

Correlation to West Virginia Content Standards and Objectives: Physics - Technical and Conceptual

Physics: A First Course

Student Text and Investigation Manual

Standard #: Course	Content Standard	Topic	Objective		Volume One Student Text Page	Volume Two Investigation Manual Page
PTC.1.01 Physics - Technical and Conceptual	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.	4	what is analysis	6 do results agree with hypothesis?
				6	what is a variable	6 recognize and control variables
				8	cause and effect relationships	6 do results agree with hypothesis?
				8	control and experimental variables	6 reflecting on the experiment
				8	dependent variables	7 construct explanations supported by evidence
				8	independent variables	7 collect precise data
				16	graphs and dependent variables	9 how do your observations support your answer?
				16	graphs and independent variables	11 what experimental data support answer?
				24	importance of changing one variable at a time in an experiment	27 identify and control variables
						27 how can photogate ensure consistent results?
		47 construct a reasonable explanation				
		60 propose a relationship between power and voltage				
		61 collect and record resistance data				
		71 find the average of the three times				

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Standard #: Course	Content Standard	Topic	Objective	Volume One Student Text Page	Volume Two Investigation Manual Page
					78 estimate the precision of measurements 94 investigate variables and how they affect the period of a pendulum
PTC.1.02 Physics - Technical and Conceptual	Standard 1: History and Nature of Science	History and Nature of Science	recognize that science has practical and theoretical limitations.	8 scientific method 19 mathematical models 22 scientific method in action 23 science helps us learn about natural world	31 did result agree with hypothesis?
PTC.1.03 Physics - Technical and Conceptual	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.	8 asking a scientific question 11 measurement 12 metric system 13 measuring time 19 mathematical models 23 science helps us learn about natural world	61 collect and record resistance data

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PTC.1.04 Physics - Technical and Conceptual	Standard 1: History and Nature of Science	History and Nature of Science	conclude that science is a blend of creativity, logic and mathematics.	8	scientific method	11	find formula for acceleration
				19	mathematical descriptions	13	derive a formula
				22	scientific method in action	17	calculate mechanical advantage
				22	unexpected discoveries	17	derive a formula to use with ropes and pulleys
				23	science is a creative enterprise	29	find a mathematical name for the steepness ratio
				26	interpreting distance/time graph	29	calculate the ratio
				34	mathematical model of acceleration	31	calculate temperature of mixture
				35	Newton's second law equation	61	collect and record resistance data
				41	average speed equation	69	calculate power used by the bulb
				43	calculating weight	75	derive a formula to calculate the charge
				61	momentum equation	76	calculate the number of electrons
				62	relating impulse and momentum conservation	99	calculate natural frequency and period
				68	kinetic energy formula		
				86	the work equation		
				89	the power equation		
				96	calculating mechanical advantage		
				118	Hooke's law equation		
				141	projectile motion problems		
143	calculating angular speed						

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				144	
					finding the circumference of a circle
				145	
					linear speed equation
				153	
					equation for law of universal gravitation
				179	
					the heat equation
				186	
					creativity and discoveries of Charles Goodyear
				193	
					density formula
				208	
					pressure and temperature relationship
				308	
					equation for Ohm's law
				342	
					equation for Coulomb's law
				438	
					calculating wave speeds
				439	
					equation for the speed of a wave
				525	
					equation for the speed of light

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PTC.1.05 Physics - Technical and Conceptual	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.	22	discovery of Penicillin
				22	Fleming's investigations
				28	Newton's idea of force
				28	Newton and the history of physics
				52	contributions of Harold Edgerton
				52	history of high-speed photography
				79	contributions of Robert Goddard
				166	Robert Brown and Brownian motion
				167	history of atomic theory
				218	atomic theory
219	development of atom models				
224	development of periodic table				

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Standard #: Course	Content Standard	Topic	Objective	Volume One Student Text Page		Volume Two Investigation Manual Page
PTC.1.06 Physics - Technical and Conceptual	Standard 1: History and Nature of Science	History and Nature of Science	integrate the history of science with cultural history to demonstrate that scientists work within their historical surroundings and are affected by them.	28	Newton and the history of physics	
				52	contributions of Harold Edgerton	
				52	history of high-speed photography	
				79	contributions of Robert Goddard	
				166	Robert Brown and Brownian motion	

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Standard #: Course	Content Standard	Topic	Objective		Volume One Student Text Page	Volume Two Investigation Manual Page	
PTC.2.01 Physics - Technical and Conceptual	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).	4	what is an experiment	6	recognize and control variables
				6	what is a variable	6	reflecting on the experiment
				8	control and experimental variables	7	construct explanations supported by evidence
				8	dependent variables	9	how do your observations support your answer?
				8	independent variables	11	what experimental data support answer?
				8	cause and effect relationships	27	identify and control variables
				8	asking a scientific question	47	design an experiment
				8	designing experiments	47	construct a reasonable explanation
				11	importance of units	60	propose a relationship between power and voltage
				11	communicating via measurement	67	explain what happened
				16	graphs and dependent variables	94	investigate variables and how they affect the period of a pendulum
				16	graphs and independent variables	94	design pendulum experiments
				22	unexpected discoveries		
				23	science is a creative enterprise		
				24	importance of changing one variable at a time in an experiment		
				186	creativity and discoveries of Charles Goodyear		

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Standard #: Course	Content Standard	Topic	Objective	Volume One Student Text Page	Volume Two Investigation Manual Page
PTC.2.02 Physics - Technical and Conceptual	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).		<p>6 use a data table</p> <p>7 collect precise data</p> <p>8 constant force data table</p> <p>9 constant height data table</p> <p>10 speed data table</p> <p>13 collision data table</p> <p>18 output and input work data table</p> <p>19 force vs. distance data table</p> <p>22 force data table</p> <p>25 rolling friction data table</p> <p>27 how can photogate ensure consistent results?</p> <p>29 speed and height data table</p> <p>61 collect and record resistance data</p> <p>78 estimate the precision of measurements</p>

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PTC.2.03 Physics - Technical and Conceptual	Standard 2: Science as Inquiry	Inquiry	apply scientific approaches to seek solutions for personal and societal issues.	53	science and photography
				72	energy usage and conservation
				104	prosthetic legs and technology
				105	science and biomechanics
				122	maglev train technology
				129	science and architecture
				186	materials scientists
				234	archaeologists
				255	impact of generating electricity on the environment
				255	energy in the ocean
PTC.2.04 Physics - Technical and Conceptual	Standard 2: Science as Inquiry	Inquiry	properly and safely manipulate equipment, materials, chemicals, organisms and models.		16 safety with simple machines
					48 demonstrate safe lab practices
					67 short circuits and lab safety
					70 capacitor safety

