

**Correlation to West Virginia Science Content Standards and Objectives**  
***Foundations of Physical Science with Earth and Space Science***  
**Student Text and Investigation Manual**

Standard #: Course	Content Standard	Topic	Objective	Volume 1 Student Text Page	Volume 2 Investigation Manual Page		
SC.9.1.01 CATS Nine	Standard 1: History and Nature of Science	History and Nature of Science	formulate scientific explanations based on the student's observational and experimental evidence, accounting for variability in experimental results.	11 19 20 20 79 547 618	controlling variables in experiments did you run a controlled experiment? finding variability in data what factors could explain the variability in their data? look at force data and decide the usefulness of a machine average density (#5) average distance from the sun	7 18 19 21 30 35 45 129 129 141 157 169 169 171	what variables should be controlled? use data to describe relationship between force and motion use data to infer correct relationship between variables construct reasonable explanation based on data interpret block and tackle data study data and determine importance of height on speed of marble analyze data and explain a rule find average velocity control the height of the liquid build models of Na and Cl and use them to explain bonding add new rules to list based on findings what does the word control mean? why was plain water tested? average dissolving rate

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					182 making hypotheses and testing them against observations 185 analyzing the results of the buffered acid experiment 193 explaining efficiency of heat transfer based on data 197 evaluating your aneroid barometer design 224 reconstruct a series of events from clues 235 interpreting how the drumming affects the intensity of the earthquake in the model
SC.9.1.02 CATS Nine	Standard 1: History and Nature of Science	History and Nature of Science	recognize that science has practical and theoretical limitations.	110 study appliance labels and instructions 142 create pamphlet on utility's energy saver programs 448 study claims made by bottled water companies	76 analyze watch manufacturer's claims 162 inferences from promotional materials for vehicles 181 study water filtration device claims

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SC.9.1.03 CATS Nine	Standard 1: History and Nature of Science	History and Nature of Science	recognize that science is based on a set of observations in a testable framework that demonstrate basic laws that are consistent.	23 why make models? 24 scientific models 24 what is a scientific model? 473 why do ears pop 485 computer modeling to predict greenhouse effects 494 modeling air currents 504 meteorologists use atmospheric pressure data to understand movement of weather systems 518 create a model (#1) 524 model of Earth's history 533 modeling plate boundaries 576 rock cycle model 614 solar system modeling 624 model of the sun's anatomy 648 evidence for Big Bang theory	6 asking questions and learning about natural world 202 modeling the effect of greenhouse gases on Earth's temperature 212 modeling underwater rivers and waterfalls and springs 215 the food paradox of the oceans 232 construct a model that simulates an earthquake 258 setting up a scale model of the solar system

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SC.9.1.04 CATS Nine	Standard 1: History and Nature of Science	History and Nature of Science	conclude that science is a blend of creativity, logic and mathematics.	42	interpreting distance/time graph	7	variables in an experiment
				435	making observations and asking questions	14	record three different time intervals
				448	forming a hypothesis and testing through experimentation (#5)	25	create a mathematical model
				459	heat equation	25	collect force data
				486	observing an aurora	27	find math rule for lever equilibrium
				602	identify question, hypothesis, procedure, and results (#1)	27	write down the number of weights you use
				630	use the data to answer the questions	28	derive a math formula
				630	what evidence was used to predict the existence of the Kuiper Belt?	146	record detailed observations
				645	inverse square law	150	record data as you perform experiment
				652	analysis with a spectrometer (#4)	182	observing daphnia and recording movements and behavior
						187	find equation for trend line
						199	collecting Schönbein strips for detecting ozone
						202	collecting data of temperature and sensations
		206	collecting temperature and time data				

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Standard #: Course	Content Standard	Topic	Objective	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
					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 251 recording the changes in the moon over a month 257 inverse square law 268 discovering the mathematical relationship between apparent brightness and distance

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SC.9.1.05 CATS Nine	Standard 1: History and Nature of Science	History and Nature of Science	trace the development of key historical concepts and principles describing their impact on modern thought and life by identifying the scientist's contributions.	34	Newton and the history of physics	130	investigate Rutherford's gold foil experiment
				34	Aristotle vs. Newton	198	contributions of Schönbein
				45	Newton's discovery of the 2nd law		
				45	Newton's Principia		
				45	Newton's Laws of Motion		
				46	oldest known standard weight		
				54	Newton and the force of gravity		
				55	Newton and the apple legend		
				73	Leonardo DaVinci		
				86	James Watt		
				105	Benjamin Franklin		
				107	Charles-Augustin Coulomb		
				110	research Franklin's electricity experiments		
				115	Volta's batteries		
				131	Georg Ohm's work with circuits		
				134	history of superconductivity		
				160	Faraday's contributions		
				161	history of magnetism		

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Standard #: Course	Content Standard	Topic	Objective	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
				589 ancient beliefs about solar eclipses	
				594 history of the telescope	
				612 changing ideas about the solar system	
				648 development of Big Bang theory	

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Standard #: Course	Content Standard	Topic	Objective	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
SC.9.2.01 CATS Nine	Standard 2: Science as Inquiry	Inquiry	model and exhibit the skills, attitudes and/or values of scientific inquiry (e.g., curiosity, logic, objectivity, openness, skepticism, appreciation, diligence, integrity, ethical practice, fairness, creativity).		<p>7 perform your own experiment</p> <p>10 conduct car/ramp experiment</p> <p>15 discuss and test ideas with your group</p> <p>16 investigate Newton's 2nd law</p> <p>19 explain how you arrived at your answer</p> <p>29 discuss what you learned about gears</p> <p>34 investigate motion on a rollercoaster</p> <p>47 discuss an explanation with your group</p> <p>75 perform self-designed experiment</p> <p>129 explain your answer and justify</p> <p>182 simulating the effect of acid rain on daphnia</p> <p>188 conducting investigation of efficiency of immersion heater</p> <p>193 conducting experiments on heat transfer</p> <p>205 investigating how specific heat of water regulates Earth's temperature</p>

