

**Correlation to Oklahoma Priority Academic Student Skills: High School Science**  
***Foundations of Physical Science* Student Text and Investigation Manual**

<b>Standard #: Science Course</b>	<b>Standard type</b>	<b>Standard</b>	<b>Objective</b>	<b>Volume 1 Student Text page</b>	<b>Volume 2 Investigation Manual page</b>
PS.1.1 Physical Science	Content Standard	Structure and Properties of Matter	Matter is made up of minute particles called atoms, and atoms are composed of even smaller components (i.e., protons, neutrons, and electrons).	311 location/size/charge of subatomic particles 311 protons/neutrons/electrons 315 atoms of same element have same atomic number 318 proton/electron attraction 388 showing valence electrons in a diagram	132 atomic number determines what element that atom is 132 building atom models 133 location of electrons in atom 133 protons and neutrons 136 model stable and neutral atoms 137 importance of atomic number 137 build atomic models 140 find the number of electrons in outermost level 140 review subatomic particles

**Correlation to Oklahoma Priority Academic Student Skills: High School Science**  
**Foundations of Physical Science Student Text and Investigation Manual**

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PS.1.2 Physical Science	Content Standard	Structure and Properties of Matter	An element is composed of a single type of atoms. When elements are listed in order according to the number of protons repeating patterns of physical and chemical properties identify families of elements with similar properties.	311	all matter is formed from atoms	132	comparing atoms
				315	atoms of same element have same atomic number	132	atomic number determines what element that atom is
				321	groups of elements and valence shells	137	importance of atomic number
				329	periodic table columns and valence electrons	141	build model of Na and Cl atoms and explain why they bond to form a molecule
				330	bonding and periodic table position		
				332	periodic table and electronegativities	142	arrangement of electrons and groups of elements
				335	periodic table and oxidation numbers		

**Correlation to Oklahoma Priority Academic Student Skills: High School Science**  
***Foundations of Physical Science* Student Text and Investigation Manual**

<b>Standard #: Science Course</b>	<b>Standard type</b>	<b>Standard</b>	<b>Objective</b>	<b>Volume 1 Student Text page</b>	<b>Volume 2 Investigation Manual page</b>		
PS.1.3 Physical Science	Content Standard	Structure and Properties of Matter	Matter has characteristic properties, such as boiling points, melting points, and density, which distinguish pure substances and can be used to separate one substance from another.	278	mixtures can be separated by physical means	114	separating a homogeneous mixture
				281	volume and mass contrasted	116	mass and volume measurements
				291	density is independent of amount of substance	124	build a density column
				292	elasticity is a physical property of matter		
				292	hardness is a physical property of matter		
				293	brittleness is a physical property of matter		
				294	tensile strength is a physical property of matter		
				294	malleability is a physical property of matter		
				295	relationship between mass volume and density		

**Correlation to Oklahoma Priority Academic Student Skills: High School Science**  
**Foundations of Physical Science Student Text and Investigation Manual**

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PS.2.1 Physical Science	Content Standard	Motion and Forces	Objects change their motion only when a net force is applied. Laws of motion are used to determine the effects of forces on the motion of objects.	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	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 discussed	14	calculate speed of car at two places on the ramp
				32	average speed vs. instantaneous	15	changes in motion can be represented graphically
				37	speed vs. time graph discussion	15	make a speed vs. time graph
				37	speed vs. time graphs	16	2nd law
				42	calculate speed from distance/time graph	16	unbalanced forces and acceleration of car
				45	Newton's third law summarized	16	thinking about force
				45	Newton's first law summarized	17	calculate speed of car
				45	Newton's second law summarized	19	find correct relationship between force mass and acceleration
				46	force has potential to change motion	19	discover 2nd law of motion
				47	weight vs. mass		

**Correlation to Oklahoma Priority Academic Student Skills: High School Science**  
***Foundations of Physical Science* Student Text and Investigation Manual**

Standard #: Science Course	Standard type	Standard	Objective	Volume 1 Student Text page	Volume 2 Investigation Manual page
				48 48 49 49 50 51 51 53 59 64	20 20 22 23 36
PS.2.2 Physical Science	Content Standard	Motion and Forces	Gravitation is a universal force that each mass exerts on any other mass.	52 52 54 55	20

**Correlation to Oklahoma Priority Academic Student Skills: High School Science**  
***Foundations of Physical Science* Student Text and Investigation Manual**