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Standard #: Course	Content Standard	Topic	Objective	Volume One Student Text Page		Volume Two Investigation Manual Page	
PTC.2.05 Physics - Technical and Conceptual	Standard 2: Science as Inquiry	Inquiry	conduct explorations in a variety of environments (e.g., laboratories, museums, libraries, parks and other outdoors locations).	4	what is an experiment	6	design a better experiment
				8	designing experiments	13	design other experiments
						15	design another experiment
						47	design an experiment
						47	conduct the experiment you designed
						94	design pendulum experiments

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Standard #:	Content Standard	Topic	Objective	Volume One Student Text Page		Volume Two Investigation Manual Page	
PTC.2.06 Physics - Technical and Conceptual	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.	171	how a thermometer works	2	using timers and photogates
				305	using a multimeter to measure current	22	use spring scales
				307	using a multimeter to measure resistance	44	using a timer and photogates
						46	using a timer and photogates
						59	use a multimeter
						61	using a multimeter to measure resistance
						62	use a multimeter to measure current
						63	use a multimeter to measure resistance of a pot
						64	use a multimeter to measure voltage drop
						65	use a multimeter to measure voltage
						66	use a multimeter to measure current
						74	use a multimeter to measure voltage
						85	use a multimeter to measure voltage
						86	use a timer and photogate to measure speed of rotor

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Standard #: Course	Content Standard	Topic	Objective	Volume One Student Text Page	Volume Two Investigation Manual Page
					93 use a timer and photogate to measure the period of a pendulum 96 use a timer and photogate to measure the natural frequency of an oscillator

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Standard #: Course	Content Standard	Topic	Objective		Volume One Student Text Page		Volume Two Investigation Manual Page
PTC.2.07 Physics - Technical and Conceptual	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)	4	what is analysis	4	construct a graph
				8	formulating a hypothesis	6	use a data table
				10	what is a model	6	form a hypothesis
				11	measurement	6	predict fastest car
				12	metric system	7	collect precise data
				13	measuring time	8	constant force data table
				16	steps to follow for graph construction	9	constant height data table
				16	constructing graphs	10	speed data table
				19	mathematical descriptions	11	find formula for acceleration
				25	constructing a graph	11	create a graph
				26	interpreting distance/time graph	13	derive a formula
				34	mathematical model of acceleration	13	collision data table
				35	Newton's second law equation	15	graph speed vs. height
				41	average speed equation	15	predict speed of car
				43	calculating weight	17	calculate mechanical advantage
				46	motion graphs	17	derive a formula to use with ropes and pulleys
				48	motion graphs	18	output and input work data table
56	analyze a speed/distance graph	19	force vs. distance data table				
61	momentum equation	20	graph work done vs. deflection of rubber band				

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Standard #: Course	Content Standard	Topic	Objective	Volume One Student Text Page	Volume Two Investigation Manual Page		
				62	relating impulse and momentum conservation	21	graph speed vs. rubber band deflection
				68	kinetic energy formula	21	predict speed of car
				86	the work equation	22	force data table
				89	the power equation	25	graph friction vs. mass
				96	calculating mechanical advantage	25	rolling friction data table
				112	using a graph to find force vector components	27	how can photogate ensure consistent results?
				118	Hooke's law equation	27	graph launch angle vs. range
				141	projectile motion problems	29	find a mathematical name for the steepness ratio
				143	calculating angular speed	29	graph acceleration vs. steepness ratio
				144	finding the circumference of a circle	29	calculate the ratio
				145	linear speed equation	29	speed and height data table
				153	equation for law of universal gravitation	30	predict temperature of mixture
				179	the heat equation	31	calculate temperature of mixture
				193	density formula	31	did result agree with hypothesis?
				208	pressure and temperature relationship	45	predict how many bounces the car will make
				308	equation for Ohm's law	45	make a graph of efficiency vs. speed
				342	equation for Coulomb's law		
				419	harmonic motion graphs		

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				420	finding the amplitude on a harmonic motion graph	47	analyze the results
				438	calculating wave speeds	50	graph time vs. temperature
				439	equation for the speed of a wave	52	construct a graph
				525	equation for the speed of light	61	collect and record resistance data
						69	calculate power used by the bulb
						71	find the average of the three times
						75	derive a formula to calculate the charge
						75	graph current vs. time for the capacitor
						76	calculate the number of electrons
						78	estimate the precision of measurements
						86	graph voltage vs. speed
						94	sketch harmonic motion graphs
						96	make predictions about natural frequency
						99	calculate natural frequency and period

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Standard #: Course	Content Standard	Topic	Objective	Volume One Student Text Page	Volume Two Investigation Manual Page		
PTC.2.08 Physics - Technical and Conceptual	Standard 2: Science as Inquiry	Inquiry	design, conduct, evaluate and revise experiments	4	what is an experiment	6	recognize and control variables
				6	what is a variable	6	do results agree with hypothesis?
				8	hypothesis defined	27	identify and control variables
				8	control and experimental variables	47	conduct the experiment you designed
				8	dependent variables	47	design an experiment
				8	independent variables	94	investigate variables and how they affect the period of a pendulum
				8	designing experiments	94	design pendulum experiments
				8	asking a scientific question		
				16	graphs and dependent variables		
				16	graphs and independent variables		
				24	importance of changing one variable at a time in an experiment		

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PTC.3.01 Physics - Technical and Conceptual	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.	6	parts of a car and ramp system	5	investigate systems and change
				6	defining a system	7	examine energy in the system
				7	the scale of a system	22	investigate equilibrium
				9	changes in scale of systems		
				9	stability of systems		
				9	energy in a system		
				10	car and ramp system		
				10	an example system		
				14	time scales		
				114	systems in equilibrium		
				128	equilibrium and architecture		
				240	system interactions		
				240	energy and systems		
				243	energy conservation and closed systems		
				251	energy flow in natural systems		
				253	energy flow and food chains		
				423	restoring forces and equilibrium		
423	equilibrium and harmonic motion						

