Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
08.1.01 8	Skills and Processes	Scientific Inquiry	access and process information from readings, investigations, and/or oral communications	27	how to read a graph		vocabulary is presented in context of investigations
				372	observe chemical changes	78	reading harmonic motion data tables and graphs
				627	research space solar power	100	observe glow-in-the-dark paper
						146	observe evidence of chemical change
						158	observe temperature changes in chemical reactions
						169	observe Tyndall effect
						172	observe dissolving process
						177	research pH indicators
						179	make observations about local surface water
						180	researching where your water comes from
						186	sensing temperature with fingers
						192	observing forced convection through liquids
						192	observe convection currents
						201	researching the causes of ozone

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						202	using your hand to sense temperature differences
						207	researching how bodies of water affect climate
						222	researching an animal that is adapted to live in the biome you studied
						227	researching forensic science

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
08.1.02 8	Skills and Processes	Scientific Inquiry	formulate questions, which lead to the development of a testable hypothesis	9	steps in the scientific method	6	how do we ask questions and get answers from nature?
				10	the research question and hypothesis	7	compare results with hypothesis
				10	forming a hypothesis	75	plan three experiments to determine which variable affects the period of a pendulum
				19	design your own experiment	170	which factor will produce fastest dissolving rate?
				429	why haven't we run out of water	170	which method will give fastest dissolving rate?
				434	what is in your tap water	237	develop a research plan for studying volcanoes
				437	what is acid rain		
				441	why are oceans salty		
				448	describe steps you would take to determine whether pH affects frog population		
				451	what is temperature		
				456	asking questions pertaining to specific heat and heat flow		
				472	why is Earth's atmosphere different from other planets		
				473	why do ears pop		
				492	why does Earth have seasons		
				501	how does rain form		
				509	how do animals survive in the desert		

Correlation to Maryland Science Content Standards

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Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
				515	what is a carbon sink		
				534	why doesn't Earth get bigger and bigger		
				588	what causes eclipses		
				621	is Pluto a planet		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
08.1.03 8	Skills and Processes	Scientific Inquiry	use observations, research, and select appropriate scientific information to form predictions and hypotheses	7	experimentation begins with a question	7	compare results with hypothesis
				9	steps in the scientific method	7	perform your own experiment
				10	forming a hypothesis	7	design your own experiment
				19	design your own experiment	9	design three experiments using car and ramp
				19	design your own experiment	10	conduct car/ramp experiment
				42	devise an experiment	14	record three different time intervals
				372	observe chemical changes	16	investigate Newton's 2nd law
				435	making observations and asking questions	16	decide how to vary the force on the car for this experiment
				448	describe steps you would take to determine whether pH affects frog population	25	collect force data
				451	what is temperature	26	what variables can be changed?
				486	observing an aurora	27	write down the number of weights you use
				530	proving hypotheses for sea-floor spreading	34	investigate motion on a rollercoaster
				580	form a hypothesis (#7)	75	design pendulum experiment
				627	research space solar power	75	plan three experiments to determine which variable affects the period of a pendulum
				630	use the data to answer the questions		

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Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
				630	what evidence was used to predict the existence of the Kuiper Belt?	75	perform self-designed experiment
				652	analysis with a spectrometer (#4)	93	decision trees and the advantage of doing multiple trials
						100	observe glow-in-the-dark paper
						146	observe evidence of chemical change
						146	record detailed observations
						150	record data as you perform experiment
						151	design experiment to find out if mass is conserved
						158	observe temperature changes in chemical reactions
						169	observe Tyndall effect
						170	which factor will produce fastest dissolving rate?
						170	which method will give fastest dissolving rate?
						170	devise hypothesis and explain
						170	what three factors influence dissolving rate?
						172	observe dissolving process

Correlation to Maryland Science Content Standards

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Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						177	research pH indicators
						179	make observations about local surface water
						180	researching where your water comes from
						182	observing daphnia and recording movements and behavior
						182	simulating the effect of acid rain on daphnia
						182	formulate hypothesis
						186	sensing temperature with fingers
						188	conducting investigation of efficiency of immersion heater
						192	observing forced convection through liquids
						192	observe convection currents
						193	conducting experiments on heat transfer
						199	collecting Schönbein strips for detecting ozone
						201	researching the causes of ozone
						202	using your hand to sense temperature differences

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						202	collecting data of temperature and sensations
						205	investigating how specific heat of water regulates Earth's temperature
						206	collecting temperature and time data
						207	researching how bodies of water affect climate
						208	formulate a hypothesis about why the seasons occur
						210	collecting qualitative data of light intensity at scale distance from the sun
						217	collecting wet and dry bulb temperature readings
						222	researching an animal that is adapted to live in the biome you studied
						227	researching forensic science
						233	identifying how the earthquake model represents an earthquake
						237	develop a research plan for studying volcanoes
						243	recording observations of crystal growing

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						251	recording the changes in the moon over a month

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
08.1.04 8	Skills and Processes	Scientific Inquiry	recognize/develop well-designed procedures that identify the independent and dependent variables, the need for control when testing a factor, the importance of multiple trials, the selection of appropriate materials/equipment , and the development ect.	11	control and experimental variables	7	doing a controlled experiment
				26	independent and dependent variables	9	conduct three experiments with appropriate equipment
				288	find the thickness of a single card	9	design three experiments and choose equipment
						9	design three experiments and choose technology
						9	design three experiments and choose equpiment
						10	selecting ramp and photogates
						12	select equipment and set up experiment
						21	choose independent and dependent variables for graph
						27	recognize variables
						30	rigging block and tackle
						40	choose circuit parts to light a bulb
						145	plan a procedure and select necessary equipment
						145	carry out procedure and select equipment
						151	plan procedures and select materials

Correlation to Maryland Science Content Standards

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Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						151	select materials from list
						190	effect of changing mass on collected data
						194	design and construct an aneroid barometer
						209	measuring the intensity of light using an electric meter and solar cell and light bulb
						211	determining whether distance from light source or axial tilt plays a more significant role in causing the seasons
						252	identifying the parts of a refracting telescope and making observations of the moon's surface

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Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
08.1.05 8	Skills and Processes	Scientific Inquiry	demonstrate safety when conducting an investigation	452	safety caution on heating jar	20	safety tip for car/ramp setup
						24	ropes and pulley safety
						26	safety tip for hanging weights from lever
						40	electrical safety
						44	short circuit safety warning
						56	short circuit safety warning
						58	short circuit safety warning
						146	safety in the lab
						150	chemistry safety
						158	wear goggles and apron
						168	safety equipment
						172	hot water safety
						179	safety tip for testing local surface water
						180	safety tip for water testing
						182	safety tips for observing Daphnia
						186	thermometer safety
						188	heat safety
						192	heat safety
						202	safety in greenhouse gas investigation

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Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						210	safety using light bulbs
						216	safety in swinging thermometers
						256	safety in lab

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
08.1.06 8	Skills and Processes	Scientific Inquiry	use appropriate instruments and metric units when making measurements and collecting data	3	time measurement	5	making measurements with precision
				5	make measurements with precision	5	measuring metric and english lengths
				5	measuring distance	6	measure time
				6	scientists use metric units	7	use a ruler to make a measurement
				19	convert from english to metric	7	measure and record variables
				24	using an electronic timer	12	make metric length measurement
				78	use and understand mass measurements	12	using photogates
				280	measuring volume of liquids	14	using photogates
				280	measuring volume of solids	16	measure force
				585	understanding time measurement in years	16	understand and use units of force
				586	clocks and the division of time	17	measure the force
				594	telescopes	17	use photogates to study car on ramp
				629	converting light years to astronomical units	17	measure the force
						18	use a balance to find mass of car
						25	measure and record the force
						30	measure height difference
						36	make precise height measurements

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						44	using electrical meter
						44	measure voltage
						46	measure current
						46	using electrical meter
						48	using electrical meter
						48	measure resistance
						50	using electrical meter
						63	making measurements with precision
						75	make precise length measurements
						87	measure wavelength
						116	measure mass
						116	measuring mass
						117	measure volume
						117	measuring volume
						176	measure pH
						186	measure temperature
						249	calibrating a sundial

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
08.1.07 8	Skills and Processes	Scientific Inquiry	collect, organize, and display data in ways others can verify (i.e. numbers, statistics, tables, graphs, drawings, charts, diagrams) using appropriate instruments (e.g., calculators, spreadsheets, databases, and graphing programs)	12	importance of reliable and accurate data collection		data tables and graphs can be created on computer or graphing calculator
				24	making a graph	4	difference between precise and accurate data
				24	interpretations of patterns in data	6	compare results with other groups
				26	creating graphs	6	electronic timer and release technique
				27	reading a graph	7	record time interval
				41	make a graph	9	collect speed data
				42	analyze a speed/distance graph	9	construct a data table
				42	interpreting distance/time graph	11	analyze speed change of car
				78	analyze lever diagram	11	graph speed vs. position
				435	making observations and asking questions	12	understand and use data table
				459	heat equation	13	graph distance vs. time
				476	atmospheric pressure at various altitudes graph	14	record three different time intervals
				486	observing an aurora	15	interpret a speed vs. time graph
				630	use the data to answer the questions	15	construct a quantitative graphical model
				630	what evidence was used to predict the existence of the Kuiper Belt?	17	record times
				645	inverse square law	17	record results in data table
				645	apparent brightness vs. distance graph		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
				651	use the diagram to answer the questions (#2)	18	organize different combinations of data
				651	use the diagram to answer the questions (#4)	18	study data table for relationship between force and motion
				651	arrange the items in the table (#3)	24	use data table to record results
				652	analysis with a spectrometer (#4)	24	collect weight data
						25	analyze block and tackle data
						25	collect force data
						25	create a mathematical model
						27	find math rule for lever equilibrium
						27	write down the number of weights you use
						27	use data table to record results
						27	analyze lever equilibrium data
						28	derive a math formula
						30	record ropes and pulley data in table
						35	does data support hypothesis?
						36	collect precise speed and height data
						36	organize data into a table

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Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						37	organize data into a graph of speed vs. height
						45	did battery voltage change?
						51	graph voltage vs. current
						75	create data table for self-designed experiment
						75	collect mass and amplitude data
						76	analyze pendulum data
						121	graph mass vs. volume
						146	record detailed observations
						147	students analyze chemical change lab results
						147	organize observations into a category table
						150	record data as you perform experiment
						151	design a data table
						171	use data table for observations
						171	collect time data and record observations
						181	organize water quality data into a table
						182	making detailed observations

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Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						182	observing daphnia and recording movements and behavior
						184	collecting pH readings while adding carbon dioxide
						185	constructing a graph of drops of acid vs pH
						186	collecting temperature data
						187	find equation for trend line
						187	construct a graphical model
						189	construct a temperature vs. time graph
						189	collecting time and temperature data
						193	collecting and recording time and temperature data
						197	constructing a graph from atmospheric pressure data
						199	collecting Schönbein strips for detecting ozone
						202	collecting data of temperature and sensations
						203	graphing water and ice temperature readings

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Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						206	collecting temperature and time data
						206	constructing a graph of time vs. temperature
						210	collecting qualitative data of light intensity at scale distance from the sun
						217	collecting wet and dry bulb temperature readings
						217	determining relationship between temperature of the atmosphere and relative humidity
						218	interpreting Doppler radar images
						237	finding a pattern of volcanoes on a bathymetric map
						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
						257	inverse square law
						268	discovering the mathematical relationship betwen apparent brightness and distance

