

Correlation to Florida Physics I Honors: Course # 2003390

Foundations of Physics

Student Text and Investigation Manual

Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page		Volume Two Investigation Manual Page	
SC.A.1.4.2 Physics I Honors	Wave characteristics, energy, and dynamics	Demonstrate understanding and apply knowledge of wave characteristics, energy, and dynamics	The student knows that the vast diversity of the properties of materials is primarily due to variations in the forces that hold molecules together.	419	differences between electric force and gravity	152	investigate magnetic forces
				424	the strength of electric forces	154	how are magnetic field lines similar to electric field lines?
				426	gravity is far weaker than electric forces	154	draw magnetic field lines for a bar magnet
				426	fields and forces	155	test materials to see if they are affected by magnets
				427	an electric field exists around a charge	161	experiment with pushes and pulls of permanent magnet in a rotor
				428	comparison between electric fields and gravitational fields		
				437	strength of an electric field		
				440	magnetism explained		
				441	comparing magnetic and electric forces		
				442	force between two magnetics is not an inverse square law		
				443	magnets create a magnetic field around them		
				443	understanding magnetic fields		
				445	alignment of domains responds to magnetic fields		
				446	creating permanent magnets		
				447	the magnetic field of Earth		

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				448	
					a compass is a magnet that lines up with Earth's magnetic field
				449	
					the strength of Earth's magnetic field
				451	
					magnetic field of a nucleus
				454	
					magnetic field between two unlike poles
				458	
					the magnetic field of loops and coils
				459	
					the magnetic field of coils and permanent magnets
				460	
					magnetic force on a moving charge
				461	
					calculating magnetic fields and forces
				568	
					forces in the atom
				626	
					strong force and electromagnetic force in the nucleus
				649	
					every field has an associated particle
				649	
					four forces in nature

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SC.A.1.4.3 Physics I Honors	Wave characteristics, energy, and dynamics	Demonstrate understanding and apply knowledge of wave characteristics, energy, and dynamics	The student knows that the vast diversity of the properties of materials is primarily due to variations in the forces that hold molecules together.	29	all matter is made of atoms	174	matter is composed of atoms
				30	relationship between states of matter and arrangement and motion of atoms and molecules	175	find the density
				33	describe movement of atoms in solids and gases	177	the density of ice vs. water
				499	idea that matter is made of atoms proved through Brownian motion	201	identify physical properties of each material
				501	atoms and elements		
				503	molecules and properties of matter		
				508	phases of matter and arrangement of molecules		
				509	temp vs. time graph for phase change of ice to water		
				509	temp vs. time graph for phase change of ice to water		
				516	refrigerator application		
				519	phases of matter		
				519	temp vs. time graphs for various materials		
				520	temp vs. time curve question		
				535	sources of heat transfer in buildings		

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				541 strength of materials depends on form and material	
				542 breaking strength of materials under stress	
				546 types of solid materials and their properties	
				561 buoyancy of Alvin	
				579 shape of a molecule influences what it does	
				593 creating materials with useful properties through chemical changes	
				622 x-rays are photons	

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SC.A.2.4.4 Physics I Honors	Energy and matter	Demonstrate understanding of interactions of energy and matter.	The student knows that nuclear energy is released when small, light atoms are fused into heavier ones.	502	elements past #92 are radioactive and decay	209	radioactive decay and half life
				570	use of radioactive isotopes in medicine	210	simulate radioactive decay
				570	radioactive isotopes	211	types of radiation
				573	fusion	213	fusion and fission
				614	three kinds of radioactivity		
				614	radioactive decay		
				615	alpha and beta and gamma radiation		
				616	energy and radioactivity		
				617	half-life		
				618	half-life calculation		
				620	danger of gamma rays and alpha particles		
				622	x-ray machines		
				623	CAT scans		
				627	fusion reactions		
				628	fission reactions		
				632	nuclear energy		
				634	three kinds of radioactive decay		
				635	differences between fission and fusion		
				636	half-life of nitrogen-13		

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SC.A.2.4.6 Physics I Honors	Wave characteristics, energy, and dynamics	Demonstrate understanding and apply knowledge of wave characteristics, energy, and dynamics	The student understands that matter may act as a wave, a particle, or something else entirely different within its own characteristic behavior.	264	frequency and amplitude and wavelength in waves	88	if frequency is increased what happens to total energy?
				265	wave pulse	89	study wave pulses on elastic cord
				265	concept of speed of a wave	89	making wave pulses on a string
				266	formula for speed of a wave	90	study the speed of the wave pulse
				267	water waves are transverse and Slinky is longitudinal	91	making circular waves in a ripple tank
				267	transverse and longitudinal waves	91	making plane waves in a ripple tank
				268	one- and two- and three-dimensional waves	91	make different types of waves in a ripple tank
				270	waves and diffraction	91	is your water wave transverse or longitudinal?
				270	waves and reflection	92	investigate reflection in a ripple tank
				270	waves and refraction	92	observing reflection in water waves
				270	waves and absorption	92	investigate diffraction in a ripple tank
				271	waves and reflection and boundaries	94	investigate the wavelength of standing waves
				271	waves and refraction and boundaries	94	investigate the frequency of standing waves
				272	waves and absorption and boundaries		
				272	waves and diffraction and boundaries		
				273	sound and light waves and interference		

