

Correlation to Illinois Learning Standards for Science
Foundations of Physical Science with Earth and Space Science
Student Text and Investigation Manual

Standard #: Area	State Goal	Learning Standard	Learning Expectation	student text pg	detail	investigation pg	detail
11.A.4a Scientific Inquiry	Understand the processes of scientific inquiry and technological design to investigate questions, conduct experiments and solve problems.	Know and apply the concepts, principles and processes of scientific inquiry.	Formulate hypotheses referencing prior research and knowledge.	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
				451	what is temperature	21	construct reasonable explanation based on data
				530	proving hypotheses for sea-floor spreading	30	interpret block and tackle data
				580	form a hypothesis (#7)	35	study data and determine importance of height on speed of marble
						45	analyze data and explain a rule
						141	build models of Na and Cl and use them to explain bonding
						170	which method will give fastest dissolving rate?
						170	devise hypothesis and explain
						182	making hypotheses and testing them against observations
						182	formulate hypothesis
						185	analyzing the results of the buffered acid experiment

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						193 explaining efficiency of heat transfer based on data 208 formulate a hypothesis about why the seasons occur 224 reconstruct a series of events from clues 235 interpreting how the drumming affects the intensity of the earthquake in the model	

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Standard #: Area	State Goal	Learning Standard	Learning Expectation	student text pg	detail	investigation pg	detail
11.A.4b Scientific Inquiry	Understand the processes of scientific inquiry and technological design to investigate questions, conduct experiments and solve problems.	Know and apply the concepts, principles and processes of scientific inquiry.	Conduct controlled experiments or simulations to test hypotheses.	11 26	control and experimental variables independent and dependent variables	7 7 9 10 10 12 16 27 30 34 40 75 145 151 182	doing a controlled experiment perform your own experiment conduct three experiments with appropriate equipment conduct car/ramp experiment selecting ramp and photogates select equipment and set up experiment investigate Newton's 2nd law recognize variables rigging block and tackle investigate motion on a rollercoaster choose circuit parts to light a bulb perform self-designed experiment carry out procedure and select equipment select materials from list simulating the effect of acid rain on daphnia

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						188	conducting investigation of efficiency of immersion heater
						190	effect of changing mass on collected data
						193	conducting experiments on heat transfer
						205	investigating how specific heat of water regulates Earth's temperature
						209	measuring the intensity of light using an electric meter and solar cell and light bulb
						211	determining whether distance from light source or axial tilt plays a more significant role in causing the seasons
						252	identifying the parts of a refracting telescope and making observations of the moon's surface

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Standard #: Area	State Goal	Learning Standard	Learning Expectation	student text pg	detail	investigation pg	detail
11.A.4c Scientific Inquiry	Understand the processes of scientific inquiry and technological design to investigate questions, conduct experiments and solve problems.	Know and apply the concepts, principles and processes of scientific inquiry.	Collect, organize and analyze data accurately and precisely.	12	importance of reliable and accurate data collection	4	difference between precise and accurate data
				24	interpretations of patterns in data	6	compare results with other groups
				24	making a graph	6	electronic timer and release technique
				26	creating graphs	7	record time interval
				27	reading a graph	9	construct a data table
				41	make a 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
				476	atmospheric pressure at various altitudes graph	12	understand and use data table
				630	use the data to answer the questions	13	graph distance vs. time
				630	what evidence was used to predict the existence of the Kuiper Belt?	14	record three different time intervals
				645	apparent brightness vs. distance graph	15	interpret a speed vs. time graph
				651	use the diagram to answer the questions (#4)	15	construct a quantitative graphical model
				651	arrange the items in the table (#3)	17	record results in data table
				651	use the diagram to answer the questions (#2)	17	record times
				652	analysis with a spectrometer (#4)	18	organize different combinations of data

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Standard #: Area	State Goal	Learning Standard	Learning Expectation	student text pg	detail	investigation pg	detail
						18	study data table for relationship between force and motion
						24	collect weight data
						24	use data table to record results
						25	analyze block and tackle data
						25	collect force data
						27	use data table to record results
						27	analyze lever equilibrium data
						27	write down the number of weights you use
						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
						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

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						75	create data table for self-designed experiment
						76	analyze pendulum data
						121	graph mass vs. volume
						147	students analyze chemical change lab results
						147	organize observations into a category table
						150	record data as you perform experiment
						151	design a data table
						171	use data table for observations
						171	collect time data and record observations
						181	organize water quality data into a table
						182	making detailed observations
						182	observing daphnia and recording movements and behavior
						184	collecting pH readings while adding carbon dioxide
						185	constructing a graph of drops of acid vs pH