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Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
08.1.08 8	Skills and Processes	Scientific Inquiry	analyze and summarize data to identify trends and form a logical argument about a cause and effect relationship or a sequence of events	19	which group did the best experiment?	6	predict which car will move fastest
				20	finding variability in data	6	compare results with other groups
				20	how will speed change?	7	test the effect of one other variable
				24	predicting speed from a graph	9	devise a hypothesis
				24	interpretations of patterns in data	11	graph speed vs. position
				27	reading a graph	11	analyze speed change of car
				28	identifying cause and effect relationships	15	interpret a speed vs. time graph
				41	identify cause and effect	18	use data to describe relationship between force and motion
				42	predict the speed of a car	18	study data table for relationship between force and motion
				42	analyze a speed/distance graph	18	evaluate graphs as to whether or not they show relationships between variables
				78	analyze lever diagram	19	use data to infer correct relationship between variables
				79	look at force data and decide the usefulness of a machine	21	determine effect of increasing mass
				438	what causes acid rain	21	evaluate percent change for data collected
				456	determining effect of changing mass on temperature changes		
				460	thermal equilibrium		
				476	atmospheric pressure at various altitudes graph		
				497	factors that shape the weather		

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Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
				608	relationship between orbital speed and distance between two objects	25	analyze block and tackle data
				645	apparent brightness vs. distance graph	27	analyze lever equilibrium data
				651	arrange the items in the table (#3)	27	think about the variables
				651	use the diagram to answer the questions (#2)	30	interpret block and tackle data
				651	use the diagram to answer the questions (#4)	34	where does the marble move the fastest?
						35	does data support hypothesis?
						43	how did A and B tapes acquire different charge?
						45	did battery voltage change?
						75	evaluate statistical significance
						75	investigate variables that affect the period of a pendulum
						76	use data to predict best string length for a pendulum clock
						76	analyze pendulum data
						121	use graph to predict mass of six objects
						141	build models of Na and Cl and use them to explain bonding

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Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						147	students analyze chemical change lab results
						151	explain how hypothesis compares to results
						151	perform the experiment you designed
						156	make predictions about solubility
						157	add new rules to list based on findings
						170	devise hypothesis and explain
						171	evaluate method based on data
						182	making hypotheses and testing them against observations
						185	analyzing the results of the buffered acid experiment
						190	effect of changing mass on data
						193	explaining efficiency of heat transfer based on data
						197	identifying relationships between air pressure and weather

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Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						197	evaluating your aneroid barometer design
						200	evaluating your qualitative ozone strips
						201	predicting areas with high ozone concentration based on your data
						204	predicting what would happen if you place your ice/water test tube into a hot cup or a cold cup
						206	identifying relationship between percent of Earth covered in water and temperature range
						208	testing hypothesis of why seasons occur against your observations in the investigation
						217	determining relationship between temperature of the atmosphere and relative humidity
						218	interpreting Doppler radar images
						224	reconstruct a series of events from clues
						224	sequencing events

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Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						235	concluding which conditions affect the timeing and duration and intensity of an earthquake based on observation
						235	interpreting how the drumming affects the intensity of the earthquake in the model
						237	finding a pattern of volcanoes on a bathymetric map
						239	estimating the number of meteor collisions on Earth during the last 3.5 billion years
						241	justify which scenario was most likely
						242	predicting the results of the crystal-growing experiment
						256	investigation discovering relationship between orbital speed and distance

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Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
08.1.09 8	Skills and Processes	Scientific Inquiry	interpret and communicate findings (i.e., speaking, writing, and drawing) in a form suited to the purpose and audience, using developmentally appropriate methods including technology tools and telecommunications	11	controlling variables in experiments		students are encouraged to keep a lab notebook
				19	did you run a controlled experiment?	6	compare results with other groups
				20	what factors could explain the variability in their data?	7	what variables should be controlled?
				20	finding variability in data	11	analyze speed change of car
				27	how to read a graph	11	graph speed vs. position
				42	analyze a speed/distance graph	13	make a distance vs. time graph
				79	look at force data and decide the usefulness of a machine	18	use data to describe relationship between force and motion
						18	study data table for relationship between force and motion
						19	use data to infer correct relationship between variables
						25	analyze block and tackle data
						27	analyze lever equilibrium data
						30	interpret block and tackle data
						35	does data support hypothesis?
						41	drawing and interpeting circuit diagrams

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Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						45	did battery voltage change?
						76	analyze pendulum data
						78	reading harmonic motion data tables and graphs
						129	control the height of the liquid
						141	build models of Na and Cl and use them to explain bonding
						145	present findings to the class
						147	students analyze chemical change lab results
						151	does your experiment agree with law of conservation of mass?
						169	what does the word control mean?
						169	why was plain water tested?
						179	create water quality report
						181	write paragraph to explain results
						182	making hypotheses and testing them against observations
						183	writing up a lab report

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Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						183	write summary of findings
						185	analyzing the results of the buffered acid experiment
						193	explaining efficiency of heat transfer based on data
						224	reconstruct a series of events from clues
						231	evaluating your completed bathymetric map
						235	interpreting how the drumming affects the intensity of the earthquake in the model
						247	evaluate your ability to interpret rock formations
08.1.10 8	Skills and Processes	Critical Thinking	describe similarities and differences of objects, materials, concepts, and actions	80	form and function of wheelbarrow and sailboat and human jaw	68	form and function of different electric motor configurations
				509	how do animals survive in the desert?	108	form and function of human eye, prism, and lenses
				512	how do savanna animals survive the periodic fires?		

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Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
08.1.11 8	Skills and Processes	Critical Thinking	construct and use classification systems for grouping objects, materials, concepts, actions, and organisms, etc.	180 258 278 407 429 435 438	harmonic motion in natural systems optical systems system of classifying matter a solute and a solvent make up a system the water cycle pond ecosystem and water quality acid rain formation system		
08.1.12 8	Skills and Processes	Critical Thinking	critique scientific information and identify possible sources of bias	485 529 543 547 605 612	what percentage comes from this source? (problem 4) critiquing Wegener's theories of continental drift determining distance to an epicenter what explains the difference in density? (#5) how big is Earth? early theories of the solar system	11 35 39 76 77 197 199	calculate % error what evidence is there in support of your hypothesis? critique group's explanation of energy transformations calculate % error show how energy loss data could be applied to designing a real clock calculating error between your barometer and a commercial barometer importance of good record keeping in order to avoid error

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Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
08.1.13 8	Skills and Processes	Critical Thinking	analyze the adequacy of the supporting evidence used to form conclusions, devise a plan, or solve a practical problem	5	measuring distance	5	measuring metric and english lengths
				19	which group did the best experiment?	6	measure time
				485	what percentage comes from this source? (problem 4)	11	calculate % error
				543	determining distance to an epicenter	16	measure force
				547	what explains the difference in density? (#5)	18	evaluate graphs as to whether or not they show relationships between variables
				605	how big is Earth?	21	evaluate percent change for data collected
						44	measure voltage
						46	measure current
						48	measure resistance
						75	evaluate statistical significance
						76	calculate % error
						87	measure wavelength
						116	measure mass
						117	measure volume
						171	evaluate method based on data
						186	measure temperature
						197	calculating error between your barometer and a commercial barometer

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Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						199	importance of good record keeping in order to avoid error
						200	evaluating your qualitative ozone strips

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Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
08.1.14 8	Skills and Processes	Critical Thinking	provide supporting evidence when forming conclusions, devising a plan or solving a practical problem	12	importance of reliable and accurate data collection	4	difference between precise and accurate data
				19	which group did the best experiment?	6	electronic timer and release technique
				435	making observations and asking questions	7	record time interval
				486	observing an aurora	9	collect speed data
				630	use the data to answer the questions	14	record three different time intervals
				630	what evidence was used to predict the existence of the Kuiper Belt?	17	record times
				652	analysis with a spectrometer (#4)	18	evaluate graphs as to whether or not they show relationships between variables
						21	evaluate percent change for data collected
						24	collect weight data
						25	collect force data
						27	write down the number of weights you use
						36	collect precise speed and height data
						75	evaluate statistical significance
						75	collect mass and amplitude data
						146	record detailed observations
						150	record data as you perform experiment

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Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						171	collect time data and record observations
						171	evaluate method based on data
						182	observing daphnia and recording movements and behavior
						182	making detailed observations
						184	collecting pH readings while adding carbon dioxide
						186	collecting temperature data
						189	collecting time and temperature data
						193	collecting and recording time and temperature data
						199	collecting Schönbein strips for detecting ozone
						200	evaluating your qualitative ozone strips
						202	collecting data of temperature and sensations
						206	collecting temperature and time data

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						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

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
08.1.15 8	Skills and Processes	Critical Thinking	analyze and extend patterns	24	interpretations of patterns in data	6	compare results with other groups
				27	reading a graph	11	graph speed vs. position
				42	analyze a speed/distance graph	11	analyze speed change of car
				78	analyze lever diagram	15	interpret a speed vs. time graph
				476	atmospheric pressure at various altitudes graph	18	study data table for relationship between force and motion
				645	apparent brightness vs. distance graph	25	analyze block and tackle data
				651	arrange the items in the table (#3)	27	analyze lever equilibrium data
				651	use the diagram to answer the questions (#2)	35	does data support hypothesis?
				651	use the diagram to answer the questions (#4)	45	did battery voltage change?
						76	analyze pendulum data
						147	students analyze chemical change lab results
						217	determining relationship between temperature of the atmosphere and relative humidity
						218	interpreting Doppler radar images

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						237	finding a pattern of volcanoes on a bathymetric map
08.1.16 8	Skills and Processes	Critical Thinking	modify ideas based on new information from developmentally appropriate readings, data, and the ideas of others			157 197	add new rules to list based on findings evaluating your aneroid barometer design
08.1.17 8	Skills and Processes	Critical Thinking	describe to others how scientific information was used	12	writing lab procedures	 9 41 145 170 179 181 183 183 196 214	students are encouraged to keep a lab notebook reporting on an experiment drawing and interpeting circuit diagrams present findings to the class write a procedure create water quality report write paragraph to explain results write summary of findings writing up a lab report writing a procedure for constructing a pointer for an aneroid barometer develop a procedure to create an underwater spring

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
08.1.18 8	Skills and Processes	Applications of Science	apply scientific principles and/or concepts to understand a new situation	10	the research question and hypothesis	6	how do we ask questions and get answers from nature?
				20	finding variability in data	18	use data to describe relationship between force and motion
				79	look at force data and decide the usefulness of a machine	19	use data to infer correct relationship between variables
				429	why haven't we run out of water	30	interpret block and tackle data
				434	what is in your tap water	141	build models of Na and Cl and use them to explain bonding
				437	what is acid rain	170	which method will give fastest dissolving rate?
				441	why are oceans salty	178	visit local water supply and perform testing
				451	what is temperature	182	making hypotheses and testing them against observations
				456	asking questions pertaining to specific heat and heat flow	185	analyzing the results of the buffered acid experiment
				472	why is Earth's atmosphere different from other planets	193	explaining efficiency of heat transfer based on data
				473	why do ears pop	198	making qualitative observations of the amount of ozone present in the school environment
				492	why does Earth have seasons		
				501	how does rain form		
				509	how do animals survive in the desert		
				515	what is a carbon sink		
				534	why doesn't Earth get bigger and bigger		
				588	what causes eclipses		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
				621	is Pluto a planet	224	reconstruct a series of events from clues
						235	interpreting how the drumming affects the intensity of the earthquake in the model