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SC.9.2.02 CATS Nine	Standard 2: Science as Inquiry	Inquiry	demonstrate ethical practices for science (e.g., established research protocol, accurate record keeping, replication of results and peer review).	12	writing lab procedures	4	difference between precise and accurate data
				12	importance of reliable and accurate data collection	6	electronic timer and release technique
				630	use the data to answer the questions	7	record time interval
				630	what evidence was used to predict the existence of the Kuiper Belt?	9	construct a data table
				630	what evidence was used to predict the existence of the Kuiper Belt?	9	collect speed data
				652	analysis with a spectrometer (#4)	12	understand and use data table
						14	record three different time intervals
						17	record times
						17	record results in data table
						18	organize different combinations of data
						24	use data table to record results
						24	collect weight data
						25	collect force data
						27	use data table to record results
						27	write down the number of weights you use
						30	record ropes and pulley data in table
						36	collect precise speed and height data

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					36 organize data into a table
					75 collect mass and amplitude data
					75 create data table for self-designed experiment
					150 record data as you perform experiment
					151 design a data table
					170 write a procedure
					171 use data table for observations
					171 collect time data and record observations
					181 organize water quality data into a table
					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

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					193 collecting and recording time and temperature data 196 writing a procedure for constructing a pointer for an aneroid barometer 206 collecting temperature and time data 210 collecting qualitative data of light intensity at scale distance from the sun 214 develop a procedure to create an underwater spring 217 collecting wet and dry bulb temperature readings 249 using your sundial to collect accurate data 253 calibrating your telescope

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SC.9.2.03 CATS Nine	Standard 2: Science as Inquiry	Inquiry	apply scientific approaches to seek solutions for personal and societal issues.	214	ultrasound technology	163	economic impact of end-product of combustion reaction
				220	voice recognition technology	163	too much CO <sub>2</sub>
				294	invention of Kevlar	163	consider a vehicle's fuel economy
				333	problems with disposing of plastics	163	research how trees offset accumulation of CO <sub>2</sub>
				355	recycling tires	163	research how trees offset accumulation of CO <sub>2</sub>
				356	recycling discarded tires	163	research how trees offset accumulation of CO <sub>2</sub>
				364	petroleum	163	can trees compensate for manmade CO <sub>2</sub> from vehicles and industry?
				368	limiting reactants	164	perform water quality tests
				379	research fuel cells	178	wise use of water supply
				379	research environmental impact of fuel cells	178	water quality specialist
				379	research economic impact of fuel cells	179	maintaining water supply quality
				379	hydrogen-powered cars and the environment	180	save water for houseplants
				392	storage of nuclear waste	180	perform water quality tests
				395	fossil fuels	182	investigate effect of acid rain on microorganisms
				400	problems caused by airborne pollutants	201	research the causes of ozone in the lower atmosphere
				400	economic impact of pollution		
				400	economic impact of reducing air pollution		

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				414	effect of electrical generating facilities on dissolved oxygen in water	222	zoo exhibit designers
				432	water cycle and conservation		
				433	wise use of water		
				433	the clean water act		
				435	water usage and quality		
				436	effect of excess nitrates on environment		
				437	acid rain explained		
				439	catalytic converters and scrubbing reduce acid rain		
				448	research the issue of acid rain		
				448	research economic impact of producing gases that cause acid rain		
				452	civil engineers and bridge design		
				457	engineers design better products when they know specific heat		
				483	hydrogen powered cars		
				538	what we can learn from seismographs		
				542	seismologists		

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Standard #: Course	Content Standard	Topic	Objective	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
				544 understanding earthquakes allows engineers to design safer buildings 561 volcanologists	

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SC.9.2.04 CATS Nine	Standard 2: Science as Inquiry	Inquiry	properly and safely manipulate equipment, materials, chemicals, organisms and models.	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 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 210 safety using light bulbs

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					216 safety in swinging thermometers 256 safety in lab
SC.9.2.05 CATS Nine	Standard 2: Science as Inquiry	Inquiry	conduct explorations in a variety of environments (e.g., laboratories, museums, libraries, parks and other outdoors locations).		7 perform your own experiment 10 conduct car/ramp experiment 16 investigate Newton's 2nd law 34 investigate motion on a rollercoaster 75 perform self-designed experiment 178 visit local water supply and perform testing 182 simulating the effect of acid rain on daphnia 188 conducting investigation of efficiency of immersion heater 193 conducting experiments on heat transfer 198 making qualitative observations of the amount of ozone present in the school environment 205 investigating how specific heat of water regulates Earth's temperature

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SC.9.2.06 CATS Nine	Standard 2: Science as Inquiry	Inquiry	use appropriate technology solutions (e.g., computer, CBL, probe interfaces, software) to measure and collect data; interpret data; analyze and/or report data; interact with simulations; conduct research; and to present and communicate conclusions.	24 using an electronic timer	<p>data tables and graphs can be created on computer or graphing calculator</p> <p>12 using photogates</p> <p>14 using photogates</p> <p>16 use a force scale</p> <p>17 use photogates to study car on ramp</p> <p>18 use a balance to find mass of car</p> <p>30 use force scale</p> <p>44 using electrical meter</p> <p>46 using electrical meter</p> <p>48 using electrical meter</p> <p>50 using electrical meter</p> <p>86 use CPO Timer to measure frequency</p> <p>107 study reflection of laser beam</p> <p>108 study refraction of laser beam</p> <p>113 trace critical angle with a laser beam</p> <p>158 use a thermometer</p>

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SC.9.2.07 CATS Nine	Standard 2: Science as Inquiry	Inquiry	demonstrate science processes within a problem solving setting (e.g., observing, measuring, calculating, communicating, comparing, ordering, categorizing, relating, hypothesizing, predicting)	5 measuring distance 11 controlling variables in experiments 19 did you run a controlled experiment? 20 what factors could explain the variability in their data? 24 making a graph 24 interpretations of patterns in data 26 creating graphs 27 reading a graph 41 make a graph 42 analyze a speed/distance graph 42 interpreting distance/time graph 78 analyze lever diagram 435 making observations and asking questions 459 heat equation 476 atmospheric pressure at various altitudes graph 485 what percentage comes from this source? (problem 4) 486 observing an aurora	students are encouraged to keep a lab notebook  data tables and graphs can be created on computer or graphing calculator  5 measuring metric and english lengths 6 measure time 6 compare results with other groups 7 what variables should be controlled? 9 construct a data table 11 graph speed vs. position 11 use your graph to predict speed 11 calculate % error 11 analyze speed change of car 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