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PTC.3.02 Physics - Technical and Conceptual	Standard 3: Unifying Themes Objectives	Themes	apply evidence from models to make predictions about interactions and changes in systems.	16	constructing graphs	4	construct a graph
				16	steps to follow for graph construction	6	predict fastest car
				19	mathematical descriptions	11	create a graph
				25	constructing a graph	11	find formula for acceleration
				26	interpreting distance/time graph	13	derive a formula
				34	mathematical model of acceleration	15	predict speed of car
				35	Newton's second law equation	15	graph speed vs. height
				35	Newton's second law equation	17	derive a formula to use with ropes and pulleys
				41	average speed equation	17	calculate mechanical advantage
				43	calculating weight	20	graph work done vs. deflection of rubber band
				46	motion graphs	20	graph work done vs. deflection of rubber band
				48	motion graphs	21	graph speed vs. rubber band deflection
				61	momentum equation	21	graph speed vs. rubber band deflection
				62	relating impulse and momentum conservation	21	predict speed of car
				68	kinetic energy formula	25	graph friction vs. mass
				86	the work equation	27	graph launch angle vs. range
				89	the power equation	29	graph acceleration vs. steepness ratio
				96	calculating mechanical advantage	29	graph acceleration vs. steepness ratio
				112	calculating mechanical advantage	29	calculate the ratio
				112	using a graph to find force vector components	29	find a mathematical name for the steepness ratio
118	Hooke's law equation	30	predict temperature of mixture				

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				141	projectile motion problems	31	calculate temperature of mixture
				143	calculating angular speed		
				144	finding the circumference of a circle	45	predict how many bounces the car will make
				145	linear speed equation	45	make a graph of efficiency vs. speed
				153	equation for law of universal gravitation	50	graph time vs. temperature
				179	the heat equation	52	construct a graph
				193	density formula	69	calculate power used by the bulb
				208	pressure and temperature relationship	75	derive a formula to calculate the charge
				308	equation for Ohm's law		
				342	equation for Coulomb's law	75	graph current vs. time for the capacitor
				419	harmonic motion graphs	76	calculate the number of electrons
				420	finding the amplitude on a harmonic motion graph	86	graph voltage vs. speed
				438	calculating wave speeds	94	sketch harmonic motion graphs
				439	equation for the speed of a wave	96	make predictions about natural frequency
				525	equation for the speed of light	99	calculate natural frequency and period

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Standard #: Course	Content Standard	Topic	Objective		Volume One Student Text Page	Volume Two Investigation Manual Page	
PTC.3.03 Physics - Technical and Conceptual	Standard 3: Unifying Themes Objectives	Themes	measure changes in systems using graphs and equations relating these to rate, scale, patterns, trends and cycles.	10	what is a model	4	construct a graph
				16	steps to follow for graph construction	6	predict fastest car
				16	constructing graphs	11	find formula for acceleration
				19	mathematical descriptions	11	create a graph
				25	constructing a graph	13	derive a formula
				26	interpreting distance/time graph	15	predict speed of car
				34	mathematical model of acceleration	15	graph speed vs. height
				35	Newton's second law equation	17	derive a formula to use with ropes and pulleys
				41	average speed equation	17	calculate mechanical advantage
				43	calculating weight	20	graph work done vs. deflection of rubber band
				46	motion graphs	21	graph speed vs. rubber band deflection
				48	motion graphs	21	predict speed of car
				56	analyze a speed/distance graph	25	graph friction vs. mass
				61	momentum equation	27	graph launch angle vs. range
				62	relating impulse and momentum conservation	29	find a mathematical name for the steepness ratio
				68	kinetic energy formula	29	calculate the ratio
				86	the work equation	29	graph acceleration vs. steepness ratio
				89	the power equation	29	graph acceleration vs. steepness ratio
				96	calculating mechanical advantage	30	predict temperature of mixture

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				112	using a graph to find force vector components	31	did result agree with hypothesis?
				118	Hooke's law equation	31	calculate temperature of mixture
				141	projectile motion problems	45	predict how many bounces the car will make
				143	calculating angular speed	45	make a graph of efficiency vs. speed
				144	finding the circumference of a circle	47	analyze the results
				145	linear speed equation	50	graph time vs. temperature
				153	equation for law of universal gravitation	52	find a percentage
				179	the heat equation	52	construct a graph
				193	density formula	69	calculate power used by the bulb
				208	pressure and temperature relationship	75	derive a formula to calculate the charge
				308	equation for Ohm's law	75	graph current vs. time for the capacitor
				342	equation for Coulomb's law	76	calculate the number of electrons
				419	harmonic motion graphs	86	graph voltage vs. speed
				420	finding the amplitude on a harmonic motion graph	94	sketch harmonic motion graphs
				438	calculating wave speeds	96	make predictions about natural frequency
				439	equation for the speed of a wave	99	calculate natural frequency and period
				525	equation for the speed of light		

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PTC.3.04 Physics - Technical and Conceptual	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).	7 9 14	the scale of a system changes in scale of systems time scales	

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PTC.4.01 Physics - Technical and Conceptual	Standard 4: Science Subject Matter/Concepts	Mechanics	qualitatively and quantitatively analyze mechanical systems (e.g., force, work, rate, resistance, energy, power, force transformations).	9	basic forms of energy	14	investigate exchange of energy in car and track system
				10	conservation of energy	15	apply law of energy conservation
				66	calculating work done on objects	15	apply law of energy conservation
				66	work defined	15	calculate potential energy of car
				66	energy is stored work	18	compare and contrast input and output work
				67	calculating potential energy	18	investigate concept of work
				67	potential energy explained	18	calculate work
				68	kinetic energy explained	19	investigate concept of energy as stored work
				68	calculating kinetic energy	20	graph force vs. distance
				68	potential to kinetic energy conversions	24	calculate kinetic energy of sled
				69	kinetic energy and stopping distance of a car	33	investigate energy and phase changes
				70	law of conservation of energy	34	apply concept of energy and phase changes
				70	potential to kinetic energy conversions	42	model how atoms exchange energy
				71	using energy conservation to solve problems	44	friction and energy dissipation
				86	calculating work	45	investigate efficiency
				87	work results from force and distance that are in same distance	45	graph efficiency vs. speed
				88	calculating work		