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						186	collecting temperature data
						187	construct a graphical model
						189	construct a temperature vs. time graph
						189	collecting time and temperature data
						193	collecting and recording time and temperature data
						197	constructing a graph from atmospheric pressure data
						203	graphing water and ice temperature readings
						206	collecting temperature and time data
						206	constructing a graph of time vs. temperature
						210	collecting qualitative data of light intensity at scale distance from the sun
						217	collecting wet and dry bulb temperature readings
						217	determining relationship between temperature of the atmosphere and relative humidity

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						218	interpreting Doppler radar images
						237	finding a pattern of volcanoes on a bathymetric map
						249	using your sundial to collect accurate data
						253	calibrating your telescope
11.A.4d Scientific Inquiry	Understand the processes of scientific inquiry and technological design to investigate questions, conduct experiments and solve problems.	Know and apply the concepts, principles and processes of scientific inquiry.	Apply statistical methods to the data to reach and support conclusions.	26	drawing a best fit curve	11	use your graph to predict speed
				31	determining slope of a line	15	calculating acceleration from the slope of the line
				38	determining slope of a line	21	think about percent change
				547	average density (#5)	171	average dissolving rate
				618	average distance from the sun	187	draw a line of best fit through temperature data points
						187	find slope of a trend line
						189	calculate slope of a graph
						197	graphing and drawing a trend line for atmospheric pressure data

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11.A.4e Scientific Inquiry	Understand the processes of scientific inquiry and technological design to investigate questions, conduct experiments and solve problems.	Know and apply the concepts, principles and processes of scientific inquiry.	Formulate alternative hypotheses to explain unexpected results.			151 157 171 197	do the data support the hypothesis add new rules to list based on findings what was happening at molecular level? evaluating your aneroid barometer design

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Standard #: Area	State Goal	Learning Standard	Learning Expectation	student text pg	detail	investigation pg	detail
11.A.4f Scientific Inquiry	Understand the processes of scientific inquiry and technological design to investigate questions, conduct experiments and solve problems.	Know and apply the concepts, principles and processes of scientific inquiry.	Using available technology, report, display and defend to an audience conclusions drawn from investigations.	20	explain your reasoning	9	reporting on an experiment
						9	present conclusions to the class
						15	discuss and test ideas with your group
						19	explain how you arrived at your answer
						29	discuss what you learned about gears
						37	describe the flow of energy based on experimental graph
						39	give a brief presentation to the class
						47	present and defend an explanation
						47	discuss an explanation with your group
						129	explain your answer and justify
						145	present findings and methods used
						145	present findings to the class
						151	present results to the class
						179	create water quality report

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						181 write paragraph to explain results 183 write summary of findings	
11.B.4a Technological Design	Understand the processes of scientific inquiry and technological design to investigate questions, conduct experiments and solve problems.	Know and apply the concepts, principles and processes of technological design.	Identify a technological design problem inherent in a commonly used product.	74	sample engineering problem	70 proposing and comparing different electric motor designs 222 design a scale model of a zoo 232 simulate an earthquake 247 design a metamorphism simulation 248 design a sundial	
11.B.4b Technological Design	Understand the processes of scientific inquiry and technological design to investigate questions, conduct experiments and solve problems.	Know and apply the concepts, principles and processes of technological design.	Propose and compare different solution designs to the design problem based upon given constraints including available tools, materials and time.			70 designing and testing different electric motors 194 design and construct an aneroid barometer 222 design a scale model of a zoo 232 simulate an earthquake 247 design a metamorphism simulation 248 design a sundial	

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11.B.4c Technological Design	Understand the processes of scientific inquiry and technological design to investigate questions, conduct experiments and solve problems.	Know and apply the concepts, principles and processes of technological design.	Develop working visualizations of the proposed solution designs (e.g., blueprints, schematics, flowcharts, cad-cam, animations).	24 26 41	making a graph creating graphs make a graph	4 13 15 37 41 51 121 147 185 187 189 197 203 206	dimensional diagrams graph distance vs. time construct a quantitative graphical model organize data into a graph of speed vs. height drawing and interpreting circuit diagrams graph voltage vs. current graph mass vs. volume organize observations into a category table constructing a graph of drops of acid vs pH construct a graphical model construct a temperature vs. time graph constructing a graph from atmospheric pressure data graphing water and ice temperature readings constructing a graph of time vs. temperature