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				543	determining distance to an epicenter	16	measure force
				547	what explains the difference in density? (#5)	17	record results in data table
				547	average density (#5)	18	study data table for relationship between force and motion
				605	how big is Earth?	18	organize different combinations of data
				618	average distance from the sun	24	use data table to record results
				630	what evidence was used to predict the existence of the Kuiper Belt?	25	create a mathematical model
				630	use the data to answer the questions	25	collect force data
				645	inverse square law	25	analyze block and tackle data
				645	apparent brightness vs. distance graph	27	find math rule for lever equilibrium
				651	use the diagram to answer the questions (#2)	27	write down the number of weights you use
				651	arrange the items in the table (#3)	27	use data table to record results
				651	use the diagram to answer the questions (#4)	27	analyze lever equilibrium data
				652	analysis with a spectrometer (#4)	28	derive a math formula
						30	record ropes and pulley data in table
						35	does data support hypothesis?
						36	organize data into a table

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					37 organize data into a graph of speed vs. height
					44 measure voltage
					45 did battery voltage change?
					46 measure current
					48 measure resistance
					51 graph voltage vs. current
					75 create data table for self-designed experiment
					76 calculate % error
					76 analyze pendulum data
					87 measure wavelength
					116 measure mass
					117 measure volume
					121 graph mass vs. volume
					129 find average velocity
					129 control the height of the liquid
					146 record detailed observations
					147 organize observations into a category table
					147 students analyze chemical change lab results

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					150 record data as you perform experiment
					151 does your experiment agree with law of conservation of mass?
					151 design a data table
					169 why was plain water tested?
					169 what does the word control mean?
					171 average dissolving rate
					171 use data table for observations
					181 organize water quality data into a table
					182 observing daphnia and recording movements and behavior
					183 writing up a lab report
					185 constructing a graph of drops of acid vs pH
					186 measure temperature
					187 find equation for trend line
					187 construct a graphical model
					189 construct a temperature vs. time graph

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					197 calculating error between your barometer and a commercial barometer
					197 constructing a graph from atmospheric pressure data
					199 collecting Schönbein strips for detecting ozone
					199 importance of good record keeping in order to avoid error
					202 collecting data of temperature and sensations
					203 graphing water and ice temperature readings
					206 constructing a graph of time vs. temperature
					206 collecting temperature and time data
					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

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					231 evaluating your completed bathymetric map
					237 finding a pattern of volcanoes on a bathymetric map
					243 recording observations of crystal growing
					247 evaluate your ability to interpret rock formations
					251 recording the changes in the moon over a month
					257 inverse square law
					268 discovering the mathematical relationship between apparent brightness and distance

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SC.9.2.08 CATS Nine	Standard 2: Science as Inquiry	Inquiry	design, conduct, evaluate and revise experiments	7 experimentation begins with a question 10 the research question and hypothesis 11 control and experimental variables 19 design your own experiment 20 finding variability in data 26 independent and dependent variables 42 devise an experiment 79 look at force data and decide the usefulness of a machine 429 why haven't we run out of water 434 what is in your tap water 437 what is acid rain 441 why are oceans salty 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	6 how do we ask questions and get answers from nature? 7 doing a controlled experiment 7 perform your own experiment 7 design your own experiment 9 conduct three experiments with appropriate equipment 9 design three experiments using car and ramp 10 selecting ramp and photogates 10 conduct car/ramp experiment 12 select equipment and set up experiment 16 investigate Newton's 2nd law 16 decide how to vary the force on the car for this experiment 18 use data to describe relationship between force and motion

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				492	19
			why does Earth have seasons		use data to infer correct relationship between variables
				501	
			how does rain form		
				509	21
			how do animals survive in the desert		choose independent and dependent variables for graph
				515	26
			what is a carbon sink		what variables can be changed?
				534	27
			why doesn't Earth get bigger and bigger		recognize variables
				588	30
			what causes eclipses		interpret block and tackle data
				621	30
			is Pluto a planet		rigging block and tackle
					34
					investigate motion on a rollercoaster
					40
					choose circuit parts to light a bulb
					75
					design pendulum experiment
					75
					perform self-designed experiment
					93
					decision trees and the advantage of doing multiple trials
					141
					build models of Na and Cl and use them to explain bonding
					145
					carry out procedure and select equipment
					151
					design experiment to find out if mass is conserved

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					151 select materials from list
					157 add new rules to list based on findings
					170 which method will give fastest dissolving rate?
					170 what three factors influence dissolving rate?
					182 making hypotheses and testing them against observations
					182 simulating the effect of acid rain on daphnia
					185 analyzing the results of the buffered acid experiment
					188 conducting investigation of efficiency of immersion heater
					190 effect of changing mass on collected data
					193 conducting experiments on heat transfer
					193 explaining efficiency of heat transfer based on data
					197 evaluating your aneroid barometer design
					205 investigating how specific heat of water regulates Earth's temperature

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					<p>209 measuring the intensity of light using an electric meter and solar cell and light bulb</p> <p>211 determining whether distance from light source or axial tilt plays a more significant role in causing the seasons</p> <p>224 reconstruct a series of events from clues</p> <p>233 identifying how the earthquake model represents an earthquake</p> <p>235 interpreting how the drumming affects the intensity of the earthquake in the model</p> <p>252 identifying the parts of a refracting telescope and making observations of the moon's surface</p>

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SC.9.3.01 CATS Nine	Standard 3: Unifying Themes Objectives	Themes	analyze systems to understand the natural and designed world; use systems analysis to make predictions about behaviors in systems; recognize order in units of matter, objects or events.	51	what is equilibrium?	36	investigate energy conservation
				59	equilibrium/action reaction	68	form and function of different electric motor configurations
				60	conservation of momentum	84	waves in motion
				80	form and function of wheelbarrow and sailboat and human jaw	87	changing frequency in standing waves
				90	conservation of energy	108	form and function of human eye, prism, and lenses
				164	electromagnets reverse current and switch polarity	150	investigate conservation of mass
				180	harmonic motion in natural systems	158	energy in chemical reactions
				258	optical systems		
				261	change in optical systems		
				278	system of classifying matter		
				363	conservation of mass		
				363	conservation of mass		
				389	atoms and nuclear energy		
				407	a solute and a solvent make up a system		
				415	solubility equilibrium		
				415	equilibrium and solubility		
				422	change in pH values		
				429	the water cycle		
				435	pond ecosystem and water quality		

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				438 acid rain formation system	
				460 thermal equilibrium	
				509 how do animals survive in the desert?	
				512 how do savanna animals survive the periodic fires?	