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PS.3.1 Physical Science	Content Standard	Interactions of Energy and Matter	All energy can be considered to be either kinetic energy, which is the energy of motion; potential energy, which depends on relative position; or energy contained by a field, such as electromagnetic waves.	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	conservation of energy and energy transformations
				91	understand basic forms of energy	39	make an energy flow chart
				92	energy transformations and conservation	39	identify type of energy involved
				93	different forms of energy described	188	specific heat and conservation of energy
				96	prove that energy is conserved		

**Correlation to Oklahoma Priority Academic Student Skills: High School Science  
Foundations of Physical Science Student Text and Investigation Manual**

Standard #: Science Course	Standard type	Standard	Objective	Volume 1 Student Text page	Volume 2 Investigation Manual page		
PS.3.2 Physical Science	Content Standard	Interactions of Energy and Matter	Waves, including sounds and seismic waves, waves on water, and light waves, have energy and can transfer energy when they interact with matter (such as used in telescopes, solar power, and telecommunication technology).	195	waves transmit energy	82	study wave pulses on elastic cord
				196	waves are all around us	83	measure speed of a wave pulse
				197	transverse and longitudinal waves	83	find speed of a wave
				198	frequency and wavelength and amplitude	84	make different types of waves in a ripple tank
				201	waves and absorption	85	observing reflection in water waves
				201	waves and reflection	86	adjust frequency of a standing wave
				201	reflection in water waves and light waves	86	investigate frequency and wavelength
				201	waves and refraction	87	investigating resonance
				202	refraction and eyeglasses	88	natural frequency and resonance of standing waves on a string
				204	resonance explained	90	investigate human perception of sound
				205	standing waves on a string	90	what is sound and how do we hear it?
				206	constructive and destructive interference	90	investigate human perception of sound
				210	natural frequency of a building and earthquakes	94	does sound behave like other waves?
				210	can wave interference sink a ship?	95	investigate interference with sound waves
				213	how the ear works	95	interference and sound waves
				215	properties of sound waves		
				217	loudness and decibels		
				219	frequency of sound and pitch		

**Correlation to Oklahoma Priority Academic Student Skills: High School Science**  
**Foundations of Physical Science Student Text and Investigation Manual**

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				220	voice recognition programs	96	investigating sound resonance
				220	sonograms	98	investigate sound and music
				220	white noise		
				221	importance of wavelength of sound waves	101	examine light through diffraction grating
				222	effect of temperature on speed of sound wave	101	observing white light through diffraction grating
				222	effect of medium on speed of sound wave	102	polarization of water waves
				223	interference of sound waves	102	polarization of a spring wave
				225	consonance and dissonance and beats	103	polarization of light
				226	musical instruments	104	investigate RGB model of color
				237	visible light and the electromagnetic spectrum	105	explore relationship between color and wavelength
				237	microwave ovens	106	tracing incident and reflected rays
				237	radio and television signals	107	investigate reflection of light
				237	light waves and the electromagnetic spectrum	107	investigate how light interacts with mirrors
				240	polarization of light	107	plot reflected rays from a mirror
				242	color and frequency of light waves	108	explore refraction with a prism
				242	properties of light waves		
				243	RGB model of color		

**Correlation to Oklahoma Priority Academic Student Skills: High School Science**  
***Foundations of Physical Science* Student Text and Investigation Manual**

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				245	we see color in terms of reflected light	108	explore refraction with lenses
				250	identify uses of electromagnetic waves	108	investigate how light interacts with a prism
				258	forming images with lenses	110	finding focal point and focal length of a lens
				260	reflection and mirrors	111	plotting images formed when light is refracted by a lens
				261	refraction and lenses		
				264	human eye as an optical instrument	113	observe internal reflection and relate to fiber optics
				268	total internal reflection and fiber optics	134	investigating visible light with a spectrometer
				272	identify uses of electromagnetic waves		
				273	find the angle of reflection		
				474	electromagnetic radiation		
				474	ultraviolet and infrared light		
				474	energy and radiation relationships		
				476	absorption and emission		

**Correlation to Oklahoma Priority Academic Student Skills: High School Science**  
**Foundations of Physical Science Student Text and Investigation Manual**