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
08.1.19 8	Skills and Processes	Applications of Science	apply concepts and processes of science to take and defend a position relative to an issue	9	steps in the scientific method	7	compare results with hypothesis
				10	forming a hypothesis	21	construct reasonable explanation based on data
				19	design your own experiment	35	study data and determine importance of height on speed of marble
				448	describe steps you would take to determine whether pH affects frog population	45	analyze data and explain a rule
				530	proving hypotheses for sea-floor spreading	75	plan three experiments to determine which variable affects the period of a pendulum
				580	form a hypothesis (#7)	163	evaluating choice of favorite car
						170	which factor will produce fastest dissolving rate?
						170	devise hypothesis and explain
						182	formulate hypothesis
						208	formulate a hypothesis about why the seasons occur
						237	develop a research plan for studying volcanoes

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
08.1.20 8	Skills and Processes	Applications of Science	use the knowledge of science and available scientific equipment to devise a plan to solve a global problem	433	the clean water act	6	asking questions and learning about natural world
				439	catalytic converters and scrubbing reduce acid rain	215	the food paradox of the oceans
				473	why do ears pop		
				483	hydrogen powered cars		
				504	meteorologists use atmospheric pressure data to understand movement of weather systems		
				538	what we can learn from seismographs		
				544	understanding earhquakes allows engineers to design safer buildings		
				648	evidence for Big Bang theory		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
08.1.21 8	Skills and Processes	Technology	explain that a model has advantages and disadvantages and may need to be changed for different purposes	23	why make models?	13	graph distance vs. time
				24	making a graph	15	construct a quantitative graphical model
				24	what is a scientific model?	25	create a mathematical model
				24	scientific models	27	find math rule for lever equilibrium
				26	creating graphs	28	derive a math formula
				41	make a graph	37	organize data into a graph of speed vs. height
				42	interpreting distance/time graph	51	graph voltage vs. current
				459	heat equation	121	graph mass vs. volume
				485	computer modeling to predict greenhouse effects	147	organize observations into a category table
				494	modeling air currents	151	does your experiment agree with law of conservation of mass?
				518	create a model (#1)	185	constructing a graph of drops of acid vs pH
				524	model of Earth's history	187	find equation for trend line
				533	modeling plate boundaries	187	construct a graphical model
				576	rock cycle model	189	construct a temperature vs. time graph
				614	solar system modeling	197	constructing a graph from atmospheric pressure data
				624	model of the sun's anatomy		
				645	inverse square law		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						202	modeling the effect of greenhouse gases on Earth's temperature
						203	graphing water and ice temperature readings
						206	constructing a graph of time vs. temperature
						212	modeling underwater rivers and waterfalls and springs
						231	evaluating your completed bathymetric map
						232	construct a model that simulates an earthquake
						247	evaluate your ability to interpret rock formations
						257	inverse square law
						258	setting up a scale model of the solar system
						268	discovering the mathematical relationship betwen apparent brightness and distance

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
08.1.22 8	Skills and Processes	Technology	demonstrate and explain that tools are essential to scientific investigation for such purposes as to observe, estimate, measure, compute, collect, and communicate scientific data and information (i.e., size, distance, motion)	5 24 280 280 288	measuring distance using an electronic timer measuring volume of liquids measuring volume of solids find the thickness of a single card	5 6 7 9 9 9 10 12 12 14 16 17 30 44 44 46 46 48	measuring metric and english lengths measure time use a ruler to make a measurement conduct three experiments with appropriate equipment design three experiments and choose equpiment design three experiments and choose equipment selecting ramp and photogates select equipment and set up experiment using photogates using photogates measure force use photogates to study car on ramp rigging block and tackle using electrical meter measure voltage measure current using electrical meter using electrical meter

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						48	measure resistance
						50	using electrical meter
						87	measure wavelength
						116	measure mass
						117	measure volume
						117	measuring volume
						145	plan a procedure and select necessary equipment
						145	carry out procedure and select equipment
						151	plan procedures and select materials
						151	select materials from list
						158	use a thermometer
						186	measure temperature
						194	design and construct an aneroid barometer
						209	measuring the intensity of light using an electric meter and solar cell and light bulb
						252	identifying the parts of a refracting telescope and making observations of the moon's surface

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
08.1.23 8	Skills and Processes	Technology	design, plan, and construct things in response to a particular need or problem (e.g., instruments, machines, structures, and systems)	74	sample engineering problem	70 70 194	designing and testing different electric motors proposing and comparing different electric motor designs design and construct an aneroid barometer

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	student text detail	investigation pg	investigation detail
08.1.24 8	Skills and Processes	Technology	evaluate and modify designs and products, when demonstrating that a solution to one problem can result in other problems and taking into account various constraints	24	making a graph	13	graph distance vs. time
				26	creating graphs	15	construct a quantitative graphical model
				41	make a graph	37	organize data into a graph of speed vs. height
						51	graph voltage vs. current
						71	which motor gave the highest speed and why?
						71	did draining the batteries affect motor speed?
						121	graph mass vs. volume
						147	organize observations into a category table
						151	does your experiment agree with law of conservation of mass?
						157	add new rules to list based on findings
						185	constructing a graph of drops of acid vs pH
						187	construct a graphical model
						189	construct a temperature vs. time graph
						197	constructing a graph from atmospheric pressure data
						197	evaluating your aneroid barometer design

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						203	graphing water and ice temperature readings
						206	constructing a graph of time vs. temperature
						231	evaluating your completed bathymetric map
						247	evaluate your ability to interpret rock formations
08.1.25 8	Skills and Processes	Technology	explain that science and technology have strongly influenced life under different technological circumstances in the past and continue to do so today	73	relationship between science and technology	70	using engineering design cycle
				433	the clean water act		
				439	catalytic converters and scrubbing reduce acid rain		
				483	hydrogen powered cars		
				530	using echo sounders to map the sea floor		
				538	what we can learn from seismographs		
				544	understanding earhquakes allows engineers to design safer buildings		
				597	using satellite technology		
				599	space shuttle		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
08.1.26 8	Skills and Processes	History of Science	explain how people from different cultures and times have made important contributions to the advancement of science, mathematics, and technology in different cultures at different times	320	the quests of alchemists	198	contributions of Schönbein
				391	scientific discovery and the atomic age		
				583	history of calendars		
				585	counting the days in a year		
				586	the history of clocks and the division of time		
				589	ancient beliefs about solar eclipses		
				594	history of the telescope		
08.1.27 8	Skills and Processes	History of Science	explain that scientists are employed in various fields that are located in diverse places ranging from laboratories to natural field settings and their findings become available to everyone in the world	110	research Franklin's electricity experiments	177	chemistry and photography
				370	research Lavoisier's contributions	178	water quality testing

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
08.2.01 8	Concepts of Earth/Space Science	Materials and Processes That Shape A Planet	demonstrate and explain the causes of the seasons, relative lengths of days and nights, and flow of energy to and from the Earth (i.e., tilt, orbit, latitude, sun's energy)	480	distribution of incoming solar radiation	208	developing a hypothesis about why the seasons occur
				481	Earth's "energy budget"	210	investigating how the distance of Earth from the sun affects its intensity
				491	the effects of Earth's rotation on daytime heating and nighttime cooling	211	investigating how Earth's tilt affects the sun's intensity
				492	Earth's tilt causes seasons	248	building a sundial to keep track of daily time based on the cycles between Earth and the sun
				585	Earth's rotation and patterns of day and night		
				587	axial tilt causes the seasons		
				588	solar eclipses		
				589	solar eclipses		
				601	identify seasons		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
08.2.02 8	Concepts of Earth/Space Science	Materials and Processes That Shape A Planet	explain how climate is affected by ocean currents, Earth's surface features, latitude, and the atmosphere (i.e., volcanic eruptions, El Niño, fluctuations in the jet stream)	439	illustration of acid rain formation	207	research how large bodies of water affect climate
				481	global warming	207	research how large bodies of water affect climate
				482	changes to the oceans due to increasing global temperatures	213	exploring how temperature-dependent layering creates currents
				483	global temperature changing over time	215	understanding the Atlantic gyre
				491	Earth's temperature varies with latitude	223	research a particular biome
				493	convection currents in the atmosphere		
				494	the Coriolis effect		
				496	descriptions of ocean currents and their effects on climate		
				496	effects of the Gulf Stream on climate of Great Britain		
				497	water in the atmosphere affects weather patterns		
				504	rotation of air masses due to Coriolis effect		
				508	causes and effects of the El Nino Southern Oscillation		
				509	descriptions and distribution of desert biomes		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
				510	different types of deserts and how they are formed		
				510	effect of cold ocean currents on formation of fog desserts		
				511	how tropical rainforests are formed		
				511	effect of warm ocean currents on formation of tropical rainforest		
				511	descriptions and distribution of tropical rainforest biomes		
				513	effect of large bodies of water on climate		
				515	alpine tundra occurs at high altitudes		
				528	Earth's surface is changing		
				568	how urban sprawl changes local climate		
08.2.03 8	Concepts of Earth/Space Science	Materials and Processes That Shape A Planet	analyze Earth (i.e., land and water) data collected from space-based instruments and relate it to weather patterns	451	thermometers	186	accurately measuring temperature using thermometers
				452	thermometers	194	construct and use an aneroid barometer
				474	measuring atmospheric pressure with barometers	218	using Doppler radar images to detect and track storms
				497	sling psychrometer		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
08.2.04 8	Concepts of Earth/Space Science	Materials and Processes That Shape A Planet	describe and model large-scale and local weather systems	480	transfer of energy in and out of Earth's atmosphere	207	research how large bodies of water affect climate
				485	computer modeling to predict greenhouse effects	215	understanding the Atlantic gyre
				494	the Coriolis effect		
				495	global wind patterns		
				496	descriptions of ocean currents and their effects on climate		
				502	cold fronts		
				502	effects of moving air masses		
				503	jet streams		
				503	warm fronts		
				504	rotation of air masses due to Coriolis effect		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
08.2.05 8	Concepts of Earth/Space Science	Materials and Processes That Shape A Planet	describe the distribution and circulation of the world's water through ocean currents, glaciers rivers, ground water, and atmosphere	433	water quality standards	212	investigate how the ocean 's salinity affects its density
				434	importance of water analysis		
				440	supply of water to oceans		
				440	oceans in the water cycle		
				441	sources of salts in the ocean		
				442	composition of seawater		
				497	water in the atmosphere affects weather patterns		
				559	volcanoes and water vapor		
				564	landforms shaped by water		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
08.2.06 8	Concepts of Earth/Space Science	Materials and Processes That Shape A Planet	describe the composition, properties, and structure of the atmosphere	471 481 481 485 495 502 502 503 503 615	composition of Earth's atmosphere greenhouse conditions on Earth greenhouse effect and greenhouse gasses research the density of Venus' and Mars' atmospheres global wind patterns cold fronts effects of moving air masses jet streams warm fronts greenhouse conditions on Venus	185 198 202	effect of ocean on carbon dioxide levels in the atmosphere detecting ozone which is a protective atmosphere gas against high energy radiation investigate the temperature effects of greenhouse gases
08.4.01 8	Concepts of Chemistry	Structure of Matter	describe the development of the atomic theory from Democritus to Bohr (Grade 8 only)	313 324 388	development of atomic theory research and create a poster to illustrate development of atomic model showing valence electrons in a diagram	130 140	investigate Rutherford's gold foil experiment find the number of electrons in outermost level