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11.B.4d Technological Design	Understand the processes of scientific inquiry and technological design to investigate questions, conduct experiments and solve problems.	Know and apply the concepts, principles and processes of technological design.	Determine the criteria upon which the designs will be judged, identify advantages and disadvantages of the designs and select the most promising design.	74	sample engineering problem	70	designing and testing different electric motors
						70	proposing and comparing different electric motor designs
						71	which motor gave the highest speed and why?
						71	did draining the batteries affect motor speed?
						71	testing a motor for performance
						194	design and construct an aneroid barometer
						222	design a scale model of a zoo
						222	design a scale model of a zoo
						232	simulate an earthquake
						232	simulate an earthquake
						247	design a metamorphism simulation
						247	design a metamorphism simulation
						248	design a sundial
						248	design a sundial

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11.B.4e Technological Design	Understand the processes of scientific inquiry and technological design to investigate questions, conduct experiments and solve problems.	Know and apply the concepts, principles and processes of technological design.	Develop and test a prototype or simulation of the solution design using available materials, instruments and technology			70 222 232 247 248	proposing and comparing different electric motor designs design a scale model of a zoo simulate an earthquake design a metamorphism simulation design a sundial

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11.B.4f Technological Design	Understand the processes of scientific inquiry and technological design to investigate questions, conduct experiments and solve problems.	Know and apply the concepts, principles and processes of technological design.	Evaluate the test results based on established criteria, note sources of error and recommend improvements.	74	sample engineering problem	70	designing and testing different electric motors
						70	proposing and comparing different electric motor designs
						71	which motor gave the highest speed and why?
						71	did draining the batteries affect motor speed?
						71	testing a motor for performance
						194	design and construct an aneroid barometer
						222	design a scale model of a zoo
						222	design a scale model of a zoo
						232	simulate an earthquake
						232	simulate an earthquake
						247	design a metamorphism simulation
						247	design a metamorphism simulation
						248	design a sundial
						248	design a sundial

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11.B.4g Technological Design	Understand the processes of scientific inquiry and technological design to investigate questions, conduct experiments and solve problems.	Know and apply the concepts, principles and processes of technological design.	Using available technology, report to an audience the relative success of the design based on the test results and criteria.	20	explain your reasoning		
							<p>data tables and graphs can be created on computer or graphing calculator</p> <p>9 present conclusions to the class</p> <p>37 describe the flow of energy based on experimental graph</p> <p>39 give a brief presentation to the class</p> <p>47 present and defend an explanation</p> <p>145 present findings and methods used</p> <p>145 present findings to the class</p> <p>151 present results to the class</p> <p>179 create water quality report</p> <p>181 write paragraph to explain results</p> <p>183 write summary of findings</p>

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12.C.4a Physical Science	Understand the fundamental concepts, principles and interconnections of the life, physical and earth/space sciences.	Know and apply concepts that describe properties of matter and energy and the interactions between them.	Use kinetic theory, wave theory, quantum theory and the laws of thermodynamics to explain energy transformations.	195	waves transmit energy	158	investigate energy changes in chemical reactions
				196	waves are all around us		
				234	electrons and energy levels and light emission	158	measure energy changes in 3 different reactions
				237	radio and television signals	188	investigate heating water with an immersion heater
				237	microwave ovens	188	investigate the increase of temperature of water as thermal energy is added
				250	identify uses of electromagnetic waves		
				272	identify uses of electromagnetic waves	265	an element's spectral lines correspond to specific wavelengths of light
				381	exothermic reactions and MREs		
				382	endothermic reactions and cold packs		
				454	changes in temperature are directly related to changes in energy		
				455	examples of flow of heat		
				461	conduction and convection and radiation		
				480	energy and radiation relationships		
				626	the sun's energy reaches Earth in the form of electromagnetic waves		

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12.C.4b Physical Science	Understand the fundamental concepts, principles and interconnections of the life, physical and earth/space sciences.	Know and apply concepts that describe properties of matter and energy and the interactions between them.	Analyze and explain the atomic and nuclear structure of matter.	311	protons/neutrons/electrons	132	building atom models
				311	location/size/charge of subatomic particles	133	location of electrons in atom
				315	atoms of same element have same atomic number	133	protons and neutrons
				318	proton/electron attraction	136	model stable and neutral atoms
				387	fusion and fission explained	137	importance of atomic number
				388	showing valence electrons in a diagram	137	build atomic models
				623	nuclear fusion and the sun	138	fusion and fission
						140	find the number of electrons in outermost level
						140	review subatomic particles
						160	radioactive decay

