	understanding isotopes				
328	atomic number on the periodic table	136	atomic number				
328	chemical symbols and element names	136	mass number				

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Standard #: Grade	Strand	Standard	Student Learning Expectation	Volume 1 Student Text page	Volume 2 Investigation Manual page
PS.05.8.04 8	Physical Science	Matter: Properties and Changes	Create atomic models of common elements	317 location/size/charge of subatomic particles 317 protons/neutrons/electrons 324 proton/electron attraction	132 building atom models 133 protons and neutrons 133 location of electrons in atom 136 model stable and neutral atoms 137 build atomic models 140 review subatomic particles
PS.05.8.05 8	Physical Science	Matter: Properties and Changes	Investigate scientists, careers, and historical breakthroughs related to the atomic theory	319 development of atomic theory 327 contributions of Mendeleev 330 research and create a poster to illustrate development of atomic model	130 investigate Rutherford's gold foil experiment

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Standard #: Grade	Strand	Standard	Student Learning Expectation	Volume 1 Student Text page	Volume 2 Investigation Manual page		
PS.06.8.01 8	Physical Science	Motion and Forces	Model how motion and forces change Earth's surface: <ul style="list-style-type: none"> •compression •tension •weathering •erosion 	534	predicting what Earth might look like in 50 million years	230	predicting plate movement over 50 million years and the resultant land features
				540	land features resulting from divergent plate boundaries	240	estimating the effects of meteor impacts on Earth
				541	resulting land features from subduction	241	identifying which geologic features on Earth were caused by meteors
				542	land features resulting from transform plate boundaries		
				553	predict separation of North America and Europe in 75 million years		
				554	predict effects of divergent plate boundaries on Great Rift Valley		
				561	formation of Hawaiian Islands due to volcanic activity		
				564	volcanoes shape the Earth		
				569	mountain-building		
				569	constructive process of mountain building		
570	changes in land features due to erosion						

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				570 571 572	
PS.06.8.02 8	Physical Science	Motion and Forces	Conduct investigations demonstrating the field force (lines of force) in magnetic fields	165 169 537 537	62 64 66
PS.06.8.03 8	Physical Science	Motion and Forces	Design and conduct investigations applying variables affecting the strength of an electromagnet	170 172 172	66 67
PS.06.8.04 8	Physical Science	Motion and Forces	Analyze and compare the relationship between electricity and magnetism	170 172 172 174 176	66 67 68

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PS.06.8.05 8	Physical Science	Motion and Forces	Investigate careers, scientists, and historical breakthroughs related to motion and forces that change Earth's surface	featured in ancillary component	featured in ancillary component
PS.07.8.01 8	Physical Science	Energy and Transfer of Energy	Construct open and closed electrical circuits: <ul style="list-style-type: none"> •series circuits •parallel circuits 	151 parallel circuit defined 151 series circuit defined 152 household wiring 153 current and voltage in series circuits 157 voltage and resistance in parallel circuits 161 analyze a parallel circuit 162 analyze a series circuit	56 build a parallel circuit 56 build a series circuit 58 build a series circuit and find total resistance 60 parallel circuit and Ohm's law
PS.07.8.02 8	Physical Science	Energy and Transfer of Energy	Describe and diagram open and closed series and parallel circuits	108 concept of electric circuits 109 circuit diagrams 119 battery uses chemical energy to produce electrical charge 151 single path vs. branching paths 151 holiday lights as series or parallel	45 battery chemicals and electrical charge 57 compare brightness of bulbs in series vs. parallel 61 compare current and voltage and resistance in each type of circuit

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Standard #: Grade	Strand	Standard	Student Learning Expectation	Volume 1 Student Text page	Volume 2 Investigation Manual page
PS.07.8.03 8	Physical Science	Energy and Transfer of Energy	Compare and contrast open and closed series circuits and parallel circuits	151 single path vs. branching paths 151 holiday lights as series or parallel	57 compare brightness of bulbs in series vs. parallel 61 compare current and voltage and resistance in each type of circuit
PS.07.8.04 8	Physical Science	Energy and Transfer of Energy	Conduct investigations demonstrating the characteristics of a wave: •wavelength •frequency •speed •amplitude	185 what is a cycle? 188 concept of frequency explained 188 concept of period explained 198 analyze systems to find cycle/period/frequency 227 importance of wavelength of sound waves	75 investigate variable that affect the period of a pendulum 75 analyze pendulum data 83 find speed of a wave 86 adjust frequency of a standing wave
PS.07.8.05 8	Physical Science	Energy and Transfer of Energy	Conduct investigations of longitudinal and transverse waves to determine how they are different	203 transverse and longitudinal waves 211 standing waves on a string 544 body waves	82 study wave pulses on elastic cord 84 make different types of waves in a ripple tank

