Correlation to Maryland Science Content Standards

Foundations of Physical 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
						100	observe glow-in-the-dark paper
						146	observe evidence of chemical change
						158	observe temperature changes in chemical reactions
						164	observe Tyndall effect
						168	observe dissolving process
						175	make observations about local surface water
						177	research pH indicators
						192	observe convection currents
						201	research electricity generation

Correlation to Maryland Science Content Standards

Foundations of Physical 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	forming a hypothesis	7	compare results with hypothesis
				10	the research question and hypothesis	75	plan three experiments to determine which variable affects the period of a pendulum
				19	design your own experiment	166	which factor will produce fastest dissolving rate?
						166	which method will give fastest dissolving rate?
						198	which type of food contains the most energy?

Correlation to Maryland Science Content Standards

Foundations of Physical 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	6	formulate hypothesis
				9	steps in the scientific method	7	perform your own experiment
				10	forming a hypothesis	7	compare results with hypothesis
				19	design your own experiment	7	design your own experiment
				19	design your own experiment	9	devise a hypothesis
				42	devise an experiment	9	design three experiments using car and ramp
				372	observe chemical changes	10	conduct car/ramp experiment
						14	record three different time intervals
						16	investigate Newton's 2nd law
						16	decide how to vary the force on the car for this experiment
						25	collect force data
						26	what variables can be changed?
						27	write down the number of weights you use
						34	formulate hypothesis
						34	investigate motion on a rollercoaster

Correlation to Maryland Science Content Standards

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						75	plan three experiments to determine which variable affects the period of a pendulum
						75	perform self-designed experiment
						75	design pendulum experiment
						93	decision trees and the advantage of doing multiple trials
						100	observe glow-in-the-dark paper
						146	record detailed observations
						146	observe evidence of chemical change
						150	record data as you perform experiment
						151	design experiment to find out if mass is conserved
						158	observe temperature changes in chemical reactions
						164	observe Tyndall effect
						166	what three factors influence dissolving rate?
						166	which method will give fastest dissolving rate?

Correlation to Maryland Science Content Standards

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						166	which factor will produce fastest dissolving rate?
						166	devise hypothesis and explain
						168	observe dissolving process
						175	make observations about local surface water
						177	research pH indicators
						178	formulate hypothesis
						192	observe convection currents
						198	formulate hypothesis
						198	which type of food contains the most energy?
						201	research electricity generation

Correlation to Maryland Science Content Standards

Foundations of Physical 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 equpiment
						9	design three experiments and choose technology
						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	carry out procedure and select equipment
						145	plan a procedure and select necessary equipment
						151	select materials from list
						151	plan procedures and select materials

Correlation to Maryland Science Content Standards

Foundations of Physical 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	500	safety rules described	20	safety tip for car/ramp setup
				501	safety quiz	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
						164	safety equipment
						168	hot water safety
						172	safety tip for water testing
						175	safety tip for testing local surface water
						180	thermometer safety
						182	heat safety
						186	thermometer safety
						192	heat safety
						198	heat safety
						200	safely using rubber bands

Correlation to Maryland Science Content Standards

Foundations of Physical 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	measuring metric and english lengths
				5	make measurements with precision	5	making measurements with precision
				5	measuring distance	6	measure time
				6	scientists use metric units	7	measure and record variables
				19	convert from english to metric	7	use a ruler to make a measurement
				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
						16	understand and use units of force
						17	measure the force
						17	measure the force
						17	use photogates to study car on ramp
						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 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	using electrical meter
						46	measure current
						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
						180	measure temperature

Correlation to Maryland Science Content Standards

Foundations of Physical 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	electronic timer and release technique
				26	creating graphs	6	compare results with other groups
				27	reading a graph	7	record time interval
				41	make a graph	9	construct a data table
				42	interpreting distance/time graph	9	collect speed data
				42	analyze a speed/distance graph	11	analyze speed change of car
				78	analyze lever diagram	11	graph speed vs. position
						12	understand and use data table
						13	graph distance vs. time
						14	record three different time intervals
						15	interpret a speed vs. time graph
						15	construct a quantitative graphical model
						17	record results in data table
						17	record times