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SC.9.3.02 CATS Nine	Standard 3: Unifying Themes Objectives	Themes	apply evidence from models to make predictions about interactions and changes in systems.	20	how will speed change?	13	graph distance vs. time
				24	predicting speed from a graph	15	construct a quantitative graphical model
				24	making a graph	25	create a mathematical model
				26	creating graphs	27	find math rule for lever equilibrium
				41	make a graph	28	derive a math formula
				42	predict the speed of a car	37	organize data into a graph of speed vs. height
				42	interpreting distance/time graph	51	graph voltage vs. current
				459	heat equation	76	use data to predict best string length for a pendulum clock
				645	inverse square law	121	graph mass vs. volume
						121	use graph to predict mass of six objects
						147	organize observations into a category table
						156	make predictions about solubility
						185	constructing a graph of drops of acid vs pH
						187	construct a graphical model
		187	find equation for trend line				
		189	construct a temperature vs. time graph				

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					197 constructing a graph from atmospheric pressure data
					201 predicting areas with high ozone concentration based on your data
					203 graphing water and ice temperature readings
					204 predicting what would happen if you place your ice/water test tube into a hot cup or a cold cup
					206 constructing a graph of time vs. temperature
					239 estimating the number of meteor collisions on Earth during the last 3.5 billion years
					242 predicting the results of the crystal-growing experiment
					257 inverse square law
					268 discovering the mathematical relationship between apparent brightness and distance

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SC.9.3.03 CATS Nine	Standard 3: Unifying Themes Objectives	Themes	measure changes in systems using graphs and equations relating these to rate, scale, patterns, trends and cycles.	20 24 24 24 26 27 41 42 42 42 78 459 476 645 645 651 651 651	how will speed change? making a graph predicting speed from a graph interpretations of patterns in data creating graphs reading a graph make a graph analyze a speed/distance graph predict the speed of a car interpreting distance/time graph analyze lever diagram heat equation atmospheric pressure at various altitudes graph inverse square law apparent brightness vs. distance graph use the diagram to answer the questions (#4) arrange the items in the table (#3) use the diagram to answer the questions (#2)	6 11 11 13 15 15 18 21 25 25 27 27 28 35 37	compare results with other groups analyze speed change of car graph speed vs. position graph distance vs. time interpret a speed vs. time graph construct a quantitative graphical model study data table for relationship between force and motion think about percent change analyze block and tackle data create a mathematical model analyze lever equilibrium data find math rule for lever equilibrium derive a math formula does data support hypothesis? organize data into a graph of speed vs. height

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					45 did battery voltage change?
					51 graph voltage vs. current
					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
					121 graph mass vs. volume
					147 students analyze chemical change lab results
					147 organize observations into a category table
					151 does your experiment agree with law of conservation of mass?
					151 do the data support the hypothesis
					156 make predictions about solubility
					171 what was happening at molecular level?
					185 constructing a graph of drops of acid vs pH
					187 construct a graphical model
					187 find equation for trend line

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					189 construct a temperature vs. time graph
					197 constructing a graph from atmospheric pressure data
					201 predicting areas with high ozone concentration based on your data
					203 graphing water and ice temperature readings
					204 predicting what would happen if you place your ice/water test tube into a hot cup or a cold cup
					206 constructing a graph of time vs. temperature
					217 determining relationship between temperature of the atmosphere and relative humidity
					218 interpreting Doppler radar images
					231 evaluating your completed bathymetric map
					237 finding a pattern of volcanoes on a bathymetric map

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Standard #: Course	Content Standard	Topic	Objective	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
					239 estimating the number of meteor collisions on Earth during the last 3.5 billion years  242 predicting the results of the crystal-growing experiment  247 evaluate your ability to interpret rock formations  257 inverse square law  268 discovering the mathematical relationship between apparent brightness and distance

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SC.9.3.04 CATS Nine	Standard 3: Unifying Themes Objectives	Themes	understand that different characteristics, properties or relationships within a system might change as its dimensions are increased or decreased (e.g., scale up, scale down).	18	perform dimensional analysis calculations	11	draw best fit curve
				26	drawing a best fit curve	13	draw best fit curve
				27	how to read a graph	41	drawing and interpreting circuit diagrams
				473	definition of atmospheric pressure	78	reading harmonic motion data tables and graphs
				475	how atmospheric pressure changes with altitude	187	draw a line of best fit through temperature data points
				476	graph showing atmospheric pressure vs. altitude	197	graphing and drawing a trend line for atmospheric pressure data
				483	global temperature changing over time	258	determining scale distances
				528	Earth's surface is changing		
				592	calculating and using light years		
				592	unit conversion in calculating light years		
				593	light years and time		
SC.9.4.10 CATS Nine	Standard 4: Science Subject Matter/Concepts	Matter, Energy, and Organization in Living Systems	trace the transfer of matter and energy in the chemical/molecular processes of photosynthesis, respiration and fermentation.	354	chemical reactions and digestion	162	carbon reactions and the environment
				364	carbon chains		