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				273	constructive and destructive interference	96	investigate range of frequencies the ear can detect
				274	resonance and reflection		
				275	standing waves on a string	101	investigate interference with sound waves
				277	standing waves on a string	111	photons and quantum theory
				277	energy of a wave is proportional to frequency and amplitude	124	use a spectrometer to measure wavelength of different colors of light
				278	nodes and antinodes		
				278	modes of a wave	125	polarization of water waves
				278	wavelength of a standing wave	125	polarization of a spring wave
				279	modes of vibration		
				281	microwaves	126	polarization of light
				282	describe relationship between wave characteristics	126	study the polarization of light
				283	type of wave represented by a spring		
				286	sound is a wave of pressure		
				287	how we hear sound waves		
				288	loudness and decibels and the sensitivity of the ear		
				289	vibrations create sound		
				291	how we know sound is a wave		

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				291	
					sound vibrates the eardrum
				292	
					importance of wavelength of sound waves
				292	
					sound is a longitudinal wave
				294	
					effect of medium and temperature on speed of sound wave
				295	
					standing wave patterns of sound
				296	
					interference of sound waves
				298	
					constructing meaning from sound
				299	
					how the ear works
				300	
					music and sound
				301	
					consonance and dissonance and beats
				306	
					beats in a musical sound
				306	
					list evidence that sound is a wave
				322	
					the photon theory of light
				323	
					photons and the intensity of light
				324	
					when the photon theory of light is useful
				338	
					how the human eye sees images

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				364	
				365	
				372	
				375	
				530	
				581	

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SC.B.1.4.1 Physics I Honors	Conservation of energy and momentum	Demonstrate understanding of conservation of energy and momentum.	The student understands how knowledge of energy is fundamental to all the scientific disciplines (e.g., the energy required for biological processes in living organisms and the energy required for the building, erosion, and rebuilding of the Earth).	185	work and energy	64	relationship between work and energy
				189	relationship between work and energy	66	law of conservation of energy
				189	energy appears in different forms	68	find the total energy at each position
				190	different forms of energy	72	potential to kinetic energy conversion in a pendulum
				190	conversions of energy	72	draw an energy flow diagram
				191	the symmetry between work and energy	74	investigating collisions and conservation of energy
				194	energy transformations	78	which ball had a greater change in momentum?
				194	conservation of energy explained	88	potential to kinetic energy conversions of a pendulum
				194	the law of conservation of energy		
				194	energy transformations		
				195	applying conservation of energy for a marble rolling on a hilly track		
				195	conservation of energy in a closed system		
				196	energy transformation hydroelectric plant		
				196	energy transformation hydroelectric plant		
				197	conservation of energy for Hoover Dam		
199	trace the energy transformations from sun to a flashing taillight						

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				212	
				212	
				213	
				215	
				215	
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Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page	Volume Two Investigation Manual Page
				224	law of conservation of momentum
				225	conservation of momentum in collisions
				226	applying conservation of momentum
				227	momentum conservation for collisions in two and three dimensions
				227	kinetic energy conservation for elastic collisions
				231	conservation of angular momentum examples
				232	conservation of angular momentum
				235	jet engines work because of conservation of momentum
				245	kinetic to potential energy changes in motion of an oscillator
				253	oscillators exchange energy back and forth between potential and kinetic
				256	resonant systems accumulate energy
				277	waves propagate by exchanging energy between two forms

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				310	
				light is a form of energy	
				320	
				photosynthesis converts light energy to chemical energy	
				322	
				photons are bundles of light energy	
				324	
				light from chemical reactions	
				356	
				electromagnetic waves exchange energy between electricity and magnetic parts	
				370	
				Einstein's thinking about momentum of particles moving near the speed of light	
				370	
				relationship and conservation of mass and energy	
				378	
				electrical energy	
				384	
				batteries use chemical energy	
				393	
				conversion of energy in regenerative braking	
				400	
				energy conversions in a series circuit	
				451	
				MRI--energy exchange by a nucleus in a magnetic field	

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				464	
					electric motor uses electromagnets to convert electrical energy to mechanical energy
				467	
					electric generators transform mechanical energy into electric energy
				469	
					energy conservation and Faraday's law
				509	
					heat of fusion
				510	
					heat of vaporization
				511	
					evaporation and condensation
				515	
					thermodynamics and conservation of energy
				552	
					conservation of energy in fluids
				552	
					explanation of pressure and energy
				553	
					energy conservation and Bernoulli's equation
				606	
					energy from sunlight stored through photosynthesis
				619	
					radiation as a flow of energy
				622	
					energy of x-rays
				627	
					fusion reactions and the sun

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				629	conservation of momentum in nuclear reactions
				629	conservation of energy in nuclear reactions
				647	energy from antimatter

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SC.B.1.4.2 Physics I Honors	Conservation of energy and momentum	Demonstrate understanding of conservation of energy and momentum.	The student understands that there is conservation of mass and energy when matter is transformed.	190	conversions of energy	66	law of conservation of energy
				194	the law of conservation of energy	68	find the total energy at each position
				194	conservation of energy explained	72	draw an energy flow diagram
				194	energy transformations	74	investigating collisions and conservation of energy
				195	applying conservation of energy for a marble rolling on a hilly track		
				195	conservation of energy in a closed system		
				196	energy transformation hydroelectric plant		
				197	conservation of energy for Hoover Dam		
				202	efficiency and energy conversions		
				203	efficiency and conservation of energy		
				205	efficiency in biological systems		
				206	connection between efficiency and time		
				212	energy conversion		
				213	the conversion process of energy flow		
215	energy flows in biological systems						

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				219	
				energy flow of a model solar car	
				227	
				kinetic energy conservation for elastic collisions	
				256	
				resonant systems accumulate energy	
				277	
				waves propagate by exchanging energy between two forms	
				320	
				photosynthesis converts light energy to chemical energy	
				324	
				light from chemical reactions	
				356	
				electromagnetic waves exchange energy between electricity and magnetic parts	
				370	
				relationship and conservation of mass and energy	
				393	
				conversion of energy in regenerative braking	
				400	
				energy conversions in a series circuit	
				451	
				MRI--energy exchange by a nucleus in a magnetic field	