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12.D.4a Physical Science	Understand the fundamental concepts, principles and interconnections of the life, physical and earth/space sciences.	Know and apply concepts that describe force and motion and the principles that explain them.	Explain and predict motions in inertial and accelerated frames of reference.	14	how to calculate speed	8	calculating speed
				15	compare and contrast speed and velocity	9	collect data and calculate speed of car
				20	calculate speed of car	10	calculate speed of the car
				20	find speed of bumblebee	12	calculate speed of moving car
				24	accurate speed measurements	12	find speed of car at different positions
				30	position vs. time graphs	13	make a position vs. time graph
				32	average speed vs. instantaneous	14	calculate acceleration of car on ramp
				32	average speed discussed	14	exploring acceleration on a ramp
				33	understanding acceleration	14	calculate speed of car at two places on the ramp
				35	how to calculate acceleration	14	acceleration is the rate at which speed changes
				36	examples of acceleration	15	make a speed vs. time graph
				37	speed vs. time graphs	16	thinking about force
				41	find acceleration of car	16	2nd law
				42	calculate speed from distance/time graph	16	unbalanced forces and acceleration of car
				45	Newton's second law summarized	17	calculate speed of car
				45	Newton's first law summarized	17	explore 2nd law and acceleration
				45	Newton's third law summarized		

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				46	force has potential to change motion	19	find correct relationship between force mass and acceleration
				48	Newton's first law in detail		
				49	force is related to acceleration	19	discover 2nd law of motion
				49	link between force and acceleration	20	force and motion with car and ramp
				49	Newton's second law in detail	21	effect of friction on the car
				51	balanced and unbalanced forces	22	car and ramp and Newton's 3rd law
				51	net force explained	23	using 3rd law to explain common phenomena
				53	acceleration due to gravity	36	find speed of marble
				56	friction explained	191	find efficiency of water heater
				59	Newton's third law in detail		
				64	research effect of friction on human joints		
				64	solving problems using $f=ma$		
				85	efficiency and bicycles		
				97	calculate work output from efficiency data		

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12.D.4b Physical Science	Understand the fundamental concepts, principles and interconnections of the life, physical and earth/space sciences.	Know and apply concepts that describe force and motion and the principles that explain them.	Describe the effects of electromagnetic and nuclear forces including atomic and molecular bonding, capacitance and nuclear reactions	278	compounds are composed of elements	136	strong force
				324	use the periodic table to predict chemical formulas	136	ions
				324	which element is more likely to combine with other elements?	138	nuclear reactions
						138	fusion and fission
						140	who do atoms form chemical bonds?
				335	chemical bonding and the periodic table	141	modeling a chemical bond
						141	when an atom ionizes
				343	mole quantities	142	who do atoms combine in certain ratios?
				357	chemical reactions involve rearrangement of atoms	143	ionic compounds
				359	balancing chemical equations	144	show ratios in which elements combine to form a compound
				364	carbon chains	148	reactants and products
				387	fusion and fission explained	149	practice balancing equations
				388	nuclear vs chemical reactions	152	write the balanced equation
				389	electromagnetic force	152	predict how much product formed given the reactants
				389	forces in the nucleus		
				389	strong nuclear force		
				393	carbon dating	157	predict the products of double displacement reactions
393	radioisotopes in science and medicine	160	radioactive decay				
400	research pros and cons of nuclear technology	160	how do you simulate nuclear decay?				

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				623	nuclear fusion and the sun	161	research pros and cons of uses for radioactive elements
						162	carbon reactions and the environment

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12.E.4a Earth Science	Understand the fundamental concepts, principles and interconnections of the life, physical and earth/space sciences.	Know and apply concepts that describe the features and processes of the Earth and its resources.	Explain how external and internal energy sources drive Earth processes (e.g., solar energy drives weather patterns; internal heat drives plate tectonics).	480	transfer of energy in and out of Earth's atmosphere	213	exploring how temperature-dependent layering creates currents
				480	distribution of incoming solar radiation	232	create a model that simulates an earthquake and discover some of the conditions that affect its timing,duration, and intensity
				481	Earth's "energy budget"		
				483	global temperature changing over time		
				485	Earth's internal energy		
				493	convection currents in the atmosphere	237	finding a pattern of volcanoes related to the locations of plate boundaries
				528	Earth's surface is changing		
				528	definition of plate tectonics		
				532	theory of plate tectonics		
				537	causes and descriptions of earthquakes		
				539	earthquakes rating scales		
				551	structure of a volcano		
				554	figure showing structure of different types of volcanoes		
				555	formation of shield volcanoes due to hot spots		
				556	formation of stratovolcanoes due to subduction		