Standard #: Science Course	Standard type	Standard	Objective	Volume 1 Student Text page	Volume 2 Investigation Manual page
PS.INQ.1.1 Physical Science	Process Standard	Observe and Measure	Identify qualitative and quantitative changes given conditions (e.g., temperature, mass, volume, time, position, length) before, during, and after an event.	3 time measurement 5 make measurements with precision 6 scientists use metric units 78 use and understand mass measurements 280 measuring volume of solids 280 measuring volume of liquids	5 making measurements with precision 7 measure and record variables 12 make metric length measurement 16 understand and use units of force 17 measure the force 17 measure the force 25 measure and record the force 30 measure height difference 36 make precise height measurements 63 making measurements with precision 75 make precise length measurements 116 measuring mass 117 measuring volume 176 measure pH

**Correlation to Oklahoma Priority Academic Student Skills: High School Science**  
***Foundations of Physical Science* Student Text and Investigation Manual**

Standard #: Science Course	Standard type	Standard	Objective	Volume 1 Student Text page	Volume 2 Investigation Manual page
PS.INQ.1.2 Physical Science	Process Standard	Observe and Measure	Use appropriate tools (e.g., metric ruler, graduated cylinder, thermometer, balances, spring scales, stopwatches) when measuring objects and/or events.	24 using an electronic timer	7 use a ruler to make a measurement 12 using photogates 14 using photogates 16 use a force scale 17 use photogates to study car on ramp 18 use a balance to find mass of car 30 use force scale 44 using electrical meter 46 using electrical meter 48 using electrical meter 50 using electrical meter 86 use CPO Timer to measure frequency 107 study reflection of laser beam 108 study refraction of laser beam 113 trace critical angle with a laser beam 158 use a thermometer

**Correlation to Oklahoma Priority Academic Student Skills: High School Science  
Foundations of Physical Science Student Text and Investigation Manual**

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PS.INQ.1.3 Physical Science	Process Standard	Observe and Measure	Use appropriate System International (SI) units (i.e., grams, meters, liters, degrees Celsius, and seconds); and SI prefixes (i.e. micro-, milli-, centi-, and kilo-) when measuring objects and/or events.	5 6 78	measuring distance scientists use metric units use and understand mass measurements	5 6 12 16 16 44 46 48 87 116 116 117 180	measuring metric and english lengths measure time make metric length measurement understand and use units of force measure force measure voltage measure current measure resistance measure wavelength measuring mass measure mass measure volume measure temperature
PS.INQ.2.1 Physical Science	Process Standard	Classify	Using observable properties, place an object or event into a classification system.	91 284 284	understand basic forms of energy states of matter and arrangement of molecules changes of state	39 118 118 118 119	identify type of energy involved molecules in a liquid investigate melting think of melting process at molecular level energy and phase changes

**Correlation to Oklahoma Priority Academic Student Skills: High School Science**  
***Foundations of Physical Science* Student Text and Investigation Manual**

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PS.INQ.2.2 Physical Science	Process Standard	Classify	Identify the properties by which a classification system is based.	243	RGB model of color	104	investigate RGB model of color

**Correlation to Oklahoma Priority Academic Student Skills: High School Science  
Foundations of Physical Science Student Text and Investigation Manual**

Standard #: Science Course	Standard type	Standard	Objective	Volume 1 Student Text page	Volume 2 Investigation Manual page		
PS.INQ.3.1 Physical Science	Process Standard	Experiment	Evaluate the design of a physical science investigation.	7	experimentation begins with a question	6	formulate hypothesis
				9	steps in the scientific method	7	compare results with hypothesis
				10	forming a hypothesis	7	design your own experiment
				11	control and experimental variables	7	doing a controlled experiment
				19	design your own experiment	7	variables in an experiment
				19	which group did the best experiment?	9	design three experiments using car and ramp
				19	design your own experiment	9	devise a hypothesis
				19	design your own experiment	9	design three experiments and choose equipment
				26	independent and dependent variables	16	decide how to vary the force on the car for this experiment
				28	identifying cause and effect relationships	18	evaluate graphs as to whether or not they show relationships between variables
				41	identify cause and effect		
				42	devise an experiment		
				288	find the thickness of a single card	21	choose independent and dependent variables for graph
						21	determine effect of increasing mass
						21	evaluate percent change for data collected
		26	what variables can be changed?				