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				464 electric motor uses electromagnets to convert electrical energy to mechanical energy	
				467 electric generators transform mechanical energy into electric energy	
				469 energy conservation and Faraday's law	
				515 thermodynamics and conservation of energy	
				552 conservation of energy in fluids	
				553 energy conservation and Bernoulli's equation	
				605 mass conservation in chemical reactions	
				629 conservation of energy in nuclear reactions	

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SC.B.1.4.3 Physics I Honors	Energy and matter	Demonstrate understanding of interactions of energy and matter.	The student knows that temperature is a measure of the average translational kinetic energy of motion of the molecules in an object.	504	temperature scales and Fahrenheit-Celsius conversions	176	investigate temperature and its effect on materials
				505	measuring temperature	179	specific heat
				506	temperature measures average kinetic energy		
				507	absolute zero and the limits of temperature		
				507	the Kelvin scale and converting between Kelvin and Celsius		
				514	specific heat and the heat equation		
				519	understanding Fahrenheit and Celsius and Kelvin		
				520	relationship between temp and average kinetic energy		
				533	using Kelvin for radiation calculations		
558	using temperature in Kelvins for Charles' law						

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SC.B.1.4.4 Physics I Honors	Energy and matter	Demonstrate understanding of interactions of energy and matter.	The student knows that as electrical charges oscillate, the create time-varying electric and magnetic fields that propagate away from the source as an electromagnetic wave.	356	electricity and magnetism oscillations	157	study how a compass works
				435	steering the electron beam on television screen	159	build an electromagnet
				441	comparing magnetic and electric forces	160	find out what happens to strength of electromagnet when current is increased
				442	force between two magnetics is not an inverse square law	160	what happens to the strength of an electromagnet when you increase the current?
				448	how does a compass work?	165	investigate electromagnetic induction
				450	compensating for magnetic declination	166	build a generator
				453	how a compass is used		
				453	magnetic poles and electric charge		
				456	magnetic field of a wire		
				457	force on a current in a magnetic field		
				462	electromagnets		
				463	building an electromagnet		
				464	electric motor uses electromagnets to convert electrical energy to mechanical energy		
				465	how electromagnets are used in electric motors		
				467	concept of electromagnetic induction		

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				470 generating electricity by induction	
				471 transformers operate on electromagnetic induction	
				472 electromagnet-based maglev	
				475 diagram of electromagnet	

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SC.B.1.4.6 Physics I Honors	Energy and matter	Demonstrate understanding of interactions of energy and matter.	The student knows that the first law of thermodynamics relates the transfer of energy to the work done and the heat transferred.	185	work and energy	64	compare output and input work
				188	for all machines work out cannot exceed work in	64	relationship between work and energy
				189	relationship between work and energy	67	friction as a source of energy dissipation
				190	conversions of energy	72	draw an energy flow diagram
				191	the symmetry between work and energy		
				194	energy transformations		
				195	friction can divert some energy		
				196	energy transformation hydroelectric plant		
				202	efficiency and energy conversions		
				203	how friction affects machines		
				205	efficiency in biological systems		
				206	friction and the arrow of time		
				212	energy conversion		
				213	the conversion process of energy flow		
				216	tidal energy represents frictional energy from the Earth-moon system		
219	energy flow of a model solar car						

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				245	
				friction causes damping in oscillators	
				256	
				resonant systems accumulate energy	
				277	
				waves propagate by exchanging energy between two forms	
				320	
				photosynthesis converts light energy to chemical energy	
				324	
				light from chemical reactions	
				356	
				electromagnetic waves exchange energy between electricity and magnetic parts	
				393	
				conversion of energy in regenerative braking	
				400	
				energy conversions in a series circuit	
				451	
				MRI--energy exchange by a nucleus in a magnetic field	
				464	
				electric motor uses electromagnets to convert electrical energy to mechanical energy	
				467	
				electric generators transform mechanical energy into electric energy	

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SC.B.1.4.7 Physics I Honors	Energy and matter	Demonstrate understanding of interactions of energy and matter.	The student knows that the total amount of usable energy always decreases, even though the total amount of energy is conserved in any transfer.	185	work and energy	64	compare output and input work
				188	for all machines work out cannot exceed work in	64	relationship between work and energy
				189	relationship between work and energy	66	law of conservation of energy
				189	energy appears in different forms	67	friction as a source of energy dissipation
				190	conversions of energy	68	find the total energy at each position
				190	different forms of energy	72	potential to kinetic energy conversion in a pendulum
				191	the symmetry between work and energy	72	draw an energy flow diagram
				194	the law of conservation of energy	74	investigating collisions and conservation of energy
				194	energy transformations	88	potential to kinetic energy conversions of a pendulum
				194	conservation of energy explained		
				194	energy transformations		
				195	friction can divert some energy		
				195	applying conservation of energy for a marble rolling on a hilly track		
				195	conservation of energy in a closed system		
				196	energy transformation hydroelectric plant		
				196	energy transformation hydroelectric plant		

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				245	
				253	
				256	
				277	
				310	
				320	
				322	
				324	
				356	