Correlation to Maryland Science Content Standards

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						18	study data table for relationship between force and motion
						18	organize different combinations of data
						24	collect weight data
						24	use data table to record results
						25	create a mathematical model
						25	collect force data
						25	analyze block and tackle data
						27	find math rule for lever equilibrium
						27	write down the number of weights you use
						27	analyze lever equilibrium data
						27	use data table to record results
						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 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	collect mass and amplitude data
						75	create data table for self-designed experiment
						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
						167	collect time data and record observations
						167	use data table for observations
						173	organize water quality data into a table
						181	construct a graphical model

Correlation to Maryland Science Content Standards

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						183	construct a temperature vs. time graph

Correlation to Maryland Science Content Standards

Foundations of Physical Science 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	11	graph speed vs. position
				24	interpretations of patterns in data	11	analyze speed change of car
				27	reading a graph	15	interpret a speed vs. time graph
				28	identifying cause and effect relationships	18	use data to describe relationship between force and motion
				41	identify cause and effect	18	evaluate graphs as to whether or not they show relationships between variables
				42	predict the speed of a car	18	study data table for relationship between force and motion
				42	analyze a speed/distance graph	19	use data to infer correct relationship between variables
				78	analyze lever diagram	21	evaluate percent change for data collected
				79	look at force data and decide the usefulness of a machine	21	determine effect of increasing mass
						25	analyze block and tackle data

Correlation to Maryland Science Content Standards

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						27	analyze lever equilibrium data
						27	think about the variables
						30	interpret block and tackle data
						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	analyze pendulum data
						76	use data to predict best string length for a pendulum clock
						121	use graph to predict mass of six objects
						141	build models of Na and Cl and use them to explain bonding
						147	students analyze chemical change lab results

Correlation to Maryland Science Content Standards

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						151	perform the experiment you designed
						151	explain how hypothesis compares to results
						156	make predictions about solubility
						157	add new rules to list based on findings
						167	evaluate method based on data

Correlation to Maryland Science Content Standards

Foundations of Physical Science Student Text and Investigation Manual

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

Correlation to Maryland Science Content Standards

Foundations of Physical Science 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?
						165	why was plain water tested?
						165	what does the word "control" mean?
						173	write prargraph to explain results
						175	create water quality report
						179	write summary of findings

Correlation to Maryland Science Content Standards

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
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 sailboat human jaw	68	form and function of different electric motor configurations
						108	form and function of human eye, prism, and lenses
08.1.11 8	Skills and Processes	Critical Thinking	construct and use classification systems for grouping objects, materials, concepts, actions, and organisms, etc.	180	harmonic motion in natural systems		
				258	optical systems		
				278	system of classifying matter		
				409	a solute and a solvent make up a system		
08.1.12 8	Skills and Processes	Critical Thinking	critique scientific information and identify possible sources of bias			11	calculate % error
						35	what evidence is there in support of your hypothesis?
						39	critique group's explanation of energy transformations
						76	calculate % error
						77	show how energy loss data could be applied to designing a real clock

Correlation to Maryland Science Content Standards

Foundations of Physical Science 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 19	measuring distance which group did the best experiment?	5 6 11 16 18 21 44 46 48 75 76 87 116 117 167 180	measuring metric and english lengths measure time calculate % error measure force evaluate graphs as to whether or not they show relationships between variables evaluate percent change for data collected measure voltage measure current measure resistance evaluate statistical significance calculate % error measure wavelength measure mass measure volume evaluate method based on data measure temperature

Correlation to Maryland Science Content Standards

Foundations of Physical Science 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
						7	record time interval
						9	collect speed data
						14	record three different time intervals
						17	record times
						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	collect mass and amplitude data
						75	evaluate statistical significance
						146	record detailed observations
						150	record data as you perform experiment