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				88	work done by or against gravity	45	calculate efficiency of the experimental system
				89	calculating power	45	describe energy changes
				90	maximum power output of a person	46	investigate energy flow in a system
				94	work and simple machines	47	draw an energy flow diagram
				101	output work is always less than input work	47	identify forms of energy in an experimental system
				102	efficiency explained	47	calculate energy
				117	potential and kinetic energy in a spring	47	investigate friction as a part of energy flow
				240	energy and systems	48	investigate energy changes in chemical reactions
				241	energy exists in many different forms	57	draw energy flow diagram of the circuit
				243	energy flow diagrams		
				244	power explained		
				245	three ways to look at power		
				246	efficiency explained		
				247	efficiency of a heat engine		
				248	efficiency of living things		
				249	energy flow diagram for mechanical systems		
				249	mechanical systems and energy		
				250	power in human technology		

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					energy flow in natural systems
				252	
					power in natural systems
				254	
					wave power
				254	
					tidal power
				334	
					efficiency of electric motors
				334	
					efficiency of gasoline engine

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PTC.4.02 Physics - Technical and Conceptual	Standard 4: Science Subject Matter/Concepts	Mechanics	use both given information and lab collected data to calculate velocity and acceleration along linear and circular paths.	17	constant speed	3	find the speed of the car
				17	speed of light	6	how can speed be measured?
				17	speed defined	7	measure the speed
				18	calculating speed	9	why did the speed change?
				18	speed units	10	find speed of car
				19	velocity defined	11	compare and contrast speed and acceleration
				32	acceleration defined	11	find acceleration of car
				32	acceleration of sports cars	21	measure speed of car
				33	acceleration and velocity	23	draw a free body diagram
				33	calculating acceleration	23	use force vectors
				35	quantitative understanding of second law	25	apply Newton's second law of motion
				36	applying Newton's second law properly	25	calculate acceleration of car
				37	using second law formula	25	calculate speed of car
				40	velocity defined	28	investigate acceleration on a ramp
				40	acceleration of falling objects	28	calculate acceleration
				45	terminal speed	29	apply Newton's second law of motion
				45	skydiving and terminal speed	44	experiment and find average speed
				56	calculate speed from distance/time graph	46	measure speed of car
				111	force vectors		

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Standard #: Course	Content Standard	Topic	Objective	Volume One Student Text Page	Volume Two Investigation Manual Page
				113	
				using a free-body diagram	
				115	
				finding resultant vector	
				136	
				speed vs. velocity	
				136	
				working with velocity vector	
				142	
				angular speed vs. linear speed	
				143	
				angular speed	
				147	
				centripetal force	
				148	
				centripetal force	
				149	
				acceleration and circular motion	
				154	
				understanding orbital motion	

Correlation to West Virginia Content Standards and Objectives: Physics - Technical and Conceptual

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Standard #: Course	Content Standard	Topic	Objective		Volume One Student Text Page	Volume Two Investigation Manual Page
PTC.4.03 Physics - Technical and Conceptual	Standard 4: Science Subject Matter/Concepts	Mechanics	draw free body diagrams to illustrate the forces acting on objects and perform simple calculations involving velocity, acceleration and net force; research the applications of force and acceleration in modern design and technology.	17	constant speed	3 find the speed of the car
				18	speed units	4 position vs. time graph
				19	velocity defined	7 measure the speed
				28	force defined	8 investigate Newton's first law of motion
				29	Newton's first law	9 why did the speed change?
				30	units of force	10 investigate Newton's second law of motion
				31	net force explained	10 find speed of car
				32	acceleration defined	11 compare and contrast speed and acceleration
				32	acceleration of sports cars	11 find acceleration of car
				33	acceleration and velocity	11 investigate net force
				33	calculating acceleration	11 speed vs. time graph
				35	quantitative understanding of second law	12 investigate Newton's 3rd law of motion
				35	Newton's second law	13 relate Newton's 3rd law of motion to car collisions
				36	applying Newton's second law properly	21 measure speed of car
				36	balanced and unbalanced forces	22 when net force is zero
				37	using second law formula	23 draw a free body diagram
				37	net force and second law calculating	23 use force vectors
				39	effect of gravity on motion	23 Newton's second law of motion
				39	calculations pertaining to free fall	24 investigate effect of friction

Correlation to West Virginia Content Standards and Objectives: Physics - Technical and Conceptual

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Standard #: Course	Content Standard	Topic	Objective	Volume One Student Text Page	Volume Two Investigation Manual Page		
				40	velocity defined	25	calculate speed of car
				40	acceleration of falling objects	25	apply Newton's second law of motion
				45	effects of air resistance	25	calculate acceleration of car
				46	position vs. time graphs		
				47	position vs. time graph for accelerating motion	26	investigate projectile motion
				48	speed vs. time graph	28	investigate acceleration on a ramp
				49	speed vs. time graph for accelerating motion	28	calculate acceleration
				51	finding distance from a speed vs. time graph	29	apply Newton's second law of motion
				52	acceleration shown through strobe photography	44	experiment and find average speed
				52	action-reaction pairs	46	measure speed of car
				52	action-reaction pairs	95	Newton's 2nd law of motion and natural frequency
				56	calculate speed from distance/time graph		
				59	Newton's third law		
				60	sorting out force pairs		
				78	third law and rockets		
				88	work and gravity		
				94	friction and machines		
				101	friction explained		
				111	force vectors		
				113	using a free-body diagram		

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Standard #: Course	Content Standard	Topic	Objective	Volume One Student Text Page	Volume Two Investigation Manual Page
				115	
				116	
				117	
				119	
				119	
				120	
				122	
				123	
				128	
				136	
				136	
				137	
				138	
				149	
				158	
				402	
				418	
				424	

Correlation to West Virginia Content Standards and Objectives: Physics - Technical and Conceptual

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Standard #: Course	Content Standard	Topic	Objective	Volume One Student Text Page		Volume Two Investigation Manual Page	
PTC.4.04 Physics - Technical and Conceptual	Standard 4: Science Subject Matter/Concepts	Mechanics	apply graphical and algebraic solutions to vector problems.	39	calculations pertaining to free fall	23	draw a free body diagram
				39	effect of gravity on motion	23	use force vectors
				52	acceleration shown through strobe photography	26	investigate projectile motion
				88	work and gravity		
				111	force vectors		
				112	resolving vectors		
				113	using a free-body diagram		
				115	finding resultant vector		
				136	working with velocity vector		
				137	projectile explained		
				138	free fall component of a trajectory		
				402	gravitational field		