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
08.4.02 8	Concepts of Chemistry	Structure of Matter	describe that elements combine in whole number ratios to form other substances called compounds (e.g., H2O, CO2, CO)	278 343 354	compounds are composed of elements mole quantities new substances are formed when a chemical change occurs	140 142 144	why do atoms form chemical bonds? why do atoms combine in certain ratios? show ratios in which elements combine to form a compound
08.4.03 8	Concepts of Chemistry	Structure of Matter	use groupings (i.e., simple periodic table, metals/nonmetals, reactive/non-reactive) of matter to predict reactions	320 321 329 330 332 332 335 336 368 419	groups of elements groups of elements and valence shells periodic table columns and valence electrons bonding and periodic table position periodic table and electronegativities metals nonmetals and metalloids periodic table and oxidation numbers writing chemical formulas predicting amount of product dissociation of water	133 141 142 148 155 157	using the periodic table build model of Na and Cl atoms and explain why they bond to form a molecule arrangement of electrons and groups of elements chemical equations calculating product yield predict the products of double displacement reactions

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
08.4.04 8	Concepts of Chemistry	Structure of Matter	explain that atoms and molecules are in constant motion and that an increase in temperature will increase that motion	284	states of matter and arrangement of molecules	118	investigate melting
				405	molecular structure of ice	118	molecules in a liquid
				451	temperature is a measure of average kinetic energy	119	investigate temperature and energy transfer in melting process
				451	increasing temperature means increasing motion of molecules	119	adding heat energy to melt an ice cube
				452	molecular motion increases when temperature increases	188	relationship between heat and temperature
				454	temperature and thermal energy and heat	188	investigate heating water with an immersion heater
				454	changes in temperature are directly related to changes in energy	188	investigate the increase of temperature of water as thermal energy is added
				455	examples of flow of heat		
				461	conduction and convection and radiation		
				623	nuclear fusion on the sun produces energy from matter		
				633	Einstein's equation		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
08.5.01 8	Concepts Of Physics	Mechanics	identify that nuclear fission and fusion are alternate forms of energy	172	generating electric power	52	the cost of using electrical appliances
				387	fusion and fission explained	138	fusion and fission
				391	nuclear vs. fossil fuels	262	solar energy can be used to generate electricity without producing pollution
				391	impact of nuclear energy		
				400	reducing pollution		
				414	environmental impact of electrical generating facilities	262	determine the efficiency of a photovoltaic cell
				438	impact of using fossil fuels		
				560	description of geothermal energy		
				623	nuclear fusion and the sun		
				627	using photovoltaic cells		
				627	the efficiency of photovoltaic cells		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
08.5.02 8	Concepts Of Physics	Mechanics	compare different ways of obtaining, transforming, and distributing energy from various sources (e.g. fossil fuels, sun, water, radioisotopes) and their impact on the environment	91	following an energy transformation	39	make an energy flow chart
				172	generating electric power	52	the cost of using electrical appliances
				391	nuclear vs. fossil fuels	262	solar energy can be used to generate electricity without producing pollution
				391	impact of nuclear energy		
				400	reducing pollution		
				414	environmental impact of electrical generating facilities	262	determine the efficiency of a photovoltaic cell
				438	impact of using fossil fuels		
				560	description of geothermal energy		
				623	energy from the sun		
				626	harnessing the sun's energy		
				627	using photovoltaic cells		
				627	the efficiency of photovoltaic cells		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
08.5.03 8	Concepts Of Physics	Mechanics	identify and describe how various types of electric circuits (i.e., series and parallel) provide a means of transferring and using electrical energy to produce heat, light, sound, as well as chemical changes	91	following an energy transformation	39	make an energy flow chart
				91	understand basic forms of energy	39	identify type of energy involved
				102	concept of electric circuits	45	battery chemicals and electrical charge
				103	circuit diagrams	56	build a parallel circuit
				113	battery uses chemical energy to produce electrical charge	56	build a series circuit
				145	series circuit defined	57	compare brightness of bulbs in series vs. parallel
				145	holiday lights as series or parallel	58	build a series circuit and find total resistance
				145	parallel circuit defined	60	parallel circuit and Ohm's law
				145	single path vs. branching paths	61	compare current and voltage and resistance in each type of circuit
				146	household wiring		
				147	current and voltage in series circuits		
				151	voltage and resistance in parallel circuits		
				155	analyze a parallel circuit		
				156	analyze a series circuit		
				623	energy from the sun		
				626	harnessing the sun's energy		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
08.5.04 8	Concepts Of Physics	Mechanics	explain that the strength of the magnetic force depends on the distance between the magnets and the object	159 163	magnetism explained understanding magnetic fields	62 64 66	describing forces that magnets exert on each other testing materials to see if they are affected by magnets compare electromagnets and permanent magnets
08.5.05 8	Concepts Of Physics	Mechanics	describe the magnetic effects of current (i.e., electromagnet) and the electric effects of magnets (i.e., motors)	164 166 166 168 170 171	what is an electromagnet? building an electromagnet increased current vs. strength of magnetic field how electric motors work dissecting an electric motor electromagnetic induction explained	66 67 68 73 73	build an electromagnet find out what happens to strength of electromagnet when current is increased investigate how an electric motor works exploring electric generators use magnetic induction to create an electric field

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
12.1.01 12	Skills and Processes	Scientific Inquiry	access and process information from readings, investigations, and/or oral communications	27	how to read a graph	78	reading harmonic motion data tables and graphs
				372	observe chemical changes	100	observe glow-in-the-dark paper
				627	research space solar power	145	present findings to the class
						146	observe evidence of chemical change
						158	observe temperature changes in chemical reactions
						169	observe Tyndall effect
						172	observe dissolving process
						177	research pH indicators
						179	make observations about local surface water
						180	researching where your water comes from
						186	sensing temperature with fingers
						192	observing forced convection through liquids
						192	observe convection currents
						201	researching the causes of ozone
						202	using your hand to sense temperature differences

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						207	researching how bodies of water affect climate
						222	researching an animal that is adapted to live in the biome you studied
						227	researching forensic science

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
12.1.02 12	Skills and Processes	Scientific Inquiry	formulate questions that lead to a testable hypothesis, which demonstrates the logical connections between the scientific concepts and the design of an investigation	7	experimentation begins with a question	7	compare results with hypothesis
				9	steps in the scientific method	7	perform your own experiment
				10	forming a hypothesis	7	design your own experiment
				19	design your own experiment	9	design three experiments using car and ramp
				19	design your own experiment	10	conduct car/ramp experiment
				42	devise an experiment	16	investigate Newton's 2nd law
				372	observe chemical changes	16	decide how to vary the force on the car for this experiment
				448	describe steps you would take to determine whether pH affects frog population	26	what variables can be changed?
				451	what is temperature	34	investigate motion on a rollercoaster
				530	proving hypotheses for sea-floor spreading	75	perform self-designed experiment
				580	form a hypothesis (#7)	75	design pendulum experiment
				627	research space solar power	75	plan three experiments to determine which variable affects the period of a pendulum
						93	decision trees and the advantage of doing multiple trials

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						100	observe glow-in-the-dark paper
						146	observe evidence of chemical change
						151	design experiment to find out if mass is conserved
						158	observe temperature changes in chemical reactions
						169	observe Tyndall effect
						170	devise hypothesis and explain
						170	which factor will produce fastest dissolving rate?
						170	which method will give fastest dissolving rate?
						170	what three factors influence dissolving rate?
						172	observe dissolving process
						177	research pH indicators
						179	make observations about local surface water
						180	researching where your water comes from
						182	simulating the effect of acid rain on daphnia
						182	formulate hypothesis

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						186	sensing temperature with fingers
						188	conducting investigation of efficiency of immersion heater
						192	observing forced convection through liquids
						192	observe convection currents
						193	conducting experiments on heat transfer
						201	researching the causes of ozone
						202	using your hand to sense temperature differences
						205	investigating how specific heat of water regulates Earth's temperature
						207	researching how bodies of water affect climate
						208	formulate a hypothesis about why the seasons occur
						222	researching an animal that is adapted to live in the biome you studied
						227	researching forensic science

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						233	identifying how the earthquake model represents an earthquake
						237	develop a research plan for studying volcanoes

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
12.1.03 12	Skills and Processes	Scientific Inquiry	use observations, research, and select appropriate scientific information to form predictions and hypotheses	19	which group did the best experiment?	7	perform your own experiment
				435	making observations and asking questions	10	conduct car/ramp experiment
				451	what is temperature	14	record three different time intervals
				486	observing an aurora	16	investigate Newton's 2nd law
				627	research space solar power	18	evaluate graphs as to whether or not they show relationships between variables
				630	use the data to answer the questions	21	evaluate percent change for data collected
				630	what evidence was used to predict the existence of the Kuiper Belt?	25	collect force data
				652	analysis with a spectrometer (#4)	27	write down the number of weights you use
						34	investigate motion on a rollercoaster
						75	perform self-designed experiment
						75	evaluate statistical significance
						146	record detailed observations
						150	record data as you perform experiment
						170	which method will give fastest dissolving rate?

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						171	evaluate method based on data
						177	research pH indicators
						180	researching where your water comes from
						182	simulating the effect of acid rain on daphnia
						182	observing daphnia and recording movements and behavior
						188	conducting investigation of efficiency of immersion heater
						193	conducting experiments on heat transfer
						199	collecting Schönbein strips for detecting ozone
						200	evaluating your qualitative ozone strips
						201	researching the causes of ozone
						202	collecting data of temperature and sensations
						205	investigating how specific heat of water regulates Earth's temperature
						206	collecting temperature and time data

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						207	researching how bodies of water affect climate
						210	collecting qualitative data of light intensity at scale distance from the sun
						217	collecting wet and dry bulb temperature readings
						222	researching an animal that is adapted to live in the biome you studied
						227	researching forensic science
						243	recording observations of crystal growing
						251	recording the changes in the moon over a month

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
12.1.04 12	Skills and Processes	Scientific Inquiry	design experimental approaches, which answer scientific questions	7	experimentation begins with a question	7	compare results with hypothesis
				9	steps in the scientific method	7	design your own experiment
				10	forming a hypothesis	9	design three experiments using car and ramp
				19	design your own experiment	16	decide how to vary the force on the car for this experiment
				19	design your own experiment	26	what variables can be changed?
				42	devise an experiment	75	plan three experiments to determine which variable affects the period of a pendulum
				448	describe steps you would take to determine whether pH affects frog population	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	which factor will produce fastest dissolving rate?
						170	what three factors influence dissolving rate?
						233	identifying how the earthquake model represents an earthquake

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						237	develop a research plan for studying volcanoes