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Foundations of Physical Science Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						167	collect time data and record observations
						167	evaluate method based on data
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	analyze speed change of car
				42	analyze a speed/distance graph	11	graph speed vs. position
				78	analyze lever diagram	15	interpret a speed vs. time graph
						18	study data table for relationship between force and motion
						25	analyze block and tackle data
						27	analyze lever equilibrium data
						35	does data support hypothesis?
						45	did battery voltage change?
						76	analyze pendulum data
						147	students analyze chemical change lab results

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Foundations of Physical Science Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
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	add new rules to list based on findings
08.1.17 8	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
						151	write a procedure
						166	write a procedure
						173	write prargraph to explain results
						175	create water quality report
						179	write summary of findings

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Foundations of Physical 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
						30	interpret block and tackle data
						141	build models of Na and Cl and use them to explain bonding
						166	which method will give fastest dissolving rate?
						174	visit local water supply and perform testing
						198	which type of food contains the most energy?

Correlation to Maryland Science Content Standards

Foundations of Physical 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	6	formulate hypothesis
				10	forming a hypothesis	7	compare results with hypothesis
				19	design your own experiment	9	devise a hypothesis
						21	construct reasonable explanation based on data
						34	formulate hypothesis
						35	study data and determine importance of height on speed of marble
						45	analyze data and explain a rule
						75	plan three experiments to determine which variable affects the period of a pendulum
						163	evaluating choice of favorite car
						166	which factor will produce fastest dissolving rate?
						166	devise hypothesis and explain
						178	formulate hypothesis
						198	formulate hypothesis

Correlation to Maryland Science Content Standards

Foundations of Physical 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			6	asking questions and learning about natural world
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
						121	graph mass vs. volume
						147	organize observations into a category table
						151	does your experiment agree with law of conservation of mass?
						181	construct a graphical model
						183	construct a temperature vs. time graph

Correlation to Maryland Science Content Standards

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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	measuring distance	5	measuring metric and english lengths
				24	using an electronic timer	6	measure time
				280	measuring volume of liquids	7	use a ruler to make a measurement
				280	measuring volume of solids	9	design three experiments and choose equpiment
				288	find the thickness of a single card	9	conduct three experiments with appropriate equipment
						10	selecting ramp and photogates
						12	select equipment and set up experiment
						12	using photogates
						14	using photogates
						16	measure force
						17	use photogates to study car on ramp
						30	rigging block and tackle
						44	using electrical meter
						44	measure voltage
						46	using electrical meter
						46	measure current
						48	measure resistance
						48	using electrical meter
						50	using electrical meter

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Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						87	measure wavelength
						116	measure mass
						117	measure volume
						117	measuring volume
						145	carry out procedure and select equipment
						145	plan a procedure and select necessary equipment
						151	select materials from list
						151	plan procedures and select materials
						158	use a thermometer
						180	measure temperature
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	designing and testing different electric motors
						70	proposing and comparing different electric motor designs

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Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	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 26 41	making a graph creating graphs make a graph	13 15 37 51 71 71 121 147 151 157 181 183	graph distance vs. time construct a quantitative graphical model organize data into a graph of speed vs. height graph voltage vs. current which motor gave the highest speed and why? did draining the batteries affect motor speed? graph mass vs. volume organize observations into a category table does your experiment agree with law of conservation of mass? add new rules to list based on findings construct a graphical model construct a temperature vs. time graph

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Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
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
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	320 391	the quests of alchemists scientific discovery and the atomic age		
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	110 370	research Franklin's electricity experiments research Lavoisier's contributions	174 177	water quality testing chemistry and photography

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Foundations of Physical Science Student Text and Investigation Manual