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Standard #: Course	Content Standard	Topic	Objective	Volume One Student Text Page	Volume Two Investigation Manual Page		
PTC.4.05 Physics - Technical and Conceptual	Standard 4: Science Subject Matter/Concepts	Mechanics	identify the relationship between potential energy and kinetic energy in gravitational and elastic potential/kinetic energy systems; recognize the conservation of energy in simple harmonic motion.	63	law of conservation of momentum	13	apply the law of conservation of momentum
				64	using momentum conservation to solve problems	14	investigate exchange of energy in car and track system
				67	calculating potential energy	15	calculate potential energy of car
				67	potential energy explained	15	apply law of energy conservation
				68	kinetic energy explained	24	calculate kinetic energy of sled
				68	potential to kinetic energy conversions	47	calculate energy
				68	calculating kinetic energy	92	explore the meaning of amplitude
				69	kinetic energy and stopping distance of a car	92	explore the meaning of cycle
				70	potential to kinetic energy conversions	92	explore harmonic motion using a pendulum
				70	law of conservation of energy	93	measure the period of a pendulum
				71	using energy conservation to solve problems	94	investigate harmonic motion with a pendulum
				74	momentum and collisions		
				77	momentum and car safety		
				117	potential and kinetic energy in a spring		
				249	energy flow diagram for mechanical systems		

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Standard #: Course	Content Standard	Topic	Objective	Volume One Student Text Page	Volume Two Investigation Manual Page
				249	
					mechanical systems and energy
				414	a pendulum's cycle
				414	understanding a cycle
				416	frequency explained
				416	period is the time for one cycle
				417	frequency is the inverse of period
				418	amplitude explained
				430	identify period and frequency and cycle and amplitude

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Standard #: Course	Content Standard	Topic	Objective	Volume One Student Text Page	Volume Two Investigation Manual Page		
PTC.4.06 Physics - Technical and Conceptual	Standard 4: Science Subject Matter/Concepts	Mechanics	calculate work, energy, power and efficiency in mechanical systems.	66	energy is stored work	14	investigate exchange of energy in car and track system
				67	potential energy explained	15	apply law of energy conservation
				68	kinetic energy explained	16	investigate simple machines
				70	law of conservation of energy	17	calculate mechanical advantage
				71	using energy conservation to solve problems	17	investigate mechanical advantage
				86	calculating work	18	compare and contrast input and output work
				88	calculating work	19	investigate concept of energy as stored work
				89	calculating power	45	calculate efficiency of the experimental system
				90	maximum power output of a person	45	graph efficiency vs. speed
				91	simple machines	45	investigate efficiency
				92	simple machines and forces		
				93	simple machines and mechanical advantage		
				94	work and simple machines		
				95	solving mechanical advantage problems		
				96	how a lever works		
				97	simple machines and the human body		
				98	how a rope and pulley system works		

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Standard #: Course	Content Standard	Topic	Objective	Volume One Student Text Page	Volume Two Investigation Manual Page
				99	
					how gears and ramps work
				101	
					output work is always less than input work
				102	
					efficiency explained
				104	
					simple machines and the human body
				244	
					power explained
				245	
					three ways to look at power
				246	
					efficiency explained
				247	
					efficiency of a heat engine
				248	
					efficiency of living things
				249	
					energy flow diagram for mechanical systems
				250	
					power in human technology
				252	
					power in natural systems
				254	
					tidal power
				254	
					wave power
				334	
					efficiency of gasoline engine
				334	
					efficiency of electric motors

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Standard #: Course	Content Standard	Topic	Objective	Volume One Student Text Page		Volume Two Investigation Manual Page	
PTC.4.07 Physics - Technical and Conceptual	Standard 4: Science Subject Matter/Concepts	Mechanics	construct models and/or working systems that show applications of technology to solve problems involving mechanical systems.	105	engineering design cycle in action	47	suggest a design modification
				385	how an electric motor works	83	build a simple electric motor
				386	how a battery-powered electric motor works	84	build an electric motor and perform experiments
				389	how a generator works	87	investigate how generators work
				414	a pendulum's cycle	87	measure voltage for each different generator
				414	understanding a cycle		
				416	frequency explained	87	building different generators
				416	period is the time for one cycle	92	explore the meaning of amplitude
				417	frequency is the inverse of period	92	explore the meaning of cycle
				418	amplitude explained	92	explore harmonic motion using a pendulum
				430	identify period and frequency and cycle and amplitude		
						93	measure the period of a pendulum
						94	investigate harmonic motion with a pendulum

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Standard #: Course	Content Standard	Topic	Objective	Volume One Student Text Page		Volume Two Investigation Manual Page	
PTC.4.08 Physics - Technical and Conceptual	Standard 4: Science Subject Matter/Concepts	Fluids	qualitatively and quantitatively analyze fluid systems (e.g., pressure, work, rate, resistance, energy, power, force transformations).	202 205	buoyancy explained Bernouilli's principle	37 38	investigate Bernoulli's principle applying Bernoulli's equation
PTC.4.09 Physics - Technical and Conceptual	Standard 4: Science Subject Matter/Concepts	Fluids	identify and apply the properties of solids, liquids and gases to explain their behavior at different pressures and temperatures.	173 174 207 209	phases of matter phase changes Boyle's law and the behavior of gases importance of Charles' law	33 34	investigate energy and phase changes apply concept of energy and phase changes
PTC.4.10 Physics - Technical and Conceptual	Standard 4: Science Subject Matter/Concepts	Fluids	identify and apply Bernoulli's principle to floating objects; identify the buoyant force acting on floating and submerged objects.	202	buoyancy explained		
PTC.4.11 Physics - Technical and Conceptual	Standard 4: Science Subject Matter/Concepts	Fluids	calculate the pressure of a solid object on a surface and the pressure exerted by a fluid at a given depth; relate the measure of pressure in kPa and/or in N/m ² .	196 203 204 205 212	quantitative understanding of stress concept of pressure atomic level explanation of pressure Bernouilli's principle and the airfoil pressure and deep water	35	investigating air pressure

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Standard #: Course	Content Standard	Topic	Objective	Volume One Student Text Page		Volume Two Investigation Manual Page
PTC.4.12 Physics - Technical and Conceptual	Standard 4: Science Subject Matter/Concepts	Fluids	construct models and/or working systems that show applications of technology to solve problems involving fluid systems.	201 202 206 213	comparing density of ice and water buoyancy explained viscosity explained submarines and density	