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
12.1.05 12	Skills and Processes	Scientific Inquiry	demonstrate safety when conducting an investigation	452	safety caution on heating jar	20	safety tip for car/ramp setup
						24	ropes and pulley safety
						26	safety tip for hanging weights from lever
						40	electrical safety
						44	short circuit safety warning
						56	short circuit safety warning
						58	short circuit safety warning
						146	safety in the lab
						150	chemistry safety
						158	wear goggles and apron
						168	safety equipment
						172	hot water safety
						179	safety tip for testing local surface water
						180	safety tip for water testing
						182	safety tips for observing Daphnia
						186	thermometer safety
						188	heat safety
						192	heat safety
						202	safety in greenhouse gas investigation

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						210	safety using light bulbs
						216	safety in swinging thermometers
						256	safety in lab

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
12.1.06 12	Skills and Processes	Scientific Inquiry	use mathematical processes (measuring, calculating, etc.) when conducting investigations, analyzing information, and/or displaying information	5	measuring distance	5	measuring metric and english lengths
				18	perform dimensional analysis calculations	6	measure time
				26	drawing a best fit curve	11	draw best fit curve
				590	astronomic numbers expressed in scientific notation	13	draw best fit curve
						16	measure force
				592	calculating light year using scientific notation	44	measure voltage
						46	measure current
				592	unit conversion in calculating light years	48	measure resistance
						87	measure wavelength
				601	converting numbers to scientific notation	116	measure mass
						117	measure volume
				606	determining Earth's mass using scientific notation	186	measure temperature
						187	draw a line of best fit through temperature data points
						197	graphing and drawing a trend line for atmospheric pressure data
						258	determining scale distances
						271	calculating solar brightness units (SBU) from kilometers in scientific notation

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
12.1.07 12	Skills and Processes	Scientific Inquiry	collect, organize, and display data in multiple ways that fit the context using appropriate instruments to effectively convey the information (e.g., calculators, spreadsheets, and databases and graphing programs)	12	importance of reliable and accurate data collection		data tables and graphs can be created on computer or graphing calculator
				24	making a graph	4	difference between precise and accurate data
				24	interpretations of patterns in data	6	compare results with other groups
				26	creating graphs	6	electronic timer and release technique
				27	reading a graph	7	record time interval
				41	make a graph	9	construct a data table
				42	analyze a speed/distance graph	9	collect speed data
				42	interpreting distance/time graph	11	graph speed vs. position
				78	analyze lever diagram	11	analyze speed change of car
				435	making observations and asking questions	12	understand and use data table
				459	heat equation	13	graph distance vs. time
				476	atmospheric pressure at various altitudes graph	14	record three different time intervals
				486	observing an aurora	15	interpret a speed vs. time graph
				630	what evidence was used to predict the existence of the Kuiper Belt?	15	construct a quantitative graphical model
				630	use the data to answer the questions	17	record times
				645	apparent brightness vs. distance graph	17	record results in data table
				645	inverse square law		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
				651	use the diagram to answer the questions (#4)	18	organize different combinations of data
				651	use the diagram to answer the questions (#2)	18	study data table for relationship between force and motion
				651	arrange the items in the table (#3)	24	collect weight data
				652	analysis with a spectrometer (#4)	24	use data table to record results
						25	analyze block and tackle data
						25	create a mathematical model
						25	collect force data
						27	use data table to record results
						27	write down the number of weights you use
						27	analyze lever equilibrium data
						27	find math rule for lever equilibrium
						28	derive a math formula
						30	record ropes and pulley data in table
						35	does data support hypothesis?
						36	organize data into a table
						36	collect precise speed and height data

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						37	organize data into a graph of speed vs. height
						45	did battery voltage change?
						51	graph voltage vs. current
						75	create data table for self-designed experiment
						75	collect mass and amplitude data
						76	analyze pendulum data
						121	graph mass vs. volume
						146	record detailed observations
						147	organize observations into a category table
						147	students analyze chemical change lab results
						150	record data as you perform experiment
						151	design a data table
						171	use data table for observations
						171	collect time data and record observations
						181	organize water quality data into a table
						182	making detailed observations

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						182	observing daphnia and recording movements and behavior
						184	collecting pH readings while adding carbon dioxide
						185	constructing a graph of drops of acid vs pH
						186	collecting temperature data
						187	find equation for trend line
						187	construct a graphical model
						189	construct a temperature vs. time graph
						189	collecting time and temperature data
						193	collecting and recording time and temperature data
						197	constructing a graph from atmospheric pressure data
						199	collecting Schönbein strips for detecting ozone
						202	collecting data of temperature and sensations
						203	graphing water and ice temperature readings

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						206	collecting temperature and time data
						206	constructing a graph of time vs. temperature
						210	collecting qualitative data of light intensity at scale distance from the sun
						217	determining relationship between temperature of the atmosphere and relative humidity
						217	collecting wet and dry bulb temperature readings
						218	interpreting Doppler radar images
						237	finding a pattern of volcanoes on a bathymetric map
						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
						257	inverse square law
						268	discovering the mathematical relationship betwen apparent brightness and distance

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
12.1.08 12	Skills and Processes	Scientific Inquiry	analyze appropriate data to identify trends to form conclusions and apply what has been learned to evaluate the hypothesis	19	which group did the best experiment?	6	compare results with other groups
				20	how will speed change?	6	predict which car will move fastest
				20	finding variability in data	7	test the effect of one other variable
				24	interpretations of patterns in data	9	devise a hypothesis
				24	predicting speed from a graph	11	analyze speed change of car
				27	reading a graph	11	graph speed vs. position
				28	identifying cause and effect relationships	15	interpret a speed vs. time graph
				41	identify cause and effect	18	use data to describe relationship between force and motion
				42	predict the speed of a car	18	study data table for relationship between force and motion
				42	analyze a speed/distance graph	18	evaluate graphs as to whether or not they show relationships between variables
				78	analyze lever diagram	19	use data to infer correct relationship between variables
				79	look at force data and decide the usefulness of a machine	21	determine effect of increasing mass
				438	what causes acid rain	21	evaluate percent change for data collected
				456	determining effect of changing mass on temperature changes		
				460	thermal equilibrium		
				476	atmospheric pressure at various altitudes graph		
				497	factors that shape the weather		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
				608	relationship between orbital speed and distance between two objects	25	analyze block and tackle data
				645	apparent brightness vs. distance graph	27	analyze lever equilibrium data
				651	use the diagram to answer the questions (#2)	27	think about the variables
				651	use the diagram to answer the questions (#4)	30	interpret block and tackle data
				651	arrange the items in the table (#3)	34	where does the marble move the fastest?
						35	does data support hypothesis?
						43	how did A and B tapes acquire different charge?
						45	did battery voltage change?
						75	evaluate statistical significance
						75	investigate variables that affect the period of a pendulum
						76	use data to predict best string length for a pendulum clock
						76	analyze pendulum data
						121	use graph to predict mass of six objects
						141	build models of Na and Cl and use them to explain bonding

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						147	students analyze chemical change lab results
						151	explain how hypothesis compares to results
						151	perform the experiment you designed
						156	make predictions about solubility
						157	add new rules to list based on findings
						170	devise hypothesis and explain
						171	evaluate method based on data
						182	making hypotheses and testing them against observations
						185	analyzing the results of the buffered acid experiment
						190	effect of changing mass on data
						193	explaining efficiency of heat transfer based on data
						197	evaluating your aneroid barometer design

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						197	identifying relationships between air pressure and weather
						200	evaluating your qualitative ozone strips
						201	predicting areas with high ozone concentration based on your data
						204	predicting what would happen if you place your ice/water test tube into a hot cup or a cold cup
						206	identifying relationship between percent of Earth covered in water and temperature range
						208	testing hypothesis of why seasons occur against your observations in the investigation
						217	determining relationship between temperature of the atmosphere and relative humidity
						218	interpreting Doppler radar images
						224	reconstruct a series of events from clues
						224	sequencing events

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						235	concluding which conditions affect the timeing and duration and intensity of an earthquake based on observation
						235	interpreting how the drumming affects the intensity of the earthquake in the model
						237	finding a pattern of volcanoes on a bathymetric map
						239	estimating the number of meteor collisions on Earth during the last 3.5 billion years
						241	justify which scenario was most likely
						242	predicting the results of the crystal-growing experiment
						256	investigation discovering relationship between orbital speed and distance

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
12.1.09 12	Skills and Processes	Scientific Inquiry	interpret and communicate findings through speaking, writing, and drawing in a form suited to the purpose and audience, in a form suited to the purpose and audience, using developmentally appropriate methods including technology tools & telecommunications	20	finding variability in data		students are encouraged to keep a lab notebook
				27	how to read a graph		vocabulary is presented in context of investigations
				79	look at force data and decide the usefulness of a machine	9	reporting on an experiment
						13	make a distance vs. time graph
						18	use data to describe relationship between force and motion
						19	use data to infer correct relationship between variables
						30	interpret block and tackle data
						41	drawing and interpeting circuit diagrams
						78	reading harmonic motion data tables and graphs
						141	build models of Na and Cl and use them to explain bonding
						145	present findings to the class
						179	create water quality report
						181	write paragraph to explain results

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						182	making hypotheses and testing them against observations
						183	writing up a lab report
						183	write summary of findings
						185	analyzing the results of the buffered acid experiment
						193	explaining efficiency of heat transfer based on data
						224	reconstruct a series of events from clues
						235	interpreting how the drumming affects the intensity of the earthquake in the model
12.1.10 12	Skills and Processes	Critical Thinking	analyze similarities and differences of objects, materials, concepts, and actions	80	form and function of wheelbarrow and sailboat and human jaw	68	form and function of different electric motor configurations
				509	how do animals survive in the desert?	108	form and function of human eye, prism, and lenses
				512	how do savanna animals survive the periodic fires?		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
12.1.11 12	Skills and Processes	Critical Thinking	construct various classification systems and infer degree of divergence and/or kinship of various objects, materials, concepts, actions, and organisms	180 258 278 407	harmonic motion in natural systems optical systems system of classifying matter a solute and a solvent make up a system		
12.1.12 12	Skills and Processes	Critical Thinking	critique scientific information in order to detect bias and analyze the source of the bias	485 529 543 547 605 612	what percentage comes from this source? (problem 4) critiquing Wegener's theories of continental drift determining distance to an epicenter what explains the difference in density? (#5) how big is Earth? early theories of the solar system	11 35 39 76 77 197 199	calculate % error what evidence is there in support of your hypothesis? critique group's explanation of energy transformations calculate % error show how energy loss data could be applied to designing a real clock calculating error between your barometer and a commercial barometer importance of good record keeping in order to avoid error

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
12.1.13 12	Skills and Processes	Critical Thinking	analyze the adequacy of the supporting evidence used to form conclusions, devise a plan, or solve a practical problem	5	measuring distance	5	measuring metric and english lengths
				19	which group did the best experiment?	6	measure time
				485	what percentage comes from this source? (problem 4)	11	calculate % error
						16	measure force
				543	determining distance to an epicenter	18	evaluate graphs as to whether or not they show relationships between variables
				547	what explains the difference in density? (#5)	21	evaluate percent change for data collected
				605	how big is Earth?	44	measure voltage
						46	measure current
						48	measure resistance
						75	evaluate statistical significance
						76	calculate % error
						87	measure wavelength
						116	measure mass
						117	measure volume
						171	evaluate method based on data
						186	measure temperature
						197	calculating error between your barometer and a commercial barometer

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						199	importance of good record keeping in order to avoid error
						200	evaluating your qualitative ozone strips