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SC.9.4.11 CATS Nine	Standard 4: Science Subject Matter/Concepts	Structure and Properties of Matter	using the element's position on the Periodic Table, predict physical and chemical properties.	321	groups of elements and valence shells	141	build model of Na and Cl atoms and explain why they bond to form a molecule
				329	periodic table columns and valence electrons	142	arrangement of electrons and groups of elements
				330	bonding and periodic table position		
				332	periodic table and electronegativities		
				335	periodic table and oxidation numbers		
SC.9.4.12 CATS Nine	Standard 4: Science Subject Matter/Concepts	Structure and Properties of Matter	describe the characteristics of radioactivity substances including alpha particles, beta particles and gamma rays; the half life of a radioactive isotope; a chain reaction; and differentiate between fission and fusion.	387	fusion and fission explained	138	fusion and fission
				388	nuclear vs chemical reactions	138	nuclear reactions
				623	nuclear fusion and the sun	160	radioactive decay
						160	how do you simulate nuclear decay?
SC.9.4.13 CATS Nine	Standard 4: Science Subject Matter/Concepts	Structure and Properties of Matter	investigate the relationship between the density of an object, its mass, and its volume.	281	volume and mass contrasted	116	mass and volume measurements
				291	density explained	124	build a density column
				295	relationship between mass volume and density	212	investigate density changes in the oceans as the cause of ocean layering
				296	density of liquid water vs. ice		

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SC.9.4.14 CATS Nine	Standard 4: Science Subject Matter/Concepts	Structure and Properties of Matter	investigate physical states of matter including descriptions of the behavior of atoms and molecules in terms of the Kinetic Molecular Theory.	284	changes of state	118	think of melting process at molecular level
				406	hydrogen bonding and the gaseous state of water	119	energy and phase changes
				451	temperature is a measure of average kinetic energy	204	investigating latent heat and thermal buffering
				498	phases changes in the atmosphere		
SC.9.4.15 CATS Nine	Standard 4: Science Subject Matter/Concepts	Chemical Reaction	write formulas and name compounds given oxidation numbers of monatomic and polyatomic ions.	336	writing a chemical formula	143	name chemical compounds
				338	summary of chemical formula writing rules	143	predict chemical formulas
				339	naming compounds	145	determine empirical formula

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SC.9.4.16 CATS Nine	Standard 4: Science Subject Matter/Concepts	Chemical Reaction	identify the various types of chemical bonds and the resulting compounds that are formed (e.g., ionic, nonpolar covalent, polar covalent).	330 ionic bonds 331 covalent bonds 332 distinguishing between ionic and covalent bonds 404 water is a polar molecule 405 hydrogen bonding in water 406 hydrogen bonding and properties of water 409 dissolution of ionic compounds 409 dissolution at the molecular level 409 dissolving an ionic compound 410 dissolution of covalent compounds 410 solute dissolution depends on chemical bonds 417 dissolution of acids in water 418 dissolution of bases in water 419 neutralization of acids and bases	136 ions 141 when an atom ionizes 143 classify ionic compounds 143 ionic compounds 171 what happened at the molecular level? 171 investigate the dissolving process

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SC.9.4.17 CATS Nine	Standard 4: Science Subject Matter/Concepts	Chemical Reaction	experimentally determine the products of chemical reactions; write balanced chemical equations; classify type of reaction; and describe energy changes.	336 writing chemical formulas 354 new substances are formed when a chemical change occurs 359 balancing chemical equations 364 formation of petroleum is a very slow chemical reaction 368 predicting amount of product 371 which of the equations is balanced? 375 synthesis or addition reactions 376 decomposition reactions 377 single displacement reactions 377 double displacement reactions 381 exothermic reactions and MREs 382 endothermic reactions and cold packs	148 reactants and products 149 balance these equations 149 practice balancing equations 150 investigate conservation of mass in effervescent tablet reaction 152 write the balanced equation 152 predict how much product formed given the reactants 155 calculating product yield 156 investigate double displacement reactions 156 predict products in a double displacement reaction 158 investigate energy changes in chemical reactions 158 measure energy changes in 3 different reactions

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SC.9.4.18 CATS Nine	Standard 4: Science Subject Matter/Concepts	Energy	identify, describe and differentiate various forms of energy and energy transformations.	88	potential and kinetic energy explained	36	energy conservation and the roller coaster
				90	conservation of energy explained	37	investigating conservation of energy with rollercoaster
				91	following an energy transformation	38	identify potential/kinetic energy conversions
				91	following an energy transformation	38	explore energy transformations
				91	understand basic forms of energy	38	conservation of energy and energy transformations
				91	energy conversions	39	make an energy flow chart
				92	energy transformations and conservation	39	identify type of energy involved
				93	different forms of energy described		
				96	prove that energy is conserved		
				537	potential energy transformed to kinetic energy causes earthquakes		
				623	energy from the sun		
				626	harnessing the sun's energy		

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SC.9.4.19 CATS Nine	Standard 4: Science Subject Matter/Concepts	Energy	relate absorption and dissipation of heat to the composition of a material.	456	definition of specific heat	205	investigating how the high specific heat of water helps regulate Earth's temperature
			456	specific heat			
			458	water's specific heat helps regulate Earth's temperature			
			459	heat equation			
SC.9.4.20 CATS Nine	Standard 4: Science Subject Matter/Concepts	Energy	demonstrate and diagram a magnetic field using bar magnets.	159	magnetism explained	62	describing forces that magnets exert on each other
				163	understanding magnetic fields	64	testing materials to see if they are affected by magnets
				531	interesting magnetic patterns on sea floor		
				531	magnetic polarity of Earth	66	compare electromagnets and permanent magnets

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SC.9.4.21 CATS Nine	Standard 4: Science Subject Matter/Concepts	Energy	hypothesize and experiment when different components are substituted in an electrical circuit; define and solve electrical problems involving potential difference, Ohm's Law and power.	102 concept of electric circuits 103 circuit diagrams 113 battery uses chemical energy to produce electrical charge 131 Ohm's law explained 132 using Ohm's law to analyze circuits 145 holiday lights as series or parallel 145 single path vs. branching paths 145 parallel circuit defined 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	45 battery chemicals and electrical charge 50 Ohm's law 56 build a parallel circuit 56 build a series circuit 57 compare brightness of bulbs in series vs. parallel 58 build a series circuit and find total resistance 60 parallel circuit and Ohm's law 61 compare current and voltage and resistance in each type of circuit