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Standard #: Course	Content Standard	Topic	Objective	Volume One Student Text Page	Volume Two Investigation Manual Page		
PTC.4.13 Physics - Technical and Conceptual	Standard 4: Science Subject Matter/Concepts	Thermodynamics	qualitatively and quantitatively analyze thermal systems (e.g., temperature, rate, resistance, energy).	170	converting between Fahrenheit and Celsius	30	investigate difference between temperature and heat
				170	measuring temperature	30	measure final temperature
				172	kinetic theory and temperature	31	measure final temperature
				175	absolute zero	32	investiate concept of specific heat
				175	Kelvin and Celsius scales	33	measure final temperature
				176	understanding the difference between heat and temperature	48	measure temperature
				176	flow of thermal energy is heat	49	measure temperature
				176		50	measure temperature
				177	heat and work		
				177	calories explained		
				178	specific heat explained		
				179	the heat equation		
				181	heat conduction		
				181	thermal equilibrium		
				182	thermal conductivity		
				183	heating systems and convection		
				183	natural and forced convection		
				184	thermal radiation		
				185	heat transfer is everywhere		

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Standard #: Course	Content Standard	Topic	Objective	Volume One Student Text Page	Volume Two Investigation Manual Page		
				242	generation of heat from frictional motion		
PTC.4.14 Physics - Technical and Conceptual	Standard 4: Science Subject Matter/Concepts	Thermodynamics	perform conversions between Fahrenheit, Celsius, and Kelvin temperature scales.	170	converting between Fahrenheit and Celsius	30	measure final temperature
				170	measuring temperature	31	measure final temperature
				175	absolute zero	33	measure final temperature
				175	Kelvin and Celsius scales	48	measure temperature
						49	measure temperature
		50	measure temperature				
PTC.4.15 Physics - Technical and Conceptual	Standard 4: Science Subject Matter/Concepts	Thermodynamics	define specific heat capacity; use the specific heat equation to calculate heat gained or lost during phase changes and heat lost when objects cool.	178	specific heat explained	32	investiate concept of specific heat
PTC.4.16 Physics - Technical and Conceptual	Standard 4: Science Subject Matter/Concepts	Thermodynamics	investigate and analyze the different rates of heat transfer by different materials.	181	heat conduction		
				183	natural and forced convection		
				184	thermal radiation		

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Standard #: Course	Content Standard	Topic	Objective	Volume One Student Text Page		Volume Two Investigation Manual Page	
PTC.4.17 Physics - Technical and Conceptual	Standard 4: Science Subject Matter/Concepts	Thermodynamics	construct models and/or working systems that show applications of technology to solve problems involving heat flow and heat exchange.	177	the British thermal unit		
				177	heat and work		
				181	thermal equilibrium		
				182	thermal conductivity		
PTC.4.18 Physics - Technical and Conceptual	Standard 4: Science Subject Matter/Concepts	Waves, Sound, and Optics	investigate and apply the reflective, refractive and diffractive properties of waves to study mechanical and electromagnetic waves.	442	refracted waves	113	investigate law of reflection
				442	reflected waves	113	use a mirror to observe reflected light
				443	diffraction explained	114	use results to derive law of reflection
				482	refraction of light	114	use a prism to investigate light rays
				482	reflection of light	115	investigate refraction
				499	mirrors reflect light	119	investigate lenses and magnification
				501	reflection explained	120	using a mirror to reflect light
				502	the law of reflection	120	investigate reflection of light
				503	understanding refraction	121	investigate refraction of light
				504	angles of incidence and refraction	121	use a lens to refract light
				528	diffraction and light	122	investigate diffraction of light
				530	diffraction gratings and spectrometers		

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Standard #: Course	Content Standard	Topic	Objective	Volume One Student Text Page		Volume Two Investigation Manual Page	
PTC.4.19 Physics - Technical and Conceptual	Standard 4: Science Subject Matter/Concepts	Waves, Sound, and Optics	use the relationship between wavelength, velocity and frequency to calculate the speed of waves; recognize that the speed of light is a constant.	437	frequency and amplitude and wavelength of waves	101	investigate standing waves and frequency
				438	the speed of waves	123	measure wavelengths of visible light using a spectrometer
				461	wavelength of sound		
				483	color and light	123	how colors of light relate to frequency and wavelength
				524	energy and color of light		

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Standard #: Course	Content Standard	Topic	Objective	Volume One Student Text Page		Volume Two Investigation Manual Page	
PTC.4.20 Physics - Technical and Conceptual	Standard 4: Science Subject Matter/Concepts	Waves, Sound, and Optics	construct models and/or working systems that show applications of technology to solve problems involving energy transfer by wave motion.	415	oscillation and oscillators	95	build and explore an oscillator
				415	sound is a wave	96	expore natural frequency of an oscillator
				423	properties of oscillators	97	explore how natural frequency depends on mass and force
				425	period and natural frequency	98	study waves on a string
				427	examples of simple oscillators	99	explore transverse waves
				434	waves transmit energy	100	study water waves
				435	how to recognize waves	101	investigate standing waves
				435	waves and technology	104	properties of sound waves
				436	longitudinal waves	105	investigate sound wave interference
				436	transverse waves	111	mixing primary colors of light
				440	standing waves on a vibrating string	111	reasearch and explain how the eye works
				446	natural frequency and resonance	123	investigate visible light wavelengths
				447	waves and energy	123	measure wavelengths of visible light using a spectrometer
				454	sound is a wave	123	how colors of light relate to frequency and wavelength
				455	acoustics		
				458	how sound is recorded		
				459	sound is a wave		
				459	sound waves and different media		
				461	how a French horn works		
				462	acoustics of concert halls		

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Standard #: Course	Content Standard	Topic	Objective	Volume One Student Text Page	Volume Two Investigation Manual Page
				483 color and light 484 how the human eye sees light 523 electromagnetic spectrum 524 wavelength and frequency of visible light 524 energy and color of light 526 low-energy electromagnetic waves 527 high-energy electromagnetic waves 536 the electromagnetic spectrum 537 infrared telescopes	124 relating transverse waves on a spring to light waves
PTC.4.21 Physics - Technical and Conceptual	Standard 4: Science Subject Matter/Concepts	Waves, Sound, and Optics	research and describe new developments in optical technology.	446 how a laser works 498 optical systems 514 understanding optical systems	