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				370	
				relationship and conservation of mass and energy	
				378	
				electrical energy	
				384	
				batteries use chemical energy	
				393	
				conversion of energy in regenerative braking	
				400	
				energy conversions in a series circuit	
				451	
				MRI--energy exchange by a nucleus in a magnetic field	
				464	
				electric motor uses electromagnets to convert electrical energy to mechanical energy	
				467	
				electric generators transform mechanical energy into electric energy	
				469	
				energy conservation and Faraday's law	
				515	
				thermodynamics and conservation of energy	
				552	
				explanation of pressure and energy	
				552	
				conservation of energy in fluids	
				553	
				energy conservation and Bernoulli's equation	

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				619	radiation as a flow of energy
				622	energy of x-rays
				629	conservation of energy in nuclear reactions
				647	energy from antimatter

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SC.B.2.4.1 Physics I Honors	Energy and matter	Demonstrate understanding of interactions of energy and matter.	The student knows that the structure of the universe is the result of interactions involving fundamental particles (matter) and basic forces (energy) and that evidence suggests that the universe contains all the matter and energy that ever existed.	189 energy appears in different forms 190 different forms of energy 199 trace the energy transformations from sun to a flashing taillight 204 efficiency of Earth 205 calories in food 210 energy from the sun drives the weather on Earth 212 understand basic forms of energy 215 energy flows in biological systems 310 light is a form of energy 322 photons are bundles of light energy 370 Einstein's mass-energy formula 378 electrical energy 384 batteries use chemical energy 552 explanation of pressure and energy 616 energy and radioactivity 619 radiation as a flow of energy	128 the equivalence of mass and energy

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				622 energy of x-rays	
				625 nuclear reactions can convert mass into energy	
				627 fusion reactions and the sun	
				629 energy is stored as mass in nuclear reactions	
				647 energy released in reactions between matter and antimatter	
				647 energy from antimatter	

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SC.B.2.4.5 Physics I Honors	Science, technology, and society	Demonstrate understanding of the interactions among science, technology, and society.	The student knows that each source of energy presents advantages and disadvantages to its use in society.	196	environmental impacts of hydroelectric power	143	the cost of using electrical appliances
				196	hydroelectric power system		
				197	efficiency of the Hoover Dam		
				217	extracting tidal power		
				217	advantages of tidal energy		
				219	using energy efficient products		
				392	hybrid cars combine advantages of gasoline fuel and electric power		
				470	energy for generators		
				534	energy-efficient building application		
				602	hydrogen as a fuel		
				608	alternate fuels to gasoline		
				618	power released by radioactive decay		
				621	sources of radiation in the environment		
				631	nuclear power application		
				631	nuclear power application		
				632	nuclear waste		
				632	nuclear energy		
632	nuclear energy						

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				634 comparison of fission and fusion	
SC.C.1.4.1 Physics I Honors	Force and motion	Demonstrate understanding of forces and motions	The student knows that all motion is relative to whatever frame of reference is chosen and that there is no absolute frame of reference from which to observe all motion.	36 speed is relative 75 problem using frames of reference 127 calculating velocity vectors may require knowing frames of reference 366 special relativity and time dilation 367 relative motion and speed of light 369 frequency of light depends on relative motion 371 simultaneity depends on the relative motion of your frame of reference 643 frame of reference and the equivalence principle	128 relativity and frames of reference

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Student Text and Investigation Manual

Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page	Volume Two Investigation Manual Page		
SC.C.1.4.2 Physics I Honors	Force and motion	Demonstrate understanding of forces and motions	The student knows that any change in velocity is an acceleration.	58	acceleration is the rate of change in the speed of an object	17	studying acceleration
				59	comparing speed and acceleration	17	find the acceleration
				60	calculating acceleration from experiments	25	derive acceleration equation
				61	zero acceleration vs. constant acceleration vs. acceleration with zero speed	29	calculate the acceleration
				62	acceleration is total change of speed divided by total change in time		
				64	calculate speed in accelerated motion		
				64	calculating the speed of an object that is accelerating		
				67	calculate time and distance from acceleration		
				70	calculating height and time of flight in free fall problems		
				84	direction of net force and acceleration and speed		
				103	calculate the acceleration of a car including friction		
				128	constant velocity of horizontal component of projectile motion		

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Student Text and Investigation Manual

Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page	Volume Two Investigation Manual Page
				129 analyze a horizontally launched projectile	
				130 analyzing changing velocity in vertical component of projectile motion	
				142 calculating acceleration for sled on slope	
				150 calculate the centripetal acceleration of a motorcycle	

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Student Text and Investigation Manual

Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page	Volume Two Investigation Manual Page		
SC.C.2.4.1 Physics I Honors	Force and motion	Demonstrate understanding of forces and motions	The student knows that acceleration due to gravitational force is proportional to mass and inversely proportional to the square of the distance between the objects.	68	free fall and acceleration due to gravity	23	investigate the effect of gravity
				69	motion formulas for free fall	51	calculate gravitational force of attraction
				70	solving problems with free fall	51	investigate law of universal gravitation
				71	acceleration of gravity does not depend on mass		
				75	problem understanding acceleration due to gravity		
				97	strength of gravity on Earth and Jupiter		
				98	gravity and acceleration and weightlessness		
				124	projectiles and trajectories		
				128	gravity only accelerates vertical motion		
				129	vertical motion of a projectile		
				130	projectiles launched at an angle		
				131	range of projectiles		
				134	resolving force of gravity in ramp coordinates		
				135	acceleration down an inclined plane		
				141	effects of gravity on motion of a projectile		

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Student Text and Investigation Manual

Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page	Volume Two Investigation Manual Page
				152	
					description of law of universal gravitation
				152	
					law of universal gravitation and orbital motion
				153	
					formula and calculations for law of universal gravitation
				154	
					orbital motion
				154	
					orbits and gravitational force
				155	
					centripetal force and the law of universal gravitation combine to form the orbit equation
				158	
					compare projectile motion to orbital motion
				158	
					calculate weight and acceleration due to gravity on Pluto
				165	
					the motion of a tossed object
				166	
					centers of mass and gravity may differ
				187	
					work done against gravity
				191	
					potential energy comes from gravity
				216	
					tides are due to force of gravity
				642	
					Newton's laws and gravity

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Student Text and Investigation Manual

Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page		Volume Two Investigation Manual Page	
SC.C.2.4.2 Physics I Honors	Force and motion	Demonstrate understanding of forces and motions	The student knows that electrical forces exist between any two charged objects.	418	electric charge is a fundamental property of matter	146	build a simple electroscope
				419	electric forces are created between electric charges	147	investigate the concept of electric charge
				420	explanation of coulomb	149	investigate charged balloons
				421	current is the flow of charge		
				422	negative charge of electrons and current flow		
				423	static electricity and charge polarization and induction		
				424	relationship of electric force and charge		
				425	the force between charges		
				426	charge creates an electric field		
				428	source charges and test charges		
				430	a capacitor stores charge		
				433	ability of a capacitor to store charge is capacitance		
				568	forces in the atom		
				626	strong force and electromagnetic force in the nucleus		
				649	four forces in nature		

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Student Text and Investigation Manual

Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page	Volume Two Investigation Manual Page
SC.C.2.4.3 Physics I Honors	Force and motion	Demonstrate understanding of forces and motions	The student describes how magnetic force and electrical force are two aspects of a single force.	356 electricity and magnetism oscillations 419 differences between electric force and gravity 424 the strength of electric forces 426 fields and forces 426 gravity is far weaker than electric forces 427 an electric field exists around a charge 428 comparison between electric fields and gravitational fields 435 steering the electron beam on television screen 437 strength of an electric field 441 comparing magnetic and electric forces 442 force between two magnetics is not an inverse square law 443 magnets create a magnetic field around them 456 magnetic field of a wire 457 force on a current in a magnetic field 462 electromagnets	154 how are magnetic field lines similar to electric field lines? 159 build an electromagnet 160 find out what happens to strength of electromagnet when current is increased 160 what happens to the strength of an electromagnet when you increase the current?

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Student Text and Investigation Manual

Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page	Volume Two Investigation Manual Page
				463 building an electromagnet 464 electric motor uses electromagnets to convert electrical energy to mechanical energy 465 how electromagnets are used in electric motors 472 electromagnet-based maglev 475 diagram of electromagnet 649 every field has an associated particle	
SC.C.2.4.4 Physics I Honors	Force and motion	Demonstrate understanding of forces and motions	The student knows that the forces that hold the nucleus of an atom together are much stronger than electromagnetic force and that this is the reason for the great amount of energy released from the nuclear reactions in the sun and other stars.	568 forces in the atom 626 strong force and electromagnetic force in the nucleus 649 four forces in nature	

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Student Text and Investigation Manual

Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page	Volume Two Investigation Manual Page		
SC.C.2.4.5 Physics I Honors	Force and motion	Demonstrate understanding of forces and motions	The student knows that most observable forces can be traced to electric forces acting between atoms or molecules.	418	electric charge is a fundamental property of matter	146	build a simple electroscope
				419	electric forces are created between electric charges	147	investigate the concept of electric charge
				419	differences between electric force and gravity	149	investigate charged balloons
				420	explanation of coulomb		
				421	current is the flow of charge		
				422	negative charge of electrons and current flow		
				423	static electricity and charge polarization and induction		
				424	the strength of electric forces		
				424	relationship of electric force and charge		
				425	the force between charges		
				426	gravity is far weaker than electric forces		
				426	charge creates an electric field		
				428	source charges and test charges		
				428	comparison between electric fields and gravitational fields		
				430	a capacitor stores charge		

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Student Text and Investigation Manual

Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page	Volume Two Investigation Manual Page
				433 ability of a capacitor to store charge is capacitance	
				568 forces in the atom	
				626 strong force and electromagnetic force in the nucleus	
				649 four forces in nature	

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Student Text and Investigation Manual

Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page	Volume Two Investigation Manual Page		
SC.C.2.4.6 Physics I Honors	Force and motion	Demonstrate understanding of forces and motions	The student can explain that all forces come in pairs commonly called action and reaction.	87	forces always occur in action-reaction pairs	30	Newton's third law and free body diagrams
				88	Newton's third law operates on pairs of objects	30	investigate Newton's third law
				89	solving problems with action-reaction forces	31	draw free body diagrams and identify action-reaction pairs
				89	identifying which force is acting on which object		
				102	the normal force as the reaction in an action-reaction pair		
				107	forces on a free-body diagram		
				111	understanding reaction forces in terms of springs and deformation		
				112	analysis of forces on a bridge		
				135	normal force of an inclined plane		
				224	momentum and Newton's third law		
				425	electric forces always occur in pairs according to Newton's third law		
				548	Newton's third law and pressure in a fluid		
				550	pressure and the third law		
557	pressure of gases						

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Student Text and Investigation Manual

Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page		Volume Two Investigation Manual Page	
SC.H.1.4.1 Physics I Honors	Unifying concepts and processes of science	Demonstrate understanding of the unifying concepts and processes of science.	Know that investigations are conducted to explore new phenomena, to check on previous results, to test how well a theory predicts, and to compare different theories	7	in science inquiry is used to uncover truth	43	perform experiment
				9	testing ideas against scientific evidence	65	investigate motion on a roller coaster
				242	finding a basic cycle of harmonic motion	67	investigate motion on a roller coaster
				432	making a simple capacitor	82	plan three experiments to determine which variable affects the period of a pendulum
				456	an experiment with a wire and compass	82	design an experiment
				463	building an electromagnet with wire and a nail	201	design a procedure to separate a mixture
				467	experiment demonstrating electromagnetic induction		
				560	deep water submarine Alvin application		
				644	proof of Einstein's theory of general relativity		
				645	astronomers find black holes by what is around them		