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
12.1.14 12	Skills and Processes	Critical Thinking	provide supporting evidence when forming conclusions, devising a plan or solving a practical problem	12	importance of reliable and accurate data collection	4	difference between precise and accurate data
				19	which group did the best experiment?	6	electronic timer and release technique
				435	making observations and asking questions	7	record time interval
				486	observing an aurora	9	collect speed data
				630	use the data to answer the questions	14	record three different time intervals
				630	what evidence was used to predict the existence of the Kuiper Belt?	17	record times
				652	analysis with a spectrometer (#4)	18	evaluate graphs as to whether or not they show relationships between variables
						21	evaluate percent change for data collected
						24	collect weight data
						25	collect force data
						27	write down the number of weights you use
						36	collect precise speed and height data
						75	evaluate statistical significance
						75	collect mass and amplitude data
						146	record detailed observations
						150	record data as you perform experiment

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						171	collect time data and record observations
						171	evaluate method based on data
						182	observing daphnia and recording movements and behavior
						182	making detailed observations
						184	collecting pH readings while adding carbon dioxide
						186	collecting temperature data
						189	collecting time and temperature data
						193	collecting and recording time and temperature data
						199	collecting Schönbein strips for detecting ozone
						200	evaluating your qualitative ozone strips
						202	collecting data of temperature and sensations
						206	collecting temperature and time data

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						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

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
12.1.15 12	Skills and Processes	Critical Thinking	analyze and extend patterns	24	interpretations of patterns in data	6	compare results with other groups
				27	reading a graph	11	graph speed vs. position
				42	analyze a speed/distance graph	11	analyze speed change of car
				78	analyze lever diagram	15	interpret a speed vs. time graph
				476	atmospheric pressure at various altitudes graph	18	study data table for relationship between force and motion
				645	apparent brightness vs. distance graph	25	analyze block and tackle data
				651	arrange the items in the table (#3)	27	analyze lever equilibrium data
				651	use the diagram to answer the questions (#2)	35	does data support hypothesis?
				651	use the diagram to answer the questions (#4)	45	did battery voltage change?
						76	analyze pendulum data
						147	students analyze chemical change lab results
						217	determining relationship between temperature of the atmosphere and relative humidity
						218	interpreting Doppler radar images

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						237	finding a pattern of volcanoes on a bathymetric map
12.1.16 12	Skills and Processes	Critical Thinking	analyze conclusions and modify ideas based on new information from developmentally appropriate readings, data, and the ideas of others			157 197	add new rules to list based on findings evaluating your aneroid barometer design

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
12.1.17 12	Skills and Processes	Critical Thinking	describe to others how scientific information was used	12	writing lab procedures		students are encouraged to keep a lab notebook
						9	reporting on an experiment
						41	drawing and interpeting circuit diagrams
						145	present findings to the class
						170	write a procedure
						179	create water quality report
						181	write paragraph to explain results
						183	write summary of findings
						183	writing up a lab report
						196	writing a procedure for constructing a pointer for an aneroid barometer
						214	develop a procedure to create an underwater spring

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
12.1.18 12	Skills and Processes	Applications of Science	apply scientific principles and/or concepts to understand a new situation	10	the research question and hypothesis	6	how do we ask questions and get answers from nature?
				20	finding variability in data	18	use data to describe relationship between force and motion
				79	look at force data and decide the usefulness of a machine	19	use data to infer correct relationship between variables
				429	why haven't we run out of water	30	interpret block and tackle data
				434	what is in your tap water	141	build models of Na and Cl and use them to explain bonding
				437	what is acid rain	170	which method will give fastest dissolving rate?
				441	why are oceans salty	178	visit local water supply and perform testing
				451	what is temperature	182	making hypotheses and testing them against observations
				456	asking questions pertaining to specific heat and heat flow	185	analyzing the results of the buffered acid experiment
				472	why is Earth's atmosphere different from other planets	193	explaining efficiency of heat transfer based on data
				473	why do ears pop	198	making qualitative observations of the amount of ozone present in the school environment
				492	why does Earth have seasons		
				501	how does rain form		
				509	how do animals survive in the desert		
				515	what is a carbon sink		
				534	why doesn't Earth get bigger and bigger		
				588	what causes eclipses		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
				621	is Pluto a planet	224	reconstruct a series of events from clues
						235	interpreting how the drumming affects the intensity of the earthquake in the model

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
12.1.19 12	Skills and Processes	Applications of Science	The student will apply skills, processes, and concepts of biology, chemistry, physics, and earth/space science to societal issues	23	why make models?	6	asking questions and learning about natural world
				24	what is a scientific model?	202	modeling the effect of greenhouse gases on Earth's temperature
				24	scientific models	212	modeling underwater rivers and waterfalls and springs
				34	Newton's research impacted mathematics	215	the food paradox of the oceans
				73	impact of technology	232	construct a model that simulates an earthquake
				395	impact of industrial revolution	258	setting up a scale model of the solar system
				433	the clean water act		
				439	catalytic converters and scrubbing reduce acid rain		
				443	impact of carbon dioxide on life in the oceans		
				473	why do ears pop		
				479	scientists detect loss of ozone in atmosphere		
				482	effects of global warming discovered		
				483	hydrogen powered cars		
				485	computer modeling to predict greenhouse effects		
				494	modeling air currents		
				496	tracking ocean currents		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
				504	meteorologists use atmospheric pressure data to understand movement of weather systems		
				511	trees and global climate		
				518	create a model (#1)		
				524	model of Earth's history		
				533	modeling plate boundaries		
				538	what we can learn from seismographs		
				542	studying seismic waves leads to information used in oil and gas exploration		
				544	understanding earhquakes allows engineers to design safer buildings		
				545	predicting tsunamis		
				568	urban sprawl		
				576	rock cycle model		
				614	solar system modeling		
				624	model of the sun's anatomy		
				648	evidence for Big Bang theory		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
12.1.20 12	Skills and Processes	Applications of Science	defend a position on a scientific issue and take into account the different types of risks and benefits in formulating a plan of action	9	steps in the scientific method	7	compare results with hypothesis
				10	forming a hypothesis	21	construct reasonable explanation based on data
				19	design your own experiment	35	study data and determine importance of height on speed of marble
				448	describe steps you would take to determine whether pH affects frog population	45	analyze data and explain a rule
				530	proving hypotheses for sea-floor spreading	75	plan three experiments to determine which variable affects the period of a pendulum
				580	form a hypothesis (#7)	163	evaluating choice of favorite car
						170	which factor will produce fastest dissolving rate?
						170	devise hypothesis and explain
						182	formulate hypothesis
						208	formulate a hypothesis about why the seasons occur
						237	develop a research plan for studying volcanoes

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
12.1.21 12	Skills and Processes	Applications of Science	The student will recognize that real problems have more than one solution and decisions to accept one solution over another are made on the basis on many issues	23 24 24 73 473 485 494 504 518 524 533 576 614 624 648	why make models? scientific models what is a scientific model? impact of Da Vinci's work why do ears pop computer modeling to predict greenhouse effects modeling air currents meteorologists use atmospheric pressure data to understand movement of weather systems create a model (#1) model of Earth's history modeling plate boundaries rock cycle model solar system modeling model of the sun's anatomy evidence for Big Bang theory	6 202 212 215 232 258	asking questions and learning about natural world modeling the effect of greenhouse gases on Earth's temperature modeling underwater rivers and waterfalls and springs the food paradox of the oceans construct a model that simulates an earthquake setting up a scale model of the solar system

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
12.1.22 12	Skills and Processes	Technology	design, construct, and use models (e.g., math, computer, physical) to make predictions about actual events	23	why make models?	13	graph distance vs. time
				24	making a graph	15	construct a quantitative graphical model
				24	what is a scientific model?	25	create a mathematical model
				24	scientific models	27	find math rule for lever equilibrium
				26	creating graphs	28	derive a math formula
				41	make a graph	37	organize data into a graph of speed vs. height
				42	interpreting distance/time graph	51	graph voltage vs. current
				459	heat equation	121	graph mass vs. volume
				485	computer modeling to predict greenhouse effects	147	organize observations into a category table
				494	modeling air currents	151	does your experiment agree with law of conservation of mass?
				518	create a model (#1)	185	constructing a graph of drops of acid vs pH
				524	model of Earth's history	187	find equation for trend line
				533	modeling plate boundaries	187	construct a graphical model
				576	rock cycle model	189	construct a temperature vs. time graph
				614	solar system modeling	197	constructing a graph from atmospheric pressure data
				624	model of the sun's anatomy		
				645	inverse square law		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						202	modeling the effect of greenhouse gases on Earth's temperature
						203	graphing water and ice temperature readings
						206	constructing a graph of time vs. temperature
						212	modeling underwater rivers and waterfalls and springs
						231	evaluating your completed bathymetric map
						232	construct a model that simulates an earthquake
						247	evaluate your ability to interpret rock formations
						257	inverse square law
						258	setting up a scale model of the solar system
						268	discovering the mathematical relationship betwen apparent brightness and distance

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
12.1.23 12	Skills and Processes	Technology	demonstrate and explain how using existing tools extend knowledge and identify the limitations, which drive the need for new technologies	5 24 280 280 288	measuring distance using an electronic timer measuring volume of liquids measuring volume of solids find the thickness of a single card	5 6 7 9 9 9 10 12 12 14 16 17 30 44 44 46 46 48	measuring metric and english lengths measure time use a ruler to make a measurement conduct three experiments with appropriate equipment design three experiments and choose equpiment design three experiments and choose equipment selecting ramp and photogates select equipment and set up experiment using photogates using photogates measure force use photogates to study car on ramp rigging block and tackle using electrical meter measure voltage measure current using electrical meter using electrical meter

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						48	measure resistance
						50	using electrical meter
						87	measure wavelength
						116	measure mass
						117	measure volume
						117	measuring volume
						145	plan a procedure and select necessary equipment
						145	carry out procedure and select equipment
						151	plan procedures and select materials
						151	select materials from list
						158	use a thermometer
						186	measure temperature
						194	design and construct an aneroid barometer
						209	measuring the intensity of light using an electric meter and solar cell and light bulb
						252	identifying the parts of a refracting telescope and making observations of the moon's surface