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SC.9.4.22 CATS Nine	Standard 4: Science Subject Matter/Concepts	Motions and Forces	relate the forces between charged objects to the charge on the objects and the distance between them.	105	charge is a fundamental property of matter	42
				106	static charge discussed	
				107	explanation of coulomb	
				108	electroscopes	
				108	how an electroscope works	

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SC.9.4.23 CATS Nine	Standard 4: Science Subject Matter/Concepts	Motions and Forces	review foundational concepts of kinematics (e.g., speed-distance-time relationships, graphs) and dynamics (e.g., Newton's Laws, simple machines).	14	how to calculate speed	8	calculating speed
				15	compare and contrast speed and velocity	9	collect data and calculate speed of car
				20	find speed of bumblebee	10	calculate speed of the car
				20	calculate speed of car	12	model the car's motion graphically
				24	accurate speed measurements	12	find speed of car at different positions
				29	position vs. time graph discussion	13	make a position vs. time graph
				30	position vs. time graphs	14	exploring acceleration on a ramp
				32	average speed vs. instantaneous	14	calculate speed of car at two places on the ramp
				32	average speed discussed	15	changes in motion can be represented graphically
				37	speed vs. time graphs	15	make a speed vs. time graph
				37	speed vs. time graph discussion	15	make a speed vs. time graph
				42	calculate speed from distance/time graph	16	2nd law
				45	Newton's third law summarized	16	unbalanced forces and acceleration of car
				45	Newton's first law summarized	16	thinking about force
				45	Newton's second law summarized	17	calculate speed of car
				46	force has potential to change motion	19	discover 2nd law of motion
				48	Newton's laws explained and applied		

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				48 Newton's first law in detail 49 Newton's second law in detail 49 force is related to acceleration 50 Newton's second law applied 51 balanced and unbalanced forces 51 net force explained 59 Newton's third law in detail 64 solving problems using $f=ma$ 599 Newton's first law of motion and the space shuttle	19 find correct relationship between force mass and acceleration 20 force and motion with car and ramp 22 car and ramp and Newton's 3rd law 23 using 3rd law to explain common phenomena 36 find speed of marble
SC.9.4.24 CATS Nine	Standard 4: Science Subject Matter/Concepts	Motions and Forces	experiment with a pendulum to determine which variables (amplitude, mass, length) will affect the motion of the pendulum.	179 what is a cycle? 182 concept of frequency explained 182 concept of period explained 192 analyze systems to find cycle/period/frequency	75 investigate variables that affect period of pendulum

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SC.9.4.25 CATS Nine	Standard 4: Science Subject Matter/Concepts	Motions and Forces	investigate types of waves and their properties including interference, diffraction, refraction, resonance; differences and similarities between transverse and longitudinal waves	197	transverse and longitudinal waves	82	study wave pulses on elastic cord
				201	reflection in water waves and light waves	83	find speed of a wave
				201	waves and reflection	84	make different types of waves in a ripple tank
				201	waves and refraction	85	observing reflection in water waves
				201	waves and absorption	86	adjust frequency of a standing wave
				202	refraction and eyeglasses	87	investigating resonance
				204	resonance explained	88	natural frequency and resonance of standing waves on a string
				205	standing waves on a string	95	investigate interference with sound waves
				206	constructive and destructive interference	95	interference and sound waves
				210	can wave interference sink a ship?	96	investigating sound resonance
				210	natural frequency of a building and earthquakes	101	examine light through diffraction grating
				221	importance of wavelength of sound waves	102	polarization of a spring wave
				223	interference of sound waves	102	polarization of water waves
				225	consonance and dissonance and beats	103	polarization of light
				240	polarization of light	105	explore relationship between color and wavelength
				242	color and frequency of light waves		
				258	refraction in optical systems		

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				258	forming images with lenses	106	investigate reflection of light
				260	reflection and mirrors	107	plot reflected rays from a mirror
				261	refraction and lenses	107	investigate how light interacts with mirrors
				263	index of refraction	108	tracing incident and refracted rays
				263	index of refraction	108	investigate how light interacts with a prism
				538	body waves	108	explore refraction with lenses
						108	explore refraction with a prism
						110	finding focal point and focal length of a lens
						111	plotting images formed when light is refracted by a lens
						253	using a retractive telescope
						265	an element's spectral lines correspond to specific wavelengths of light

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SC.9.4.26 CATS Nine	Standard 4: Science Subject Matter/Concepts	Energy in the Earth System	investigate formation and destruction of landforms.	510	using maps to identify mountain ranges	229	using a globe to identify mountain ranges
				528	predicting what Earth might look like in 50 million years	230	predicting plate movement over 50 million years and the resultant land features
				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		
				553	using a map to identify volcanoes		
				562	constructive and destructive processes		
				563	mountain-building		
				564	changes in land features due to erosion		
				565	formation of soil		
				566	effect of glaciers on land		
				576	the rock cycle		

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SC.9.4.27 CATS Nine	Standard 4: Science Subject Matter/Concepts	Energy in the Earth System	demonstrate the relationships of temperature, air pressure, wind speed, wind direction and humidity as elements of weather.	451	thermometers	185	effect of ocean on carbon dioxide levels in the atmosphere
				452	thermometers		
				471	composition of Earth's atmosphere	186	accurately measuring temperature using thermometers
				473	definition of atmospheric pressure	194	construct and use an aneroid barometer
				474	measuring atmospheric pressure with barometers	198	detecting ozone which is a protective atmosphere gas against high energy radiation
				475	how atmospheric pressure changes with altitude		
				476	graph showing atmospheric pressure vs. altitude	202	investigate the temperature effects of greenhouse gases
				477	ozone layer	218	using Doppler radar images to detect and track storms
				479	ozone depletion		
				481	greenhouse effect and greenhouse gasses		
				495	global wind patterns		
				497	water in the atmosphere affects weather patterns		
				497	sling psychrometer		
				502	effects of moving air masses		
				502	cold fronts		
				503	warm fronts		
				503	jet streams		