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

Correlation to Maryland Science Content Standards

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
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	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	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
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	284 451 451 455	states of matter and arrangement of molecules temperature and kinetic energy increasing temperature means increasing motion of molecules temperature and thermal energy and heat	118 118 119 119 182	molecules in a liquid investigate melting investigate temperature and energy transfer in melting process adding heat energy to melt an ice cube relationship between heat and temperature

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Foundations of Physical 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		
				391	impact of nuclear energy		
				400	reducing pollution		
				444	impact of using fossil fuels		
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	201	investigate different methods of generating electricity
				391	impact of nuclear energy		
				400	reducing pollution		
				444	impact of using fossil fuels		

Correlation to Maryland Science Content Standards

Foundations of Physical 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
						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	single path vs. branching paths	60	parallel circuit and Ohm's law
				145	parallel circuit defined	61	compare current and voltage and resistance in each type of circuit
				145	series circuit defined		
				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		

Correlation to Maryland Science Content Standards

Foundations of Physical 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? increased current vs. strength of magnetic field building an electromagnet 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 use magnetic induction to create an electric field exploring electric generators

Correlation to Maryland Science Content Standards

Foundations of Physical 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	27 372	how to read a graph observe chemical changes	78 100 145 146 158 164 168 175 177 192 201	reading harmonic motion data tables and graphs observe glow-in-the-dark paper present findings to the class observe evidence of chemical change observe temperature changes in chemical reactions observe Tyndall effect observe dissolving process make observations about local surface water research pH indicators observe convection currents research electricity generation

Correlation to Maryland Science Content Standards

Foundations of Physical 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	6	formulate hypothesis
				9	steps in the scientific method	7	compare results with hypothesis
				10	forming a hypothesis	7	perform your own experiment
				19	design your own experiment	7	design your own experiment
				19	design your own experiment	9	design three experiments using car and ramp
				42	devise an experiment	9	devise a hypothesis
				372	observe chemical changes	10	conduct car/ramp experiment
						16	investigate Newton's 2nd law
						16	decide how to vary the force on the car for this experiment
						26	what variables can be changed?
						34	investigate motion on a rollercoaster
						34	formulate hypothesis
						75	perform self-designed experiment
						75	design pendulum experiment

Correlation to Maryland Science Content Standards

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						75	plan three experiments to determine which variable affects the period of a pendulum
						93	decision trees and the advantage of doing multiple trials
						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
						164	observe Tyndall effect
						166	devise hypothesis and explain
						166	which method will give fastest dissolving rate?
						166	what three factors influence dissolving rate?
						166	which factor will produce fastest dissolving rate?
						168	observe dissolving process
						175	make observations about local surface water
						177	research pH indicators

Correlation to Maryland Science Content Standards

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						178	formulate hypothesis
						192	observe convection currents
						198	formulate hypothesis
						198	which type of food contains the most energy?
						201	research electricity generation

Correlation to Maryland Science Content Standards

Foundations of Physical 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 10 14 16 18 21 25 27 34 75 75 146 150 166	perform your own experiment conduct car/ramp experiment record three different time intervals investigate Newton's 2nd law evaluate graphs as to whether or not they show relationships between variables evaluate percent change for data collected collect force data write down the number of weights you use investigate motion on a rollercoaster perform self-designed experiment evaluate statistical significance record detailed observations record data as you perform experiment which method will give fastest dissolving rate?

Correlation to Maryland Science Content Standards

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						167	evaluate method based on data
						177	research pH indicators
						198	which type of food contains the most energy?
						201	research electricity generation

Correlation to Maryland Science Content Standards

Foundations of Physical 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
						75	design pendulum experiment
						93	decision trees and the advantage of doing multiple trials
						151	design experiment to find out if mass is conserved
						166	which factor will produce fastest dissolving rate?
						166	what three factors influence dissolving rate?