**Correlation to Oklahoma Priority Academic Student Skills: High School Science**  
***Foundations of Physical Science* Student Text and Investigation Manual**

Standard #: Science Course	Standard type	Standard	Objective	Volume 1 Student Text page	Volume 2 Investigation Manual page
					27 recognize variables
					34 formulate hypothesis
					75 design pendulum experiment
					75 plan three experiments to determine which variable affects the period of a pendulum
					75 evaluate statistical significance
					93 decision trees and the advantage of doing multiple trials
					145 plan a procedure and select necessary equipment
					151 design experiment to find out if mass is conserved
					151 plan procedures and select materials
					166 which factor will produce fastest dissolving rate?
					166 devise hypothesis and explain
					166 what three factors influence dissolving rate?
					167 evaluate method based on data
					178 formulate hypothesis

**Correlation to Oklahoma Priority Academic Student Skills: High School Science**  
***Foundations of Physical Science* Student Text and Investigation Manual**

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					198 formulate hypothesis
PS.INQ.3.2 Physical Science	Process Standard	Experiment	Identify the independent variables, dependent variables, and controls in an experiment.	11 control and experimental variables 26 independent and dependent variables	7 doing a controlled experiment 21 choose independent and dependent variables for graph 27 recognize variables

**Correlation to Oklahoma Priority Academic Student Skills: High School Science**  
**Foundations of Physical Science Student Text and Investigation Manual**

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PS.INQ.3.3 Physical Science	Process Standard	Experiment	Use mathematics to show relationships within a given set of observations.	42 interpreting distance/time graph 42 analyze a speed/distance graph	6 compare results with other groups 11 graph speed vs. position 11 analyze speed change of car 18 study data table for relationship between force and motion 25 create a mathematical model 25 analyze block and tackle data 27 find math rule for lever equilibrium 27 analyze lever equilibrium data 28 derive a math formula 35 does data support hypothesis? 45 did battery voltage change? 76 analyze pendulum data 129 find average velocity 147 students analyze chemical change lab results 167 average dissolving rate

**Correlation to Oklahoma Priority Academic Student Skills: High School Science**  
***Foundations of Physical Science* Student Text and Investigation Manual**

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PS.INQ.3.4 Physical Science	Process Standard	Experiment	Identify a hypothesis for a given problem in physical science investigations.		6 formulate hypothesis 7 variables in an experiment 9 devise a hypothesis 34 formulate hypothesis 166 which method will give fastest dissolving rate? 166 devise hypothesis and explain 178 formulate hypothesis 198 which type of food contains the most energy? 198 formulate hypothesis

**Correlation to Oklahoma Priority Academic Student Skills: High School Science**  
***Foundations of Physical Science* Student Text and Investigation Manual**

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PS.INQ.3.5 Physical Science	Process Standard	Experiment	Recognize potential hazards and practice safety procedures in all physical science activities.		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 164 safety equipment 168 hot water safety 172 safety tip for water testing 180 thermometer safety 182 heat safety 186 thermometer safety 192 heat safety 198 heat safety 200 safely using rubber bands

**Correlation to Oklahoma Priority Academic Student Skills: High School Science**  
***Foundations of Physical Science* Student Text and Investigation Manual**

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PS.INQ.4.1 Physical Science	Process Standard	Interpret and Communicate	Select appropriate predictions based on previously observed patterns of evidence.	20	how will speed change?	76	use data to predict best string length for a pendulum clock
				24	predicting speed from a graph	121	use graph to predict mass of six objects
				42	predict the speed of a car	151	does your experiment agree with law of conservation of mass?
						156	make predictions about solubility

**Correlation to Oklahoma Priority Academic Student Skills: High School Science**  
***Foundations of Physical Science* Student Text and Investigation Manual**

Standard #: Science Course	Standard type	Standard	Objective	Volume 1 Student Text page	Volume 2 Investigation Manual page
PS.INQ.4.2 Physical Science	Process Standard	Interpret and Communicate	Report data in an appropriate manner.		<p>data tables and graphs can be created on computer or graphing calculator</p> <p>9 construct a data table</p> <p>12 understand and use data table</p> <p>17 record results in data table</p> <p>18 organize different combinations of data</p> <p>24 use data table to record results</p> <p>27 use data table to record results</p> <p>30 record ropes and pulley data in table</p> <p>36 organize data into a table</p> <p>75 create data table for self-designed experiment</p> <p>151 design a data table</p> <p>167 use data table for observations</p> <p>173 organize water quality data into a table</p>

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***Foundations of Physical Science* Student Text and Investigation Manual**