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SC.9.4.28 CATS Nine	Standard 4: Science Subject Matter/Concepts	Energy in the Earth System	compare and analyze the characteristics of oceans, including their lateral and vertical motions.	441	sources of salts in the ocean	207	research how large bodies of water affect climate
				442	composition of seawater	207	research how large bodies of water affect climate
				491	Earth's temperature varies with latitude	212	investigate how the ocean 's salinity affects its density
				496	effects of the Gulf Stream on climate of Great Britain	215	understanding the Atlantic gyre
				496	descriptions of ocean currents and their effects on climate	223	research a particular biome
				508	causes and effects of the El Nino Southern Oscillation		
				510	effect of cold ocean currents on formation of fog deserts		
				510	different types of deserts and how they are formed		
				511	effect of warm ocean currents on formation of tropical rainforest		
				511	how tropical rainforests are formed		
				513	effect of large bodies of water on climate		
515	alpine tundra occurs at high altitudes						

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SC.9.4.29 CATS Nine	Standard 4: Science Subject Matter/Concepts	Geochemical Cycles	employ a variety of tests to identify common rock-forming minerals.	570	properties of minerals	242	understanding how igneous rocks are formed and growing crystals to investigate their formation
				571	common minerals		
				572	Mohs hardness scale		
				573	formation of igneous and sedimentary and metamorphic rocks	244	understanding how sedimentary rocks are formed and creating sedimentary deposits to investigate them
				575	identifying igneous and sedimentary and metamorphic rocks	246	understanding and investigating how metamorphic rocks are formed
						247	interpreting how different rock formations were formed
SC.9.4.30 CATS Nine	Standard 4: Science Subject Matter/Concepts	Geochemical Cycles	analyze and describe common rock samples using grain size and shape, and mineral composition.	570	properties of minerals	242	understanding how igneous rocks are formed and growing crystals to investigate their formation
				571	common minerals		
				572	Mohs hardness scale		
				573	formation of igneous and sedimentary and metamorphic rocks	244	understanding how sedimentary rocks are formed and creating sedimentary deposits to investigate them
				575	identifying igneous and sedimentary and metamorphic rocks	246	understanding and investigating how metamorphic rocks are formed
						247	interpreting how different rock formations were formed

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SC.9.4.31 CATS Nine	Standard 4: Science Subject Matter/Concepts	Geochemical Cycles	use models to describe interactive cycles such as the water, the nitrogen and the carbon dioxide cycles.	436	nitrates and the nitrogen cycle	178	actions to take to improve water quality
				437	effects of acid rain on natural environments		
				471	nitrogen cycle		
				471	nitrogen cycle diagrammed		
				472	the carbon cycle explained		
SC.9.4.32 CATS Nine	Standard 4: Science Subject Matter/Concepts	Origin and Changes in the Earth Systems and Universe	examine how scientists use seismographic evidence in determining structure and composition of the Earth's interior.	525	formation of Earth's layers		
				526	description of Earth's layers		
				537	conversion of energy in rocks causes seismic waves		
				538	seismic waves		
				551	structure of a volcano		
				552	formation of magma in Earth's mantle		
				554	figure showing structure of different types of volcanoes		
SC.9.4.33 CATS Nine	Standard 4: Science Subject Matter/Concepts	Origin and Changes in the Earth Systems and Universe	determine the relative age of materials using time-stratigraphic and bio-stratigraphic relationships.	522	relative dating	225	determining the relative ages of rock formations
				523	interpreting rock formations	226	sequencing events in a geologic cross-section
				523	faunal succession		
				569	studying moon rocks on Earth		

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SC.9.4.34 CATS Nine	Standard 4: Science Subject Matter/Concepts	Origin and Changes in the Earth Systems and Universe	estimate the absolute age of materials using existing radio isotopic data.	522	relative dating	225	determining the relative ages of rock formations
				523	interpreting rock formations	226	sequencing events in a geologic cross-section
				569	studying moon rocks on Earth		
SC.9.4.35 CATS Nine	Standard 4: Science Subject Matter/Concepts	Origin and Changes in the Earth Systems and Universe	describe the effects of the movement of subsurface water.	440	oceans in the water cycle	212	investigate how the ocean 's salinity affects its density
				441	sources of salts in the ocean		
				442	composition of seawater		
				559	volcanoes and water vapor		
				564	landforms shaped by water		
SC.9.4.36 CATS Nine	Standard 4: Science Subject Matter/Concepts	Origin and Changes in the Earth Systems and Universe	relate changes in the Earth's surface to the motion of lithospheric plates.	528	definition of plate tectonics	228	listing which kind of plate boundary is associated with each geologic feature
				530	sea-floor spreading and mid-ocean ridges	229	identifying tectonic plates and plate boundaries
				531	magnetic patterns on the sea floor		
				532	theory of plate tectonics		
				533	describing plate boundaries		
				534	divergent plate boundaries		
				535	convergent plate boundaries		
				536	transform plate boundaries		

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SC.9.4.37 CATS Nine	Standard 4: Science Subject Matter/Concepts	Origin and Changes in the Earth Systems and Universe	summarize and discuss the evidentiary basis for the Theory of Plate Tectonics.	528	predicting what Earth might look like in 50 million years	229	identifying tectonic plates and plate boundaries
				528	definition of plate tectonics	230	predicting plate movement over 50 million years and the resultant land features
				532	theory of plate tectonics		
				533	describing plate boundaries		
				534	divergent plate boundaries		
				534	land features resulting from divergent plate boundaries		
				535	convergent plate boundaries		
				535	resulting land features from subduction		
				536	transform plate boundaries		
				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		

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				564 changes in land features due to erosion 566 effect of glaciers on land	
SC.9.4.38 CATS Nine	Standard 4: Science Subject Matter/Concepts	Origin and Changes in the Earth Systems and Universe	research and describe the life cycles of various stellar types.	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	255 observe and describe the appearance of the moon and Jupiter and its moons 264 using spectroscopy to analyze the light emitted by stars and identify most common elements

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SC.9.4.39 CATS Nine	Standard 4: Science Subject Matter/Concepts	Origin and Changes in the Earth Systems and Universe	interpret topographic maps, weather maps and charts, and astronomical models such as solar systems, galaxies, constellations, stellar types and stellar evolution.	485	computer modeling to predict greenhouse effects	229	using a globe to identify mountain ranges
				510	using maps to identify mountain ranges	258	setting up a scale model of the solar system
				553	using a map to identify volcanoes	259	determining scale distances for the planets
				613	explanation and illustration of the solar system	260	determining scale sizes of the planets
				614	relative sizes and distances within the solar system		
				615	classifying the planets		
				624	features and diagram of the sun		
				625	features and emissions of the sun		