Correlation to Maryland Science Content Standards

Foundations of Physical 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	500 501	safety rules described safety quiz	20 24 26 40 44 56 58 146 150 158 164 168 172 175 180 182 186 192 198 200	safety tip for car/ramp setup ropes and pulley safety safety tip for hanging weights from lever electrical safety short circuit safety warning short circuit safety warning short circuit safety warning safety in the lab chemistry safety wear goggles and apron safety equipment hot water safety safety tip for water testing safety tip for testing local surface water thermometer safety heat safety thermometer safety heat safety heat safety safely using rubber bands

Correlation to Maryland Science Content Standards

Foundations of Physical 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
						13	draw best fit curve
						16	measure force
						44	measure voltage
						46	measure current
						48	measure resistance
						87	measure wavelength
						116	measure mass
						117	measure volume
						180	measure temperature

Correlation to Maryland Science Content Standards

Foundations of Physical 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	interpreting distance/time graph	9	collect speed data
				42	analyze a speed/distance graph	11	analyze speed change of car
				78	analyze lever diagram	11	graph speed vs. position
						12	understand and use data table
						13	graph distance vs. time
						14	record three different time intervals
						15	construct a quantitative graphical model
						15	interpret a speed vs. time graph
						17	record results in data table
						17	record times

Correlation to Maryland Science Content Standards

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						18	organize different combinations of data
						18	study data table for relationship between force and motion
						24	use data table to record results
						24	collect weight data
						25	analyze block and tackle data
						25	collect force data
						25	create a mathematical model
						27	analyze lever equilibrium data
						27	write down the number of weights you use
						27	use data table to record results
						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 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	collect mass and amplitude data
						75	create data table for self-designed experiment
						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
						167	collect time data and record observations
						167	use data table for observations
						173	organize water quality data into a table
						181	construct a graphical model

Correlation to Maryland Science Content Standards

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						183	construct a temperature vs. time graph

Correlation to Maryland Science Content Standards

Foundations of Physical 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	finding variability in data	6	predict which car will move fastest
				20	how will speed change?	7	test the effect of one other variable
				24	predicting speed from a graph	11	graph speed vs. position
				24	interpretations of patterns in data	11	analyze speed change of car
				27	reading a graph	15	interpret a speed vs. time graph
				28	identifying cause and effect relationships	18	use data to describe relationship between force and motion
				41	identify cause and effect	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
				42	predict the speed of a car	19	use data to infer correct relationship between variables
				78	analyze lever diagram	21	evaluate percent change for data collected
				79	look at force data and decide the usefulness of a machine	21	determine effect of increasing mass
						25	analyze block and tackle data

Correlation to Maryland Science Content Standards

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						27	analyze lever equilibrium data
						27	think about the variables
						30	interpret block and tackle data
						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
						147	students analyze chemical change lab results

Correlation to Maryland Science Content Standards

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						151	perform the experiment you designed
						151	explain how hypothesis compares to results
						156	make predictions about solubility
						157	add new rules to list based on findings
						167	evaluate method based on data

Correlation to Maryland Science Content Standards

Foundations of Physical 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
						173	write prargraph to explain results
						175	create water quality report
						179	write summary of findings

Correlation to Maryland Science Content Standards

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
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 sailboat human jaw	68 108	form and function of different electric motor configurations form and function of human eye, prism, and lenses
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	180 258 278 409	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			11 35 39 76 77	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

Correlation to Maryland Science Content Standards

Foundations of Physical 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 19	measuring distance which group did the best experiment?	5 6 11 16 18 21 44 46 48 75 76 87 116 117 167 180	measuring metric and english lengths measure time calculate % error measure force evaluate graphs as to whether or not they show relationships between variables evaluate percent change for data collected measure voltage measure current measure resistance evaluate statistical significance calculate % error measure wavelength measure mass measure volume evaluate method based on data measure temperature

Correlation to Maryland Science Content Standards

Foundations of Physical 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
						7	record time interval
						9	collect speed data
						14	record three different time intervals
						17	record times
						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	collect mass and amplitude data
						75	evaluate statistical significance
						146	record detailed observations
						150	record data as you perform experiment