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12.E.4b Earth Science	Understand the fundamental concepts, principles and interconnections of the life, physical and earth/space sciences.	Know and apply concepts that describe the features and processes of the Earth and its resources.	Describe how rock sequences and fossil remains are used to interpret the age and changes in the Earth.	522 523 569	relative dating interpreting rock formations studying moon rocks on Earth	225 226	determining the relative ages of rock formations sequencing events in a geologic cross-section
12.F.4a Earth Science	Understand the fundamental concepts, principles and interconnections of the life, physical and earth/space sciences.	Know and apply concepts that explain the composition and structure of the universe and Earth's place in it.	Explain theories, past and present, for changes observed in the universe.	611 612 621 641 641 647 648 649	historical theories of the origin of the moon historical theories about the solar system historical theories of which objects were planets how the solar system was formed the existence of other planetary systems the Big Bang theory of the origin of the universe evidence for the Big Bang theory evidence for the Big Bang theory		

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12.F.4b Earth Science	Understand the fundamental concepts, principles and interconnections of the life, physical and earth/space sciences.	Know and apply concepts that explain the composition and structure of the universe and Earth's place in it.	Describe and compare the chemical and physical characteristics of galaxies and objects within galaxies (e.g., pulsars, nebulae, black holes, dark matter, stars).	591	characteristics of the universe	255	observe and describe the appearance of the moon and Jupiter and its moons
				633	what is a star?	264	light emission and chemical composition
				638	the life cycle of stars	267	spectral lines and elements
				639	description and illustration of the life cycle of stars		
				640	death of massive stars		
				640	birth of elements		
				640	elements formed by nuclear fusion in stars		
				642	what is a galaxy?		
				652	research and describe astronomical objects		

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13.A.4a Practices of Science	Understand the relationships among science, technology and society in historical and contemporary contexts.	Know and apply the accepted practices of science.	Estimate and suggest ways to reduce the degree of risk involved in science activities.	452	featured throughout CPO Science program safety caution on heating jar	20	featured throughout CPO Science program 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

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						210 safety using light bulbs 216 safety in swinging thermometers 256 safety in lab	

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13.A.4b Practices of Science	Understand the relationships among science, technology and society in historical and contemporary contexts.	Know and apply the accepted practices of science.	Assess the validity of scientific data by analyzing the results, sample set, sample size, similar previous experimentation, possible misrepresentation of data presented and potential sources of error.	11	controlling variables in experiments	11	calculate % error
				19	which group did the best experiment?	18	evaluate graphs as to whether or not they show relationships between variables
				19	did you run a controlled experiment?	21	evaluate percent change for data collected
				20	what factors could explain the variability in their data?	75	evaluate statistical significance
				485	what percentage comes from this source? (problem 4)	76	calculate % error
				543	determining distance to an epicenter	151	does your experiment agree with law of conservation of mass?
				547	what explains the difference in density? (#5)	169	why was plain water tested?
				605	how big is Earth?	169	what does the word control mean?
						171	evaluate method based on data
						197	calculating error between your barometer and a commercial barometer
						199	importance of good record keeping in order to avoid error
						200	evaluating your qualitative ozone strips
						231	evaluating your completed bathymetric map

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						247	evaluate your ability to interpret rock formations

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13.A.4c Practices of Science	Understand the relationships among science, technology and society in historical and contemporary contexts.	Know and apply the accepted practices of science.	Describe how scientific knowledge, explanations and technological designs may change with new information over time (e.g., the understanding of DNA, the design of computers).	34	Aristotle vs. Newton	130	investigate Rutherford's gold foil experiment
				45	Newton's Laws of Motion		
				54	Newton and the force of gravity		
				105	Benjamin Franklin		
				107	Charles-Augustin Coulomb		
				312	contributions of Fermi		
				313	development of atomic theory		
				321	contributions of Mendeleev		
				324	research and create a poster to illustrate development of atomic model		
				332	plate tectonic history		
				393	contributions of Marie and Pierre Curie		
				528	development of plate tectonic theory		
				529	continental drift theory		
				529	continental drift theory history		
				612	changing ideas about the solar system		
648	development of Big Bang theory	230	investigate plate tectonics				