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
12.1.24 12	Skills and Processes	Technology	explain that when designing a device. Process, or system (e.g., manufacturing, marketing, operating, maintaining, replacing, and disposing of) risk analysis and technology assessment determines how it will be employed	74	sample engineering problem	52	the cost of using electrical appliances
				135	circuit board explained	70	designing and testing different electric motors
				172	generating electric power	70	proposing and comparing different electric motor designs
				368	limiting reactants	71	testing a motor for performance
				379	research environmental impact of fuel cells	71	which motor gave the highest speed and why?
				379	research fuel cells	71	did draining the batteries affect motor speed?
				379	research fuel cells	163	too much CO2
				379	research economic impact of fuel cells	163	research how trees offset accumulation of CO2
				379	hydrogen-powered cars and the environment	163	research how trees offset accumulation of CO<subscript>2</>
				391	impact of nuclear energy	163	economic impact of end-product of combustion reaction
				391	nuclear vs. fossil fuels	194	design and construct an aneroid barometer
				395	fossil fuels	201	research the causes of ozone in the lower atmosphere
				400	reducing pollution		
				400	problems caused by airborne pollutants		
				400	economic impact of pollution		
				400	economic impact of reducing air pollution		
				414	environmental impact of electrical generating facilities		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
				436	effect of excess nitrates on environment	262	solar energy can be used to generate electricity without producing pollution
				438	impact of using fossil fuels	262	determine the efficiency of a photovoltaic cell
				448	research economic impact of producing gases that cause acid rain		
				560	description of geothermal energy		
				627	the efficiency of photovoltaic cells		
				627	using photovoltaic cells		
12.1.25 12	Skills and Processes	Technology	explain that science and technology have strongly influenced the course of history and cite how human inventiveness has brought new risks as well as improvements to human existence	73	relationship between science and technology	70	using engineering design cycle
				433	the clean water act		
				439	catalytic converters and scrubbing reduce acid rain		
				483	hydrogen powered cars		
				530	using echo sounders to map the sea floor		
				538	what we can learn from seismographs		
				544	understanding earhquakes allows engineers to design safer buildings		
				597	using satellite technology		
				599	space shuttle		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
12.1.26 12	Skills and Processes	History of Science	describe how various cultures from ancient times to the present have made contributions that led to current scientific ideas and technological invention	320 391 583 585 586 589 594	the quests of alchemists scientific discovery and the atomic age history of calendars counting the days in a year the history of clocks and the division of time ancient beliefs about solar eclipses history of the telescope	198	contributions of Schönbein

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
12.1.27 12	Skills and Processes	History of Science	explain that scientific careers differ from one another in what is studied, techniques used, where studied, and outcomes sought but they share a common purpose and philosophy and are part of the same scientific enterprise	23	why make models?	6	asking questions and learning about natural world
				24	scientific models	177	chemistry and photography
				24	what is a scientific model?	178	water quality testing
				473	why do ears pop	202	modeling the effect of greenhouse gases on Earth's temperature
				485	computer modeling to predict greenhouse effects	212	modeling underwater rivers and waterfalls and springs
				494	modeling air currents	215	the food paradox of the oceans
				504	meteorologists use atmospheric pressure data to understand movement of weather systems	232	construct a model that simulates an earthquake
				518	create a model (#1)	258	setting up a scale model of the solar system
				524	model of Earth's history		
				533	modeling plate boundaries		
				548	describe the work of a geologist and paleontologist and seismologist		
				576	rock cycle model		
				614	solar system modeling		
				624	model of the sun's anatomy		
				648	evidence for Big Bang theory		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
12.2.01 12	Concepts of Earth/Space Science	Materials and Processes That Shape A Planet	explain how the formation, weathering, sedimentation, and reformation of rock constitutes a continuing "rock cycle" in which the total amount of materials stay, the same	440	oceans as part of the hydrosphere	237	examining the magma chemistry of volcanoes and how it relates to a volcano's location
				471	description of Earth's atmosphere	242	understanding how igneous rocks are formed and growing crystals to investigate their formation
				472	effect of life on Earth's atmosphere	244	understanding how sedimentary rocks are formed and creating sedimentary deposits to investigate them
				477	layers of the atmosphere	246	understanding and investigating how metamorphic rocks are formed
				478	layers of the atmosphere	247	interpreting how different rock formations were formed
				533	activity of Earth's crust at plate boundaries		
				534	balance of creating and consuming Earth's crust		
				554	properties of volcanically formed rock		
				559	types of volanic rock		
				561	describing volcanic rock		
				562	constructive and destructive processes		
				562	constructive and destructive processes		
				565	formation of soil		
				573	formation of igneous and sedimentary and metamorphic rocks		
				575	identifying igneous and sedimentary and metamorphic rocks		
				576	the rock cycle		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
				576	the rock cycle		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
12.2.02 12	Concepts of Earth/Space Science	Earth History	use absolute dating, superposition, and fossil correlation to explain the sequence of events, which make up Earth's biologic and geologic history	521	origin of fossils	225	determining the relative ages of rock formations
				522	relative dating	226	sequencing events in a geologic cross-section
				523	faunal succession	230	predicting plate movement over 50 million years and the resultant land features
				523	interpreting rock formations		
				524	table and description of the geologic time scale		
				524	extinction of the dinosaurs due to giant meteor hitting Earth		
				528	predicting what Earth might look like in 50 million years		
				534	land features resulting from divergent plate boundaries		
				535	resulting land features from subduction		
				536	land features resulting from transform plate boundaries		
				547	predict separation of North America and Europe in 75 million years		
				548	predict effects of divergent plate boundaries on Great Rift Valley		
				563	mountain-building		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
				564	changes in land features due to erosion		
				566	effect of glaciers on land		
				566	ice ages		
				569	studying moon rocks on Earth		
				619	how an asteroid event may have caused the extinction of dinosaurs		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
12.2.03 12	Concepts of Earth/Space Science	Plate Tectonics	describe Earth's surface in reference to plate tectonics (i.e., internal heat flow and the dynamic nature of Earth's crust)	525	formation of Earth's layers	228	listing which kind of plate boundary is associated with each geologic feature
				526	description of Earth's layers	229	identifying tectonic plates and plate boundaries
				528	predicting what Earth might look like in 50 million years	230	predicting plate movement over 50 million years and the resultant land features
				528	definition of plate tectonics	236	understanding the Volcanic Explosivity Index
				530	sea-floor spreading and mid-ocean ridges	237	finding a pattern of volcanoes related to the locations of plate boundaries
				531	magnetic patterns on the sea floor	240	estimating the effects of meteor impacts on Earth
				532	theory of plate tectonics	241	identifying which geologic features on Earth were caused by meteors
				533	describing plate boundaries		
				534	land features resulting from divergent plate boundaries		
				534	divergent plate boundaries		
				535	resulting land features from subduction		
				535	convergent plate boundaries		
				536	transform plate boundaries		
				536	land features resulting from transform plate boundaries		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
				537	causes and descriptions of earthquakes		
				537	earthquakes and plate tectonics		
				539	earthquakes rating scales		
				547	predict separation of North America and Europe in 75 million years		
				548	predict effects of divergent plate boundaries on Great Rift Valley		
				551	structure of a volcano		
				552	formation of magma in Earth's mantle		
				552	formation of magma in Earth's mantle		
				552	geologic basis for volcanic eruptions		
				553	where volcanic activity occurs		
				554	types and shapes of volcanoes		
				554	figure showing structure of different types of volcanoes		
				555	geologic basis for shield volcanoes		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
				555	formation of shield volcanoes due to hot spots		
				555	formation of Hawaiian Islands due to volcanic activity		
				555	shield volcanoes		
				556	formation of stratovolcanoes due to subduction		
				556	geologic basis for stratovolcanoes		
				556	stratovolcanoes		
				557	geologic bases for cinder cone volcanoes		
				558	volcanoes shape the Earth		
				563	mountain-building		
				563	constructive process of mountain building		
				564	the destructive process of erosion		
				564	changes in land features due to erosion		
				565	wind erosion		
				566	effect of glaciers on land		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
12.2.04 12	Concepts of Earth/Space Science	Astronomy	identify and describe the properties, interactions, and the theories of formation of the universe and its components (i.e., galaxies, stars, planets, asteroids, comets, and meteors)	611	historical theories of the origin of the moon	255	observe and describe the appearance of the moon and Jupiter and its moons
				612	historical theories about the solar system	264	using spectroscopy to analyze the light emitted by stars and identify most common elements
				621	historical theories of which objects were planets		
				638	the life cycle of stars		
				639	death of small to medium stars results in white dwarfs and planetary nebula and black dwarfs		
				639	description and illustration of the life cycle of stars		
				640	death of massive stars results in supernovas and neutron stars and black holes		
				640	elements formed by nuclear fusion in stars		
				647	the Big Bang theory of the origin of the universe		
				648	evidence for the Big Bang theory		
				649	evidence for the Big Bang theory		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
12.2.05 12	Concepts of Earth/Space Science	Astronomy	compare the similarities and differences among the sun, the terrestrial planets, and the gas planets and relate those similarities and differences to the structure, scale, and formation of the solar system	472	comparison of Earth's atmosphere to other planets	256	simulate an object in orbit and investigate how orbital period varies within distance
				481	greenhouse conditions on Earth	258	setting up a scale model of the solar system
				485	research the density of Venus' and Mars' atmospheres	259	determining scale distances for the planets
				612	orbits of planets around the sun	260	determining scale sizes of the planets
				613	explanation and illustration of the solar system		
				614	relative sizes and distances within the solar system		
				615	greenhouse conditions on Venus		
				615	what makes Earth capable of supporting life		
				619	asteroids and comets		
				620	meteors and meteorites and the Kuiper Belt		
				641	the existence of other planetary systems		
				641	how the solar system was formed		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
12.2.06 12	Concepts of Earth/Space Science	Interactions of Hydrosphere and Atmosphere	analyze the major components of the atmosphere and hydrosphere and explain how the transfer of energy through them influences Earth's weather and climate	439	illustration of acid rain formation	185	effect of ocean on carbon dioxide levels in the atmosphere
				440	oceans as part of the hydrosphere	198	detecting ozone which is a protective atmosphere gas against high energy radiation
				471	composition of Earth's atmosphere	202	investigate the temperature effects of greenhouse gases
				471	description of Earth's atmosphere	207	research how large bodies of water affect climate
				472	effect of life on Earth's atmosphere	207	research how large bodies of water affect climate
				477	layers of the atmosphere	213	exploring how temperature-dependent layering creates currents
				478	layers of the atmosphere	215	understanding the Atlantic gyre
				480	transfer of energy in and out of Earth's atmosphere		
				480	distribution of incoming solar radiation		
				481	greenhouse effect and greenhouse gasses		
				481	Earth's "energy budget"		
				482	changes to the oceans due to increasing global temperatures		
				483	global temperature changing over time		
				485	Earth's internal energy		
				491	Earth's temperature varies with latitude		
				493	convection currents in the atmosphere		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
				495	global wind patterns		
				496	effects of the Gulf Stream on climate of Great Britain		
				496	descriptions of ocean currents and their effects on climate		
				497	water in the atmosphere affects weather patterns		
				502	cold fronts		
				502	effects of moving air masses		
				503	warm fronts		
				503	jet streams		
				508	causes and effects of the El Nino Southern Oscillation		
				510	effect of cold ocean currents on formation of fog desserts		
				511	effect of warm ocean currents on formation of tropical rainforest		
				513	effect of large bodies of water on climate		
				515	alpine tundra occurs at high altitudes		
				528	Earth's surface is changing		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
				568	how urban sprawl changes local climate		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
12.2.07 12	Concepts of Earth/Space Science	Interactions of Hydrosphere and Atmosphere	explain the principles of hydrology including surface and ground water flows, aquifers, percolation, desalinization and sources of water contamination and pollution	411	effects of PCB's in Great Lakes	178	actions to take to improve water quality
				414	effect of electrical generating facilities on dissolved oxygen in water	178	predict the quality of surface water to be tested and justify your answer
				433	water quality standards	178	predict the quality of surface water to be tested and justify your answer
				433	The Clean Water Act	179	address what you can do to maintain or improve the water quality at the test site
				434	importance of water analysis	182	the effects of acid rain on organisms in aquatic environments
				435	water quality testing	212	investigate how the ocean 's salinity affects its density
				436	water quality testing		
				437	acid rain		
				437	effects of acid rain on natural environments		
				439	illustration of acid rain formation		
				440	supply of water to oceans		
				440	oceans in the water cycle		
				441	sources of salts in the ocean		
				442	composition of seawater		
				443	impact of increased CO2 in oceans		
				443	impact of increased CO2 on oceans		
				444	pollution and the ocean food chain		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
				445	pollution and the ocean food chain		
				471	nitrogen cycle		
				479	effects of CFC's on the ozone layer		
				482	effects of burning fossil fuels		
				482	changes to the oceans due to increasing global temperatures		
				515	permafrost		
				559	volcanoes and water vapor		
				564	landforms shaped by water		
				568	how urban sprawl changes local climate		
12.2.08 12	Concepts of Earth/Space Science	Interactions of Hydrosphere and Atmosphere	analyze the major components, thermal structure and chemical composition of the atmosphere	471	composition of Earth's atmosphere	185	effect of ocean on carbon dioxide levels in the atmosphere
				481	greenhouse effect and greenhouse gasses	198	detecting ozone which is a protective atmosphere gas against high energy radiation
						202	investigate the temperature effects of greenhouse gases