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Standard #: Course	Content Standard	Topic	Objective		Volume One Student Text Page	Volume Two Investigation Manual Page
PTC.4.22 Physics - Technical and Conceptual	Standard 4: Science Subject Matter/Concepts	Electricity and Magnetism	qualitatively and quantitatively analyze electrical systems (e.g., voltage, work, rate, resistance, energy, power, force transformations).	298	electric current	57 build circuits
				299	examples of electric circuits in nature	58 measure voltage
				299	electric circuits	59 draw and interpret circuit diagrams
				300	circuit diagrams	59 measure current
				300	resistors	60 a circuit with a dimmer switch
				301	battery circuits	60 measure voltage
				302	current in simple circuits	61 investigate resistance
				303	understanding voltage	62 investigate Ohm's law
				305	measuring current with a multimeter	63 investigate resistance and potentiometers
				306	understanding electrical resistance	63 use Ohm's law
				307	measuring resistance	64 investigating voltage drops
				308	Ohm's law	65 build a circuit with three bulbs and a switch
				309	resistance of common objects	65 measure the voltage
				311	resistors	65 investigate series circuits
				318	series circuits	66 current in a series circuit
				319	resistance in a series circuit	66 investigate series circuits
				319	current in a series circuit	67 Ohm's law and short circuits
				320	voltage in a series circuit	68 compare series and parallel circuits
				321	Ohm's law and voltage drops	68 investigate parallel circuits

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Standard #: Course	Content Standard	Topic	Objective	Volume One Student Text Page	Volume Two Investigation Manual Page		
				323	parallel circuits	69	finding power used by a circuit
				323	current in a parallel circuit		
				324	voltage in a parallel circuit	69	construct a simple circuit
				325	comparing series and parallel circuits	70	explain what you observed in terms of energy and power
				326	parallel circuits in homes	71	calculate energy and power
				328	calculating power in a circuit	74	investigate the flow of electric charge
				346	charge and current		
				349	voltage and charge	75	work with Ohm's law
				351	voltage and capacitors		

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Standard #: Course	Content Standard	Topic	Objective	Volume One Student Text Page		Volume Two Investigation Manual Page	
PTC.4.23 Physics - Technical and Conceptual	Standard 4: Science Subject Matter/Concepts	Electricity and Magnetism	investigate the nature of electrical and magnetic fields; recognize the basic properties of electrical charge and differentiate between conductors and insulators.	310	semiconductors	58	investigate conductors and insulators
				310	conductors and insulators	72	investigate the nature of electric charge
				340	understanding electric charge	73	build an electroscope and conduct experiments
				341	charged objects and static electricity	77	investigate the strength of magnetic force
				341	what causes shocks	79	investigate interactions of different materials with magnets
				344	how an electroscope works	80	compare magnetic force and electric current in an electromagnet
				348	superconductors	80	explore properties of electromagnets
				348	electrons and semiconductors	81	compare electromagnet and permanent magnet
				348	electrons and insulators	81	find relationship between current and magnetic field
				354	understanding lightning	85	investigate electromagnetic induction
				360	what is a magnet	88	investigate magnetic fields
				362	magnetic fields	90	use magnetic fields to solve a puzzle
				363	magnetic field lines		
				364	electromagnets		
				365	building an electromagnet		
				374	magnets and MRI scanners		
				381	magnetic field of a wire		
				387	electromagnetic induction explained		

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Standard #: Course	Content Standard	Topic	Objective	Volume One Student Text Page		Volume Two Investigation Manual Page	
PTC.4.24 Physics - Technical and Conceptual	Standard 4: Science Subject Matter/Concepts	Electricity and Magnetism	draw and construct electrical circuits; apply Ohm's law to calculate voltage drops in series and parallel circuits.	298	electric current	57	build circuits
				299	examples of electric circuits in nature	58	measure voltage
				299	electric circuits	59	draw and interpret circuit diagrams
				300	circuit diagrams	59	measure current
				300	resistors	60	a circuit with a dimmer switch
				301	battery circuits	60	measure voltage
				302	current in simple circuits	61	investigate resistance
				303	understanding voltage	62	investigate Ohm's law
				305	measuring current with a multimeter	63	investigate resistance and potentiometers
				306	understanding electrical resistance	63	use Ohm's law
				307	measuring resistance	64	investigating voltage drops
				308	Ohm's law	65	build a circuit with three bulbs and a switch
				309	resistance of common objects	65	measure the voltage
				311	resistors	65	investigate series circuits
				318	series circuits	66	current in a series circuit
				319	resistance in a series circuit	66	investigate series circuits
				319	current in a series circuit	67	Ohm's law and short circuits
				320	voltage in a series circuit	68	compare series and parallel circuits
				321	Ohm's law and voltage drops	68	investigate parallel circuits

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Standard #: Course	Content Standard	Topic	Objective	Volume One Student Text Page	Volume Two Investigation Manual Page		
				323	parallel circuits	69	finding power used by a circuit
				323	current in a parallel circuit		
				324	voltage in a parallel circuit	69	construct a simple circuit
				325	comparing series and parallel circuits	70	explain what you observed in terms of energy and power
				326	parallel circuits in homes	71	calculate energy and power
				328	calculating power in a circuit	74	investigate the flow of electric charge
				346	charge and current		
				349	voltage and charge	75	work with Ohm's law
				351	voltage and capacitors		

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Standard #: Course	Content Standard	Topic	Objective	Volume One Student Text Page	Volume Two Investigation Manual Page		
PTC.4.25 Physics - Technical and Conceptual	Standard 4: Science Subject Matter/Concepts	Electricity and Magnetism	construct models and/or working systems that show applications of technology to solve problems involving use of electricity.	326	understanding short circuits	67	understand why short circuits are dangerous
				350	how capacitors work	67	investigate short circuits and learn how to avoid
				351	capacitors and current	70	investigate capacitors
				351	charging a capacitor	75	calculate charge stored in capacitor
				352	measuring capacitance	80	compare magnetic force and electric current in an electromagnet
				382	using coils to concentrate a magnetic field	80	explore properties of electromagnets
				385	how an electric motor works	81	find relationship between current and magnetic field
				386	how a battery-powered electric motor works	82	investigate how a steel pin affects magnetic force created by a coil
				388	Faraday's law of induction	83	build a simple electric motor
				389	how a generator works	84	build an electric motor and perform experiments
						87	investigate how generators work