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Standard #: Area	State Goal	Learning Standard	Learning Expectation	student text pg	detail	investigation pg	detail
13.A.4d Practices of Science	Understand the relationships among science, technology and society in historical and contemporary contexts.	Know and apply the accepted practices of science.	Explain how peer review helps to assure the accurate use of data and improves the scientific process.	58	Newton on a skateboard	6	asking questions and learning about natural world
				73	impact of Da Vinci's work	39	study energy transformations in daily life scenarios
				78	describe a problem that would be solved by an engineer	163	evaluating choice of favorite car
				120	circuits in your house	179	researching and preparing for a field trip to test surface water
				320	the quests of alchemists	198	contributions of Schönbein
				391	scientific discovery and the atomic age	201	suggesting ways that ozone concentrations could be reduced
				452	balloons expands or contracts due to thermal expansion	204	connecting the latent heat investigation to Earth
				454	temperature vs. thermal energy for a cup or pot of soup	215	the food paradox of the oceans
				461	understanding thermal energy through cocoa example	218	understanding Doppler radar
				465	examples of reflectors and absorbers		
				473	why do ears pop		
				473	why do ears pop		
				476	atmospheric pressure in Denver		
				490	using the North Star to estimate your latitude		

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				504	meteorologists use atmospheric pressure data to understand movement of weather systems		
				509	how do animals survive in the desert		
				536	analogy of plate movements		
				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		
				648	evidence for Big Bang theory		
13.B.4a Science, Technology, and Society	Understand the relationships among science, technology and society in historical and contemporary contexts.	Know and apply concepts that describe the interaction between science, technology and society.	Compare and contrast scientific inquiry and technological design as pure and applied sciences.	433	the clean water act		
				439	catalytic converters and scrubbing reduce acid rain		
				483	hydrogen powered cars		
				538	what we can learn from seismographs		
				544	understanding earthquakes allows engineers to design safer buildings		

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Standard #: Area	State Goal	Learning Standard	Learning Expectation	student text pg	detail	investigation pg	detail
13.B.4b Science, Technology, and Society	Understand the relationships among science, technology and society in historical and contemporary contexts.	Know and apply concepts that describe the interaction between science, technology and society.	Analyze a particular occupation to identify decisions that may be influenced by a knowledge of science.	452 457 542 561	civil engineers and bridge design engineers design better products when they know specific heat seismologists volcanologists	177 178 178 222	chemistry and photography water quality testing water quality specialist zoo exhibit designers
13.B.4c Science, Technology, and Society	Understand the relationships among science, technology and society in historical and contemporary contexts.	Know and apply concepts that describe the interaction between science, technology and society.	Analyze ways that resource management and technology can be used to accommodate population trends.	364 379 379 400 414 432 433 435 437 448	petroleum research environmental impact of fuel cells research fuel cells problems caused by airborne pollutants effect of electrical generating facilities on dissolved oxygen in water water cycle and conservation wise use of water water usage and quality acid rain explained research the issue of acid rain	163 163 164 178 179 180 180 182 201	consider a vehicle's fuel economy research how trees offset accumulation of CO ₂ perform water quality tests wise use of water supply maintaining water supply quality save water for houseplants perform water quality tests investigate effect of acid rain on microorganisms research the causes of ozone in the lower atmosphere

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13.B.4d Science, Technology, and Society	Understand the relationships among science, technology and society in historical and contemporary contexts.	Know and apply concepts that describe the interaction between science, technology and society.	Analyze local examples of resource use, technology use or conservation programs; document findings; and make recommendations for improvements.	333	problems with disposing of plastics	163	consider a vehicle's fuel economy
				355	recycling tires	163	research how trees offset accumulation of CO ₂
				356	recycling discarded tires	164	perform water quality tests
				364	petroleum	178	wise use of water supply
				379	research environmental impact of fuel cells	179	maintaining water supply quality
				379	research fuel cells	180	save water for houseplants
				392	storage of nuclear waste	180	perform water quality tests
				400	problems caused by airborne pollutants	201	research the causes of ozone in the lower atmosphere
				432	water cycle and conservation		
				433	wise use of water		
435	water usage and quality						
13.B.4e Science, Technology, and Society	Understand the relationships among science, technology and society in historical and contemporary contexts.	Know and apply concepts that describe the interaction between science, technology and society.	Evaluate claims derived from purported scientific studies used in advertising and marketing strategies.	110	study appliance labels and instructions	76	analyze watch manufacturer's claims
				142	create pamphlet on utility's energy saver programs	162	inferences from promotional materials for vehicles
				448	study claims made by bottled water companies	181	study water filtration device claims