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PS.07.8.06 8	Physical Science	Energy and Transfer of Energy	Explain how energy is transferred through waves: <ul style="list-style-type: none"> •seismic waves •sound waves •water waves •electromagnetic waves 	201 waves transmit energy 202 waves are all around us 243 microwave ovens 243 radio and television signals 256 identify uses of electromagnetic waves 278 identify uses of electromagnetic waves 486 energy and radiation relationships 632 the sun's energy reaches Earth in the form of electromagnetic waves	
PS.07.8.07 8	Physical Science	Energy and Transfer of Energy	Describe how waves travel through different kinds of media	210 resonance explained 212 constructive and destructive interference 216 natural frequency of a building and earthquakes 216 can wave interference sink a ship? 229 interference of sound waves 231 consonance and dissonance and beats	87 investigating resonance 88 natural frequency and resonance of standing waves on a string 95 investigate interference with sound waves 96 investigating sound resonance 101 examine light through diffraction grating

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Standard #: Grade	Strand	Standard	Student Learning Expectation	Volume 1 Student Text page	Volume 2 Investigation Manual page
PS.07.8.08 8	Physical Science	Energy and Transfer of Energy	Differentiate among reflection, refraction, and absorption of various types of waves	207 waves and absorption 207 waves and refraction 207 reflection in water waves and light waves 207 waves and reflection 208 refraction and eyeglasses 264 refraction in optical systems 264 forming images with lenses 266 reflection and mirrors 267 refraction and lenses 269 index of refraction 486 absorption and emission	85 observing reflection in water waves 106 investigate reflection of light 107 investigate how light interacts with mirrors 107 plot reflected rays from a mirror 108 tracing incident and refracted rays 108 explore refraction with lenses 108 investigate how light interacts with a prism 108 explore refraction with a prism 110 finding focal point and focal length of a lens 111 plotting images formed when light is refracted by a lens 253 using a retractive telescope
PS.07.8.09 8	Physical Science	Energy and Transfer of Energy	Describe and diagram the electromagnetic spectrum	243 light waves and the electromagnetic spectrum 243 visible light and the electromagnetic spectrum	134 investigating visible light with a spectrometer

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Standard #: Grade	Strand	Standard	Student Learning Expectation	Volume 1 Student Text page	Volume 2 Investigation Manual page
PS.07.8.10 8	Physical Science	Energy and Transfer of Energy	Analyze the electromagnetic spectrum	202 waves are all around us 243 visible light and the electromagnetic spectrum 243 microwave ovens 243 radio and television signals 243 light waves and the electromagnetic spectrum 256 identify uses of electromagnetic waves 278 identify uses of electromagnetic waves	134 investigating visible light with a spectrometer
PS.07.8.11 8	Physical Science	Energy and Transfer of Energy	Investigate examples of real world uses of the electromagnetic spectrum	202 waves are all around us 243 microwave ovens 243 radio and television signals 256 identify uses of electromagnetic waves 278 identify uses of electromagnetic waves	
PS.07.8.12 8	Physical Science	Energy and Transfer of Energy	Conduct investigations demonstrating the separation of white light into its spectrum using refraction	248 visible light wavelenths and color 269 using a prism to show different colors in white light	101 observing white light through diffraction grating

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PS.07.8.13 8	Physical Science	Energy and Transfer of Energy	Compare ways to transfer information: <ul style="list-style-type: none"> •sound •light •radio •microwave energy 	225 frequency of sound and pitch 226 voice recognition programs 226 white noise 226 sonograms 228 effect of medium on speed of sound wave 228 effect of temperature on speed of sound wave 232 musical instruments 274 total internal reflection and fiber optics	90 investigate human perception of sound 90 what is sound and how do we hear it? 94 does sound behave like other waves? 98 investigate sound and music 113 observe internal reflection and relate to fiber optics
PS.07.8.14 8	Physical Science	Energy and Transfer of Energy	Investigate careers, scientists, and historical breakthroughs related to waves and the electromagnetic spectrum	featured in ancillary component	featured in ancillary component