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
12.4.01 12	Concepts of Chemistry	Structure of Matter	use observation of the properties of matter to predict its structure and changes to its structure	284	melting and boiling point explained	116	mass and volume measurements
				284	changes of state	118	observe melting process and study quantitatively
				284	melting and boiling points	119	melting point of ice
				285	table of melting and boiling points	119	energy and phase changes
				285	characteristics of matter related to its state	124	build a density column
				291	density is independent of amount of substance	212	investigate density changes in the oceans as the cause of ocean layering
				291	density explained		
				292	hardness is a physical property of matter		
				292	elasticity is a physical property of matter		
				293	brittleness is a physical property of matter		
				294	development of Kevlar brand fiber		
				294	tensile strength is a physical property of matter		
				294	malleability is a physical property of matter		
				295	relationship between mass volume and density		
				296	density of liquid water vs. ice		
				297	buoyancy explained		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
				298	sinking and floating		
				302	viscosity of motor oils		
				305	viscosity of glue mixtures		
				457	engineers use specific heat of substances to design better products		
				498	phases changes in the atmosphere		

Correlation to Maryland Science Content Standards

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
12.4.02 12	Concepts of Chemistry	Physical or Chemical Changes	explain how the number and arrangement of electrons can be used to predict when an atom will transfer or share electrons to form a bond and explain how the resulting materials are different from the original materials	315	atoms of same element have same atomic number	132	atomic number determines what element that atom is
				324	use the periodic table to predict chemical formulas	136	ions
				324	which element is more likely to combine with other elements?	137	importance of atomic number
				335	chemical bonding and the periodic table	140	find the number of electrons in outermost level
				353	physical and chemical changes and digestion	141	whan an atom ionizes
				354	new substances are formed when a chemical change occurs	141	modeling a chemical bond
				355	physical and chemical changes in tire recycling	143	ionic compounds
				364	carbon chains	146	investigate and observe chemical and physical changes in the lab
				372	determine if changes are chemical or physical	157	predict the products of double displacement reactions
				388	showing valence electrons in a diagram	162	carbon reactions and the environment
				404	water is a polar molecule		
				405	hydrogen bonding in water		
				406	hydrogen bonding and properties of water		

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Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
12.4.03 12	Concepts of Chemistry	Classification of Matter	explain that all matter has structure and the structure serves as the basis for the properties of and the changes in matter	278	compounds are composed of elements	114	investigate a homogeneous mixture
				279	summary of matter classification	118	molecules in a liquid
				284	states of matter and arrangement of molecules	118	investigate melting
				288	create a poster of matter classification	132	building atom models
				311	all matter is formed from atoms	132	comparing atoms
				311	all matter is formed from atoms	132	atomic number determines what element that atom is
				311	protons/neutrons/electrons	133	location of electrons in atom
				311	location/size/charge of subatomic particles	133	protons and neutrons
				315	atoms of same element have same atomic number	136	model stable and neutral atoms
				318	proton/electron attraction	137	build atomic models
				321	groups of elements and valence shells	137	importance of atomic number
				329	periodic table columns and valence electrons	140	review subatomic particles
				330	bonding and periodic table position	140	why do atoms form chemical bonds?
				332	periodic table and electronegativities	141	build model of Na and Cl atoms and explain why they bond to form a molecule
				335	periodic table and oxidation numbers	142	arrangement of electrons and groups of elements
						142	why do atoms combine in certain ratios?

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Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
				343	mole quantities	144	show ratios in which elements combine to form a compound
				354	new substances are formed when a chemical change occurs	157	predict the products of double displacement reactions
				357	chemical reactions involve rearrangement of atoms	162	importance of fossil fuels
				364	carbon chains	162	structure of fossil fuels
				394	photosynthesis and carbon reactions	162	carbon reactions and the environment
				395	fossil fuels and carbon reactions	169	investigate solutions and colloids and suspensions
				403	water structure and its function as a solvent		
				403	a water molecule is v-shaped		
				405	molecular structure of ice		
				409	why water is called the universal solvent		

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Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
12.4.04 12	Concepts of Chemistry	Conservation of Matter and Energy	analyze the interrelationship of mass and energy associated with chemical, physical, and nuclear changes. (i.e., endothermic, exothermic, kinetic molecular theory, rate of change, and gas laws)	234	electrons and energy levels and light emission	119	investigate temperature and energy transfer in melting process
				299	Charles' law	119	adding heat energy to melt an ice cube
				300	Boyle's law	134	what does atomic structure have to do with light and color?
				300	what is pressure?	138	nuclear reactions
				381	exothermic reactions and MREs	138	fusion and fission
				382	endothermic reactions and cold packs	147	feel the heat generated by chemical reaction
				387	fusion and fission explained	158	investigate energy changes in chemical reactions
				388	nuclear vs chemical reactions	158	measure energy changes in 3 different reactions
				393	carbon dating	160	radioactive decay
				393	radioisotopes in science and medicine	160	how do you simulate nuclear decay?
				400	research pros and cons of nuclear technology	161	research pros and cons of uses for radioactive elements
				451	increasing temperature means increasing motion of molecules	188	investigate heating water with an immersion heater
				451	temperature is a measure of average kinetic energy	188	investigate the increase of temperature of water as thermal energy is added
				452	molecular motion increases when temperature increases		
				454	changes in temperature are directly related to changes in energy		

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Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
				455	examples of flow of heat	194	building a compression chamber to observe changes in atm pressure
				461	conduction and convection and radiation	196	correcting your barometer's readings for the effects of temperature on a gas
				623	nuclear fusion and the sun	265	an element's spectral lines correspond to specific wavelengths of light
				623	nuclear fusion on the sun produces energy from matter		
				633	Einstein's equation		
12.5.01 12	Concepts Of Physics	Mechanics	use algebra and geometry to apply the concepts of energy, force (i.e., Newton's Law, gravitation, friction), and momentum to explain the behavior of objects (i.e., linear and rotational motion, projectiles, collisions)	52	gravity depends on mass	14	exploring acceleration on a ramp
				52	the effect of gravity	19	discover 2nd law of motion
				54	Newton's law of universal gravitation	20	investigate effect of gravity on motion
				55	calculating gravitational force between objects	21	effect of friction on the car
				56	friction explained	22	car and ramp and Newton's 3rd law
				60	law of conservation of momentum	24	measure force in newtons
				60	how to calculate momentum	257	relating the relationship between orbital speed and distance to the equation of universal gravitation
				64	calculate momentum		
				64	research effect of friction on human joints		
				64	solving problems using f=ma		
				69	newtons and pounds		
				606	Newton's law of universal gravitation		

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Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
12.5.02 12	Concepts Of Physics	Mechanics	explain the relationship between the universal law of gravitation and the force of gravity on an object at the surface of the Earth	52 54 55 606	gravity depends on mass Newton's law of universal gravitation calculating gravitational force between objects Newton's law of universal gravitation	257	relating the relationship between orbital speed and distance to the equation of universal gravitation

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Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
12.5.04 12	Concepts Of Physics	Electricity & Magnetism	analyze electric fields and their effect on charges and electric circuits (i.e., series, parallel, and complex), magnets and magnetic fields, and explain how electricity and magnetism affect one another (i.e., motors and generators)	101	concept of electric current	42	investigate electric charge
				105	charge is a fundamental property of matter	46	investigate concept of electric current
				106	static charge discussed	50	Ohm's law
				107	explanation of coulomb	56	build a parallel circuit
				108	how an electroscope works	56	build a series circuit
				108	electroscopes	57	compare brightness of bulbs in series vs. parallel
				131	Ohm's law explained	58	build a series circuit and find total resistance
				132	using Ohm's law to analyze circuits	60	parallel circuit and Ohm's law
				145	single path vs. branching paths	61	compare current and voltage and resistance in each type of circuit
				145	parallel circuit defined	62	describing forces that magnets exert on each other
				145	holiday lights as series or parallel	64	testing materials to see if they are affected by magnets
				145	series circuit defined	66	build an electromagnet
				146	household wiring	66	compare electromagnets and permanent magnets
				147	current and voltage in series circuits	67	find out what happens to strength of electromagnet when current is increased
				151	voltage and resistance in parallel circuits	68	investigate how an electric motor works
				155	analyze a parallel circuit		
				156	analyze a series circuit		
				159	magnetism explained		
				163	understanding magnetic fields		

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Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
				164	what is an electromagnet?	73	exploring electric generators
				166	increased current vs. strength of magnetic field	73	use magnetic induction to create an electric field
				166	building an electromagnet		
				168	how electric motors work		
				170	dissecting an electric motor		
				171	electromagnetic induction explained		

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Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
12.5.05 12	Concepts Of Physics	Wave Interactions	use energy transformations and physical effects to explain the interactions of waves and physical effects, (i.e., Doppler effect, and Interference patterns)	195	waves transmit energy	85	observing reflection in water waves
				201	waves and absorption	95	interference and sound waves
				201	waves and refraction	95	investigate interference with sound waves
				201	waves and reflection	101	examine light through diffraction grating
				201	reflection in water waves and light waves	108	explore refraction with a prism
				202	refraction and eyeglasses		
				206	constructive and destructive interference		
				210	can wave interference sink a ship?		
				223	interference of sound waves		
				225	consonance and dissonance and beats		
				261	refraction and lenses		
				480	energy and radiation relationships		
				626	the sun's energy reaches Earth in the form of electromagnetic waves		
				648	the Doppler effect		

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Foundations of Physical Science with Earth and Space Science

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Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
12.5.06 12	Concepts Of Physics	Nuclear Energy	describe developments in modern Physics (i.e., nuclear fission, photoelectric effect, wave-particles duality, energy of light) and their applications (e.g., nuclear power, MRI). (i.e., semi-conductors)	234	electrons and energy levels and light emission	134	what does atomic structure have to do with light and color?
				387	fusion and fission explained	138	fusion and fission
				388	nuclear vs chemical reactions	138	nuclear reactions
				393	radioisotopes in science and medicine	160	how do you simulate nuclear decay?
				393	carbon dating	161	research pros and cons of uses for radioactive elements
				400	research pros and cons of nuclear technology	265	an element's spectral lines correspond to specific wavelengths of light
				623	nuclear fusion and the sun		