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PS.INQ.4.3 Physical Science	Process Standard	Interpret and Communicate	Interpret data tables, line, bar, trend, and/or circle graphs.	24	making a graph	13	graph distance vs. time
				24	interpretations of patterns in data	13	make a distance vs. time graph
				26	creating graphs	15	construct a quantitative graphical model
				27	how to read a graph	15	interpret a speed vs. time graph
				27	reading a graph	37	organize data into a graph of speed vs. height
				41	make a graph	51	graph voltage vs. current
				78	analyze lever diagram	78	reading harmonic motion data tables and graphs
						121	graph mass vs. volume
						147	organize observations into a category table
						181	construct a graphical model
		183	construct a temperature vs. time graph				

**Correlation to Oklahoma Priority Academic Student Skills: High School Science**  
**Foundations of Physical Science Student Text and Investigation Manual**

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PS.INQ.4.4 Physical Science	Process Standard	Interpret and Communicate	Accept or reject hypotheses when given results of a physical science investigation.	10 process of reviewing hypothesis explained	35 what evidence is there in support of your hypothesis? 151 do the data support the hypothesis 151 review your hypothesis 167 what was happening at molecular level? 167 did you prove or disprove your hypothesis?
PS.INQ.4.5 Physical Science	Process Standard	Interpret and Communicate	Evaluate experimental data to draw the most logical conclusion.		21 construct reasonable explanation based on data 35 study data and determine importance of height on speed of marble 45 analyze data and explain a rule
PS.INQ.4.6 Physical Science	Process Standard	Interpret and Communicate	Prepare a written report describing the sequence, results, and interpretation of a physical science investigation or event.		9 reporting on an experiment 173 write paragraph to explain results 175 create water quality report 179 write summary of findings

**Correlation to Oklahoma Priority Academic Student Skills: High School Science**  
***Foundations of Physical Science* Student Text and Investigation Manual**

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PS.INQ.4.7 Physical Science	Process Standard	Interpret and Communicate	Communicate or defend scientific thinking that resulted in conclusions.	20 explain your reasoning	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 discuss an explanation with your group 47 present and defend an explanation 129 explain your answer and justify 145 present findings and methods used 151 present results to the class

**Correlation to Oklahoma Priority Academic Student Skills: High School Science**  
**Foundations of Physical Science Student Text and Investigation Manual**

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PS.INQ.4.8 Physical Science	Process Standard	Interpret and Communicate	Identify and/or create an appropriate graph or chart from collected data, tables, or written description.	24 making a graph 26 creating graphs 41 make a graph	13 make a distance vs. time graph 13 graph distance vs. time 15 construct a quantitative graphical model 37 organize data into a graph of speed vs. height 51 graph voltage vs. current 121 graph mass vs. volume 147 organize observations into a category table 181 construct a graphical model 183 construct a temperature vs. time graph
PS.INQ.5.1 Physical Science	Process Standard	Model	Interpret a model which explains a given set of observations.	23 why make models? 24 scientific models 24 what is a scientific model? 42 interpreting distance/time graph	25 create a mathematical model 27 find math rule for lever equilibrium 28 derive a math formula
PS.INQ.5.2 Physical Science	Process Standard	Model	Select predictions based on models.	20 how will speed change? 24 predicting speed from a graph 42 predict the speed of a car	76 use data to predict best string length for a pendulum clock 121 use graph to predict mass of six objects 156 make predictions about solubility

**Correlation to Oklahoma Priority Academic Student Skills: High School Science**  
***Foundations of Physical Science* Student Text and Investigation Manual**

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PS.INQ.5.3 Physical Science	Process Standard	Model	Compare a given model to the physical world.	23 why make models? 24 scientific models 24 what is a scientific model?	
PS.INQ.6.1 Physical Science	Process Standard	Inquiry	Formulate a testable hypothesis and design an appropriate experiment relating to the physical world.		6 formulate hypothesis 9 devise a hypothesis 34 formulate hypothesis 166 devise hypothesis and explain 178 formulate hypothesis 198 formulate hypothesis

**Correlation to Oklahoma Priority Academic Student Skills: High School Science**  
**Foundations of Physical Science Student Text and Investigation Manual**

Standard #: Science Course	Standard type	Standard	Objective	Volume 1 Student Text page	Volume 2 Investigation Manual page
PS.INQ.6.2 Physical Science	Process Standard	Inquiry	Design and conduct physical science investigations in which variables are identified and controlled.	7 10 11 19 20 26 42 79 288	6 7 7 7 9 9 9 9 10 10 12 16 16 18
				experimentation begins with a question the research question and hypothesis control and experimental variables design your own experiment finding variability in data independent and dependent variables devise an experiment look at force data and decide the usefulness of a machine find the thickness of a single card	how do we ask questions and get answers from nature? perform your own experiment doing a controlled experiment design your own experiment design three experiments and choose equipment conduct three experiments with appropriate equipment design three experiments using car and ramp selecting ramp and photogates conduct car/ramp experiment select equipment and set up experiment decide how to vary the force on the car for this experiment investigate Newton's 2nd law use data to describe relationship between force and motion