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SC.9.5.01 CATS Nine	Standard 5: Scientific Design and Application	Scientific Design and Application	identify the scientific concepts underlying simple technological innovations.	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 earthquakes allows engineers to design safer buildings		
				597	using satellite technology		
				599	space shuttle		

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SC.9.5.02 CATS Nine	Standard 5: Scientific Design and Application	Scientific Design and Application	cite examples of the interdependence of science and technology (e.g., new technologies have lead to development of new scientific knowledge).	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		

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SC.9.5.03 CATS Nine	Standard 5: Scientific Design and Application	Scientific Design and Application	apply scientific skills and technological tools to design a solution that addresses a personal or societal need.	74	sample engineering problem	70	designing and testing different electric motors
				214	ultrasound technology	70	proposing and comparing different electric motor designs
				220	voice recognition technology	71	testing a motor for performance
				294	invention of Kevlar	71	which motor gave the highest speed and why?
				433	the clean water act	71	did draining the batteries affect motor speed?
				439	catalytic converters and scrubbing reduce acid rain	194	design and construct an aneroid barometer
				483	hydrogen powered cars		
				538	what we can learn from seismographs		
				544	understanding earthquakes allows engineers to design safer buildings		
SC.9.5.04 CATS Nine	Standard 5: Scientific Design and Application	Scientific Design and Application	analyze the consequences of imposed constraints on an engineering solution.	74	sample engineering problem	70	designing and testing different electric motors
						70	proposing and comparing different electric motor designs
						194	design and construct an aneroid barometer

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SC.9.6.01 CATS Nine	Standard 6: Science in Personal and Social Perspectives	Personal and Social Perspectives	research uses and values of natural resources.	172	generating electric power	52	the cost of using electrical appliances
				391	nuclear vs. fossil fuels		
				391	impact of nuclear energy	262	solar energy can be used to generate electricity without producing pollution
				400	reducing pollution		
				414	environmental impact of electrical generating facilities	262	determine the efficiency of a photovoltaic cell
				438	impact of using fossil fuels		
				542	using seismic waves for oil and gas exploration		
				560	description of geothermal energy		
				560	mineral deposits and diamonds		
				627	using photovoltaic cells		
				627	the efficiency of photovoltaic cells		

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SC.9.6.02 CATS Nine	Standard 6: Science in Personal and Social Perspectives	Personal and Social Perspectives	research current environmental issues (e.g., effects of pollution, solid waste management, local, national, and global issues).	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	The Clean Water Act	178	predict the quality of surface water to be tested and justify your answer
				435	water quality testing		
				436	water quality testing	179	address what you can do to maintain or improve the water quality at the test site
				436	nitrates and the nitrogen cycle		
				437	acid rain	182	investigate effect of acid rain on microorganisms
				437	acid rain		
				437	acid rain explained	182	the effects of acid rain on organisms in aquatic environments
				437	effects of acid rain on natural environments		
				437	effects of acid rain on the soil	182	the effects of acid rain on organisms in aquatic environments
				438	causes and health effects of acid rain		
				443	impact of increased CO2 in oceans		
				444	pollution and the ocean food chain		
				445	pollution and the ocean food chain		
				448	research the issue of acid rain		

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				471	
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SC.9.6.03 CATS Nine	Standard 6: Science in Personal and Social Perspectives	Personal and Social Perspectives	describe the impact of cultural, technological, and economic influences on the evolving nature of scientific thought and knowledge.	34	Aristotle vs. Newton	130	investigate Rutherford's gold foil experiment
				34	Newton's research impacted mathematics	198	contributions of Schönbein
				45	Newton's Laws of Motion		
				54	Newton and the force of gravity		
				73	impact of Da Vinci's work		
				73	impact of technology		
				105	Benjamin Franklin		
				107	Charles-Augustin Coulomb		
				312	history of atomic theory		
				312	contributions of Fermi		
				313	development of atomic theory		
				320	the quests of alchemists		
				324	research and create a poster to illustrate development of atomic model		
				343	Avogadro's number		
				363	history of law of conservation of mass		
				391	scientific discovery and the atomic age		
				393	history of nuclear chemistry		

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				393 contributions of Marie and Pierre Curie 468 research the history of heat and temperature 542 studying seismic waves leads to information used in oil and gas exploration 545 predicting tsunamis 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	
SC.9.6.04 CATS Nine	Standard 6: Science in Personal and Social Perspectives	Personal and Social Perspectives	explore occupational opportunities in science and technology including the academic preparation necessary.	452 civil engineers and bridge design 457 engineers design better products when they know specific heat 542 seismologists 561 volcanologists	177 chemistry and photography 178 water quality testing 178 water quality specialist 222 zoo exhibit designers

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SC.9.6.05 CATS Nine	Personal and Social Perspectives	Personal and Social Perspectives	engage in decision making activities and actions to resolve science- technology-society issues.	135	circuit board explained	163	too much CO <sub>2</sub>
				364	petroleum	163	consider a vehicle's fuel economy
				379	research economic impact of fuel cells	163	research how trees offset accumulation of CO <sub>2</sub>
				379	hydrogen-powered cars and the environment	163	research how trees offset accumulation of CO <sub>2</sub>
				379	research fuel cells	163	can trees compensate for manmade CO <sub>2</sub> from vehicles and industry?
				379	research environmental impact of fuel cells	164	perform water quality tests
				395	fossil fuels	178	wise use of water supply
				400	economic impact of reducing air pollution	179	maintaining water supply quality
				400	economic impact of pollution	180	save water for houseplants
				400	problems caused by airborne pollutants	180	perform water quality tests
				432	water cycle and conservation	201	research the causes of ozone in the lower atmosphere
				433	wise use of water		
				435	water usage and quality		
				436	effect of excess nitrates on environment		
				448	research economic impact of producing gases that cause acid rain		