Correlation to Maryland Science Content Standards

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						167	collect time data and record observations
						167	evaluate method based on data
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	analyze speed change of car
				42	analyze a speed/distance graph	11	graph speed vs. position
				78	analyze lever diagram	15	interpret a speed vs. time graph
						18	study data table for relationship between force and motion
						25	analyze block and tackle data
						27	analyze lever equilibrium data
						35	does data support hypothesis?
						45	did battery voltage change?
						76	analyze pendulum data
						147	students analyze chemical change lab results

Correlation to Maryland Science Content Standards

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
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	add new rules to list based on findings
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 151 write a procedure 166 write a procedure 173 write prargraph to explain results 175 create water quality report 179 write summary of findings

Correlation to Maryland Science Content Standards

Foundations of Physical 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 20 79	the research question and hypothesis finding variability in data look at force data and decide the usefulness of a machine	6 18 19 30 141 166 174 198	how do we ask questions and get answers from nature? use data to describe relationship between force and motion use data to infer correct relationship between variables interpret block and tackle data build models of Na and Cl and use them to explain bonding which method will give fastest dissolving rate? visit local water supply and perform testing which type of food contains the most energy?
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 24 24 34 73 395	why make models? what is a scientific model? scientific models Newton's research impacted mathematics impact of technology impact of industrial revolution	6	asking questions and learning about natural world

Correlation to Maryland Science Content Standards

Foundations of Physical 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	6	formulate hypothesis
				10	forming a hypothesis	7	compare results with hypothesis
				19	design your own experiment	9	devise a hypothesis
						21	construct reasonable explanation based on data
						34	formulate hypothesis
						35	study data and determine importance of height on speed of marble
						45	analyze data and explain a rule
						75	plan three experiments to determine which variable affects the period of a pendulum
						163	evaluating choice of favorite car
						166	which factor will produce fastest dissolving rate?
						166	devise hypothesis and explain
						178	formulate hypothesis
						198	formulate hypothesis

Correlation to Maryland Science Content Standards

Foundations of Physical 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	why make models? what is a scientific model? scientific models impact of Da Vinci's work	6	asking questions and learning about natural world

Correlation to Maryland Science Content Standards

Foundations of Physical 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
						121	graph mass vs. volume
						147	organize observations into a category table
						151	does your experiment agree with law of conservation of mass?
						181	construct a graphical model
						183	construct a temperature vs. time graph

Correlation to Maryland Science Content Standards

Foundations of Physical 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 10 12 12 14 16 17 30 44 44 46 46 48 48 50	measuring metric and english lengths measure time use a ruler to make a measurement design three experiments and choose equpiment conduct three experiments with appropriate 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 using electrical meter measure current measure resistance using electrical meter using electrical meter

Correlation to Maryland Science Content Standards

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
						87	measure wavelength
						116	measure mass
						117	measure volume
						117	measuring volume
						145	carry out procedure and select equipment
						145	plan a procedure and select necessary equipment
						151	select materials from list
						151	plan procedures and select materials
						158	use a thermometer
						180	measure temperature

Correlation to Maryland Science Content Standards

Foundations of Physical 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	hydrogen-powered cars and the environment	71	which motor gave the highest speed and why?
				379	research environmental impact of 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	research fuel cells	163	economic impact of end-product of combustion reaction
				391	impact of nuclear energy		
				391	nuclear vs. fossil fuels		
				395	fossil fuels		
				400	economic impact of pollution		
				400	economic impact of reducing air pollution		
				400	reducing pollution		
				400	problems caused by airborne pollutants		
				444	impact of using fossil fuels		

Correlation to Maryland Science Content Standards

Foundations of Physical Science Student Text and Investigation Manual

Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
				448	research economic impact of producing gases that cause acid rain		
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
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	the quests of alchemists scientific discovery and the atomic age		