**Correlation to Oklahoma Priority Academic Student Skills: High School Science**  
***Foundations of Physical Science* Student Text and Investigation Manual**

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					<p>19 use data to infer correct relationship between variables</p> <p>21 choose independent and dependent variables for graph</p> <p>26 what variables can be changed?</p> <p>27 recognize variables</p> <p>30 interpret block and tackle data</p> <p>30 rigging block and tackle</p> <p>34 investigate motion on a rollercoaster</p> <p>75 design pendulum experiment</p> <p>75 perform self-designed experiment</p> <p>93 decision trees and the advantage of doing multiple trials</p> <p>141 build models of Na and Cl and use them to explain bonding</p> <p>145 plan a procedure and select necessary equipment</p> <p>145 carry out procedure and select equipment</p>

**Correlation to Oklahoma Priority Academic Student Skills: High School Science**  
***Foundations of Physical Science* Student Text and Investigation Manual**

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					<p>151 plan procedures and select materials</p> <p>151 design experiment to find out if mass is conserved</p> <p>151 select materials from list</p> <p>166 what three factors influence dissolving rate?</p> <p>174 visit local water supply and perform testing</p>

**Correlation to Oklahoma Priority Academic Student Skills: High School Science  
*Foundations of Physical Science* Student Text and Investigation Manual**

Standard #: Science Course	Standard type	Standard	Objective	Volume 1 Student Text page	Volume 2 Investigation Manual page
PS.INQ.6.3 Physical Science	Process Standard	Inquiry	Use a variety of technologies, such as hand tools, measuring instruments, and computers to collect, analyze, and display data.	5 measuring distance 12 importance of reliable and accurate data collection	data tables and graphs can be created on computer or graphing calculator  4 difference between precise and accurate data  5 measuring metric and english lengths  6 electronic timer and release technique  6 measure time  7 record time interval  9 collect speed data  16 measure force  17 record times  24 collect weight data  36 collect precise speed and height data  44 measure voltage  46 measure current  48 measure resistance  75 collect mass and amplitude data  87 measure wavelength  116 measure mass  117 measure volume

**Correlation to Oklahoma Priority Academic Student Skills: High School Science**  
***Foundations of Physical Science* Student Text and Investigation Manual**

Standard #: Science Course	Standard type	Standard	Objective	Volume 1 Student Text page	Volume 2 Investigation Manual page
					167 collect time data and record observations 180 measure temperature

**Correlation to Oklahoma Priority Academic Student Skills: High School Science**  
**Foundations of Physical Science Student Text and Investigation Manual**

Standard #: Science Course	Standard type	Standard	Objective	Volume 1 Student Text page	Volume 2 Investigation Manual page
PS.INQ.6.4 Physical Science	Process Standard	Inquiry	Inquiries should lead to the formulation of explanations or models (physical, conceptual, and mathematical).	20 finding variability in data 23 why make models? 24 scientific models 24 what is a scientific model? 24 making a graph 26 creating graphs 41 make a graph 42 interpreting distance/time graph 79 look at force data and decide the usefulness of a machine	7 perform your own experiment 10 conduct car/ramp experiment 13 graph distance vs. time 15 construct a quantitative graphical model 16 investigate Newton's 2nd law 18 use data to describe relationship between force and motion 19 use data to infer correct relationship between variables 25 create a mathematical model 27 find math rule for lever equilibrium 28 derive a math formula 30 interpret block and tackle data 34 investigate motion on a rollercoaster 37 organize data into a graph of speed vs. height 51 graph voltage vs. current 75 perform self-designed experiment

**Correlation to Oklahoma Priority Academic Student Skills: High School Science**  
***Foundations of Physical Science* Student Text and Investigation Manual**

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					<p>121 graph mass vs. volume</p> <p>141 build models of Na and Cl and use them to explain bonding</p> <p>147 organize observations into a category table</p> <p>151 does your experiment agree with law of conservation of mass?</p> <p>157 add new rules to list based on findings</p> <p>181 construct a graphical model</p> <p>183 construct a temperature vs. time graph</p>