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Student Text and Investigation Manual

Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page	Volume Two Investigation Manual Page		
SC.H.1.4.2 Physics I Honors	Unifying concepts and processes of science	Demonstrate understanding of the unifying concepts and processes of science.	The student knows that from time to time, major shifts occur in the scientific view of how the world works, but that more often the changes that take place in the body of scientific knowledge are small modifications of prior knowledge.	7	revising explanations through observation	12	do your results agree with hypothesis?
				8	Comparing a theory and a natural law	33	does your experiment confirm your hypothesis?
				8	refining theories based on observations	50	does your experiment provide confirmation?
				8	testing hypotheses with experiments	66	does this agree with your hypothesis?
				41	Galileo and Newton conducted experiments with balls on ramps	111	how does what you observed support the quantum theory?
				78	Newton's laws of motion		
				81	Newton's discovery of the connection between force and mass and acceleration		
				136	determining formula for acceleration on a ramp		
				152	Sir Isaac Newton and law of universal gravitation		
				188	perpetual motion machines		
				349	Galileo and telescopes		
				350	Newtonian reflecting telescope		
				367	speed of light did not behave as expected for Michelson and Morley		
				369	proof of time dilation		

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Student Text and Investigation Manual

Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page	Volume Two Investigation Manual Page
				375 explain Thomas Young's demonstration of the wave nature of light	
				382 Ben Franklin and current	
				420 Charles-Augustin de Coulomb	
				580 Newton and classical physics	
				614 Marie Curie	
				615 Henri Bequerel and beta rays	

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Student Text and Investigation Manual

Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page	Volume Two Investigation Manual Page		
SC.H.1.4.3 Physics I Honors	Unifying concepts and processes of science	Demonstrate understanding of the unifying concepts and processes of science.	The student understands that no matter how well one theory fits observations, a new theory might fit them as well or better, or might fit a wider range of observations, because in science, the testing, revising, and occasional discarding ect.	7	revising explanations through observation	13	compare prediction to measurement
				8	refining theories based on observations	16	what do the results tell you?
				11	Ptolemy model vs. Copernicus model of the solar system	18	are the accelerations different?
				40	making a good model	19	does the ball accelerate?
				44	using a graphical model to make a prediction and checking the model's accuracy	22	how do you measured positions compare to model?
				297	frequency spectrum	22	compare calculation with graph estimate
				306	explain why hearing can be damaged by loud sounds	29	does experiment agree with prediction?
						43	how does the measurement compare to your prediction?
						43	what would happen if...?
						58	explain why the angular acceleration is different
						76	compare predicted mass to actual mass
						80	explain your observations
						87	explain how force applied causes the response
		90	explain why higher tension makes waves move faster				
		92	explain how wind might cause big waves in water				

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Student Text and Investigation Manual

Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page	Volume Two Investigation Manual Page
					109 explain how the colored filters work 114 are there differences between your prediction and measurement? 132 what conclusions can you draw? 133 analyze data and explain a rule

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Student Text and Investigation Manual

Standard #: Course	Strand	Standard	Benchmark		Volume One Student Text Page	Volume Two Investigation Manual Page
SC.H.1.4.4 Physics I Honors	Unifying concepts and processes of science	Demonstrate understanding of the unifying concepts and processes of science.	The student knows that scientists in any one research group tend to see things alike and that therefore scientific teams are expected to seek out the possible sources of bias in the design of their investigations and in their data analysis.	7	developing models to explain observations	16 what do the results tell you?
				40	creating useful models	18 are the accelerations different?
				41	Galileo and Newton conducted experiments with balls on ramps	19 does the ball accelerate?
				78	Newton's laws of motion	22 model for uniform accelerated motion
				81	Newton's discovery of the connection between force and mass and acceleration	43 what would happen if...? 58 explain why the angular acceleration is different
				101	a model for friction	80 explain your observations
				102	a model for static friction	87 explain how force applied causes the response
				152	Sir Isaac Newton and law of universal gravitation	90 explain why higher tension makes waves move faster
				306	explain why hearing can be damaged by loud sounds	92 explain how wind might cause big waves in water
				330	optics and optical instruments	109 explain how the colored filters work
				349	Galileo and telescopes	132 what conclusions can you draw?
				350	Newtonian reflecting telescope	133 analyze data and explain a rule
				382	Ben Franklin and current	
				420	Charles-Augustin de Coulomb	
				492	the binary number system and its use in computers	

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Student Text and Investigation Manual

Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page	Volume Two Investigation Manual Page
				580 Newton and classical physics 614 Marie Curie 615 Henri Bequerel and beta rays 641 research on future of the universe	

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Student Text and Investigation Manual

Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page	Volume Two Investigation Manual Page		
SC.H.1.4.5 Physics I Honors	Unifying concepts and processes of science	Demonstrate understanding of the unifying concepts and processes of science.	The students understands that new ideas in science are limited by the context in which they are conceived, are often rejected by the scientific establishment, sometimes spring from unexpected finding, and usually grow slowly from many contributors.	42	writing procedures in a lab notebook helps make sure your results are repeatable	122	communicate your findings
				52	Dr. Harold Edgerton and strobe photography		
				52	Dr. Harold Edgerton and strobe photography		
				91	biomechanics application		
				92	applications of biomechanics		
				155	first artificial human-made Earth satellite was Sputnik		
				178	Great Pyramid of Giza and simple machines		
				257	Pierre and Jacques Curie and the piezoelectric effect		
				269	wave motion and equilibrium		
				290	technological breakthrough of sound recording		
				310	past theories of light		
				325	history of printing		
				348	the usefulness of recorded images		
				349	the telescope		
				361	Young's double-slit experiment		