Correlation to Maryland Science Content Standards

Foundations of Physical 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 24 24	why make models? what is a scientific model? scientific models	6 174 177	asking questions and learning about natural world water quality testing chemistry and photography

Correlation to Maryland Science Content Standards

Foundations of Physical 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	melting and boiling points	118	observe melting process and study quantitatively
				284	changes of state	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 explained		
				291	density is independent of amount of substance		
				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	malleability is a physical property of matter		
				294	tensile strength 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 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		
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

Correlation to Maryland Science Content Standards

Foundations of Physical Science 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	investigate melting
						118	molecules in a liquid
				284	states of matter and arrangement of molecules	132	building atom models
						132	comparing atoms
				288	create a poster of matter classification	132	atomic number determines what element that atom is
				311	all matter is formed from atoms	133	protons and neutrons
				311	all matter is formed from atoms	133	location of electrons in atom
				311	protons/neutrons/electrons	136	model stable and neutral atoms
				311	location/size/charge of subatomic particles	137	build atomic models
				315	atoms of same element have same atomic number	137	importance of atomic number
				318	proton/electron attraction	140	why do atoms form chemical bonds?
				321	groups of elements and valence shells	140	review subatomic particles
				329	periodic table columns and valence electrons	141	build model of Na and Cl atoms and explain why they bond to form a molecule
				330	bonding and periodic table position	142	arrangement of electrons and groups of elements
				332	periodic table and electronegativities	142	why do atoms combine in certain ratios?
				335	periodic table and oxidation numbers		

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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	165	investigate solutions and colloids and suspensions
				421	water structure and its function as a solvent		
				421	a water molecule is v-shaped		
				487	simple sugars are transported to cells		

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Standard #: Grade	Standard	Topic	Indicator	student text pg	student text detail	investigation pg	investigation 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	fusion and fission
				381	exothermic reactions and MREs	138	nuclear reactions
				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	radioisotopes in science and medicine	160	radioactive decay
				393	carbon dating	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	temperature and kinetic energy		
				451	increasing temperature means increasing motion of molecules		

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Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
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 52 54 55 56 60 60 64 64 64 69	gravity depends on mass the effect of gravity Newton's law of universal gravitation calculating gravitational force between objects friction explained law of conservation of momentum how to calculate momentum calculate momentum research effect of friction on human joints solving problems using f=ma newtons and pounds	14 19 20 21 22 24	exploring acceleration on a ramp discover 2nd law of motion investigate effect of gravity on motion effect of friction on the car car and ramp and Newton's 3rd law measure force in newtons
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	gravity depends on mass Newton's law of universal gravitation calculating gravitational force between objects		

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Standard #: Grade	Standard	Topic	Indicator	student text pg	detail	investigation pg	detail
12.5.03 12	Concepts Of Physics	Thermodynamics	analyze and apply the concepts of thermodynamics (i.e., laws, heat energy transfer, equilibrium)	468	densely packed solids are good conductors of heat	119	investigate temperature and energy transfer in melting process
				468	heat transfer through air	147	feel the heat generated by chemical reaction
				470	warming hands over candle	190	investigate conduction through all states of matter
				470	convection currents and weather	192	investigate convection in liquids
				472	convection currents in water	194	investigate radiation emitted by liquids
				476	solid road surface emits radiation	194	investigate radiation emitted by solids
				478	apply knowledge of heat transfer to different situations		
				481	global warming and heat transfer by radiation		

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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	compare electromagnets and permanent magnets
				146	household wiring	66	build an electromagnet
				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	use magnetic induction to create an electric field
				166	building an electromagnet	73	exploring electric generators
				166	increased current vs. strength of magnetic field		
				168	how electric motors work		
				170	dissecting an electric motor		
				171	electromagnetic induction explained		
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	reflection in water waves and light waves	101	examine light through diffraction grating
				201	waves and reflection	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		
				474	energy and radiation relationships		

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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		