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Standard #: Course	Content Standard	Topic	Objective	Volume One Student Text Page		Volume Two Investigation Manual Page	
PTC.4.26 Physics - Technical and Conceptual	Standard 4: Science Subject Matter/Concepts	Modern Physics	recognize and distinguish between Einstein's General and Special Theories of Relativity and research evidences to support these theories.	280	meaning of Einstein's formula	53	explore the concept of relativity
				284	theory of special relativity	55	a thought experiment on Einstein's theories
PTC.4.27 Physics - Technical and Conceptual	Standard 4: Science Subject Matter/Concepts	Modern Physics	recognize the products of nuclear decay and write decay chain equations.	221	weak force explained		
				222	radioactive decay		
				269	fusion reactions		
				270	fission reactions		
				270	radioactive materials		

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Standard #: Course	Content Standard	Topic	Objective	Volume One Student Text Page	Volume Two Investigation Manual Page
PTC.5.01 Physics - Technical and Conceptual	Standard 5: Scientific Design and Application Objectives	Scientific Design	investigate, analyze, synthesize, and evaluate those devices in the home that were developed from the understanding of science and technology.	53	relationship between science and technology
				78	rocket technology
				79	new technologies
				104	prosthetic legs and technology
				122	maglev train technology
				213	deep water submarine technology
				235	technology and archaeology
				273	how a smoke detector works
				458	recording sound
532	applications of polarization				

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Standard #: Course	Content Standard	Topic	Objective	Volume One Student Text Page		Volume Two Investigation Manual Page	
PTC.5.02 Physics - Technical and Conceptual	Standard 5: Scientific Design and Application Objectives	Scientific Design	investigate and analyze the interdependence of science and technology.	53	relationship between science and technology		
				78	rocket technology		
				79	new technologies		
				104	prosthetic legs and technology		
				122	maglev train technology		
				213	deep water submarine technology		
				235	technology and archaeology		
				273	how a smoke detector works		
				458	recording sound		
			532	applications of polarization			
PTC.5.03 Physics - Technical and Conceptual	Standard 5: Scientific Design and Application Objectives	Scientific Design	apply scientific skills and technological tools to design solutions that address personal and societal needs.	105	engineering design cycle in action	47	suggest a design modification
						87	measure voltage for each different generator
						87	building different generators

Correlation to West Virginia Content Standards and Objectives: Physics - Technical and Conceptual

Physics: A First Course

Student Text and Investigation Manual

Standard #: Course	Content Standard	Topic	Objective	Volume One Student Text Page	Volume Two Investigation Manual Page		
PTC.5.04 Physics - Technical and Conceptual	Standard 5: Scientific Design and Application Objectives	Scientific Design	describe the scientific concepts underlying technological innovations.	53	relationship between science and technology	87	investigate how generators work
				78	rocket technology		
				79	new technologies		
				104	prosthetic legs and technology		
				122	maglev train technology		
				213	deep water submarine technology		
				235	technology and archaeology		
				273	how a smoke detector works		
				333	transformers		
				389	how a generator works		
				390	how transformers work		
				458	recording sound		
				532	applications of polarization		

Correlation to West Virginia Content Standards and Objectives: Physics - Technical and Conceptual

Physics: A First Course

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Standard #: Course	Content Standard	Topic	Objective	Volume One Student Text Page		Volume Two Investigation Manual Page	
PTC.5.05 Physics - Technical and Conceptual	Standard 5: Scientific Design and Application Objectives	Scientific Design	use appropriate technology solutions to measure and gather data; interpret data; analyze data; and to present and communicate conclusions.	11	importance of units	2	using timers and photogates
				11	communicating via measurement	6	use a data table
				11	measurement	7	collect precise data
				12	metric system	8	constant force data table
				13	measuring time	9	constant height data table
				56	analyze a speed/distance graph	10	speed data table
				171	how a thermometer works	13	collision data table
				305	using a multimeter to measure current	18	output and input work data table
				307	using a multimeter to measure resistance	19	force vs. distance data table
						22	force data table
						22	use spring scales
						25	rolling friction data table
						27	how can photogate ensure consistent results?
						29	speed and height data table
		44	using a timer and photogates				
		46	using a timer and photogates				
		47	analyze the results				
		59	use a multimeter				

Correlation to West Virginia Content Standards and Objectives: Physics - Technical and Conceptual

Physics: A First Course

Student Text and Investigation Manual

Standard #: Course	Content Standard	Topic	Objective	Volume One Student Text Page	Volume Two Investigation Manual Page
					61 using a multimeter to measure resistance
					61 collect and record resistance data
					62 use a multimeter to measure current
					63 use a multimeter to measure resistance of a pot
					64 use a multimeter to measure voltage drop
					65 use a multimeter to measure voltage
					66 use a multimeter to measure current
					67 explain what happened
					74 use a multimeter to measure voltage
					78 estimate the precision of measurements
					85 use a multimeter to measure voltage
					86 use a timer and photogate to measure speed of rotor
					93 use a timer and photogate to measure the period of a pendulum

Correlation to West Virginia Content Standards and Objectives: Physics - Technical and Conceptual

Physics: A First Course

Student Text and Investigation Manual

Standard #: Course	Content Standard	Topic	Objective	Volume One Student Text Page		Volume Two Investigation Manual Page
						96 use a timer and photogate to measure the natural frequency of an oscillator
PTC.6.01 Physics - Technical and Conceptual	Standard 6: Science in Personal and Social Perspectives	Perspectives	describe the impact of cultural, technological, and economic influences on the evolving nature of scientific thought and knowledge.	23 53 78 79 213 235 273 458 532	impact of medical breakthroughs relationship between science and technology rocket technology new technologies deep water submarine technology technology and archaeology how a smoke detector works recording sound applications of polarization	
PTC.6.02 Physics - Technical and Conceptual	Standard 6: Science in Personal and Social Perspectives	Perspectives	explore occupational opportunities in science and technology including the academic preparation necessary.	53 105 129 186 234 515	science and photography science and biomechanics science and architecture materials scientists archaeologists recording images	

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Physics: A First Course

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Standard #: Course	Content Standard	Topic	Objective	Volume One Student Text Page	Volume Two Investigation Manual Page
PTC.6.03 Physics - Technical and Conceptual	Standard 6: Science in Personal and Social Perspectives	Perspectives	engage in decision making activities and actions to resolve science- technology-society issues.	72 energy usage and conservation	