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Student Text and Investigation Manual

Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page	Volume Two Investigation Manual Page
				367	Einstein and theory of special relativity
				368	Einstein's thinking revolutionized physics
				440	scientists have never found single magnetic poles
				447	discovering and using magnetism
				501	search for elements and alchemy
				560	deep water submarine Alvin application
				561	the Alvin research submarine
				568	understanding how gravity works inside atoms
				575	discovery of helium
				583	the meaning of the uncertainty principle
				625	turning lead into gold
				637	areas of active research in physics
				640	unresolved questions of history of universe
				641	research on future of the universe

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Student Text and Investigation Manual

Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page	Volume Two Investigation Manual Page		
SC.H.1.4.6 Physics I Honors	The student uses the scientific processes and habits of mind to solve problems.	10	The student understands that, in the short run, new ideas that do not mesh well with mainstream ideas in science often encounter vigorous criticism and that, in the long run, theories are judged by how they fit with other theories.	8	Comparing a theory and a natural law	16	what do the results tell you?
				41	Galileo and Newton conducted experiments with balls on ramps	18	are the accelerations different?
				78	Newton's laws of motion	19	does the ball accelerate?
				81	Newton's discovery of the connection between force and mass and acceleration	43	what would happen if...?
				136	determining formula for acceleration on a ramp	58	explain why the angular acceleration is different
				152	Sir Isaac Newton and law of universal gravitation	75	the discovery of atom's nucleus
				306	explain why hearing can be damaged by loud sounds	80	explain your observations
				349	Galileo and telescopes	87	explain how force applied causes the response
				350	Newtonian reflecting telescope	90	explain why higher tension makes waves move faster
				367	speed of light did not behave as expected for Michelson and Morley	92	explain how wind might cause big waves in water
				369	proof of time dilation	109	explain how the colored filters work
				375	explain Thomas Young's demonstration of the wave nature of light	111	how does what you observed support the quantum theory?
				382	Ben Franklin and current	132	what conclusions can you draw?
				420	Charles-Augustin de Coulomb	133	analyze data and explain a rule

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Student Text and Investigation Manual

Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page	Volume Two Investigation Manual Page
				440 magnetism 447 history of magnetism 499 development of atomic theory 501 ancient Greeks' ideas of elements 580 Newton and classical physics 614 Marie Curie 615 Henri Bequerel and beta rays	
SC.H.1.4.7 Physics I Honors	Unifying concepts and processes of science	Demonstrate understanding of the unifying concepts and processes of science.	The student understands the importance of a sense of responsibility, a commitment to peer review, truthful reporting of the methods and outcomes of investigations, and making the public aware of the findings.	42 writing procedures in a lab notebook helps make sure your results are repeatable	122 communicate your findings 122 present your findings 175 display information you found for your element 202 keep detailed notes as you work

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Student Text and Investigation Manual

Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page		Volume Two Investigation Manual Page	
SC.H.2.4.1 Physics I Honors	Unifying concepts and processes of science	Demonstrate understanding of the unifying concepts and processes of science.	The student knows that scientists assume that the universe is a vast system in which basic rules exist that may range from very simple to extremely complex, but scientists operate on the belief that the rules can be discovered by careful, systemic study.	2	structure of the universe and laws of nature	6	precision in measurement
				7	in science inquiry is used to uncover truth	6	collecting data with precision
				86	zero net force in equilibrium	15	collect time data with precision
				99	weight in equilibrium problems	18	collect time data with precision
				106	definition of equilibrium	28	system of Atwood's machine
				108	applications of equilibrium	44	forces in equilibrium
				111	equilibrium and reaction or normal forces	153	make measurement with precision
				115	understanding of equilibrium	153	making measurements with precision
				133	equilibrium of forces and balancing forces	202	find the mass to the nearest tenth of a gram
				163	rotational equilibrium		
				175	explain rotational equilibrium		
				202	processes		
				204	natural systems and efficiency		
				204	efficiency in natural systems		
				205	efficiency of plants		
				206	reversible and irreversible processes		
				210	power in natural systems		

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Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page	Volume Two Investigation Manual Page
				212	
				212	
				213	
				214	
				214	
				215	
				225	
				244	
				248	
				250	
				251	
				255	
				264	
				366	

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Student Text and Investigation Manual

Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page	Volume Two Investigation Manual Page
				370	
				the equivalence of energy and matter	
				379	
				examples of circuits in nature	
				420	
				lightning and electric charge	
				447	
				the magnetic field of Earth	
				449	
				shifting and reversal of Earth's magnetic poles	
				522	
				heat transfer in living things	
				522	
				thermal equilibrium	
				528	
				convection in the ocean	
				541	
				form and the strength of materials	
				560	
				deep water submarine Alvin application	
				566	
				knowing structure of atom	
				582	
				matter and energy in quantum theory	
				592	
				system of classifying matter	
				616	
				matter and energy and radioactivity	
				644	
				proof of Einstein's theory of general relativity	
				645	
				astronomers find black holes by what is around them	

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Student Text and Investigation Manual

Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page		Volume Two Investigation Manual Page	
SC.H.2.4.2 Physics I Honors	Unifying concepts and processes of science	Demonstrate understanding of the unifying concepts and processes of science.	The student knows that scientists control conditions in order to obtain evidence, but when that is not possible for practical or ethical reasons, they try to observe a wide range of natural occurrences to discern patterns.	2	understanding natural laws	11	recognizing and controlling variables
				3	connecting cause and effect through observation	12	cause and effect relationships
				7	in science inquiry is used to uncover truth	82	determine which variable has the greatest effect
				9	connecting cause and effect through analysis	82	dependent and independent variables
				40	defining variables	90	what effect does changing the tension have?
				42	control and experimental variables	166	variables that affect the performance of the generator
				43	dependent and independent variables in graphs		
				45	recognizing patterns and cause and effect relationships		
				54	importance of changing one variable at a time in an experiment		
				251	changing the natural frequency of a stretched rubber band		
				560	deep water submarine Alvin application		
				644	proof of Einstein's theory of general relativity		
				645	astronomers find black holes by what is around them		

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Student Text and Investigation Manual

Standard #: Course	Strand	Standard	Benchmark		Volume One Student Text Page	Volume Two Investigation Manual Page	
SC.H.3.4.1 Physics I Honors	Unifying concepts and processes of science	Demonstrate understanding of the unifying concepts and processes of science.	The student knows that performance testing is often conducted using small-scale models, computer simulations, or analogous systems to reduce the chance of system failure.	7	developing models to explain observations	13	compare prediction to measurement
				11	Ptolemy model vs. Copernicus model of the solar system	13	create a graph
				40	making a good model	16	describe the graph
				40	creating useful models	16	create a graph
				42	controlling variables in experiments	22	model for uniform accelerated motion
				43	constructing a graph	22	create graphs
				44	graphical models	22	compare calculation with graph estimate
				44	using a graphical model to make a prediction and checking the model's accuracy	22	how do you measured positions compare to model?
				54	constructing a graph	29	does experiment agree with prediction?
				55	create a graph from a data table	37	make a graph
				101	a model for friction	38	make a graph
				102	a model for static friction	43	how does the measurement compare to your prediction?
				113	build and test a prototype structure out of toothpicks	43	discuss sources of error
				290	the process of digital sound reproduction	43	sketch four graphs
				297	frequency spectrum	45	discuss sources of errors
				330	optics and optical instruments	56	create a graph
						66	create a graph of speed vs. position
						76	compare predicted mass to actual mass

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Student Text and Investigation Manual

Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page	Volume Two Investigation Manual Page		
				411	the waveform of AC electricity	82	make three different graphs
				492	the binary number system and its use in computers	83	design and construct a pendulum
						85	create a system that oscillates
						87	sketch a graph
						114	are there differences between your prediction and measurement?
						135	graph voltage vs. current
						136	graph voltage vs. current
						151	make a graph of voltage vs. time
						160	create a graph
						163	design and test different electric motors
						167	make a graph of voltage vs. number of magnets
						169	make a current vs. voltage graph for the diode
						191	build an air-speed tester

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Student Text and Investigation Manual

Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page	Volume Two Investigation Manual Page
SC.H.3.4.2 Physics I Honors	Science, technology, and society	Demonstrate understanding of the interactions among science, technology, and society.	The student knows that technological problems often create a demand for new scientific knowledge and that new technologies make it possible for scientists to extend their research in a way that advances science.	12	all technology is based on fundamental laws of physics
				12	engineers design practical devices for solving problems
				31	use of nanotechnology
				31	use of nanotechnology
				51	analyzing motion with video and strobe photography
				72	antilock brakes application
				72	antilock brakes application
				112	relationship between science and engineering and technology
				112	designing a bridge
				138	use of robots
				155	geostationary satellites
				172	bicycle physics application
				196	hydroelectric power application
				196	hydroelectric power application
				209	range of power for common devices
216	energy from ocean tides				
217	research into tidal power				

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Student Text and Investigation Manual

Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page	Volume Two Investigation Manual Page
				228	
				seat belts and air bags	
				235	
				jet engines application	
				235	
				jet engines application	
				243	
				oscillators are used in communications and music and clocks	
				257	
				quartz crystals application	
				257	
				quartz crystals application	
				263	
				waves can carry information	
				280	
				microwave ovens application	
				280	
				microwave ovens application	
				293	
				uses of Doppler radar	
				311	
				invention of electric light	
				325	
				the printing press	
				325	
				the printing press	
				349	
				the telescope	
				369	
				technological advances have allowed discovery of the expanding universe	
				372	
				holography application	
				378	
				importance of electricity	
				392	
				hybrid gas/electric cars application	

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Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page	Volume Two Investigation Manual Page
				392 hybrid gas/electric cars application	
				413 wiring application	
				413 wiring application	
				429 electron beam accelerators	
				434 how television works application	
				434 how television works application	
				451 MRI application	
				451 MRI application	
				472 maglev train application	
				473 how magplanes levitate	
				490 why computers are useful	
				492 computers and electronic addition of numbers application	
				516 refrigerator application	
				534 energy-efficient building application	
				534 energy-efficient building application	
				560 deep water submarine Alvin application	
				570 use of radioactive isotopes in medicine	
				585 laser application	

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Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page	Volume Two Investigation Manual Page
				615 smoke detectors	
				622 x-ray machines	
				623 creation of CAT scans	
				623 CAT scans	
				623 creation of CAT scans	
				631 nuclear power application	
				631 nuclear power application	
				632 nuclear energy	

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Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page		Volume Two Investigation Manual Page
SC.H.3.4.3 Physics I Honors	Science, technology, and society	Demonstrate understanding of the interactions among science, technology, and society.	The student knows that scientists can bring information, insights, and analytical skills to matters of public concern and help people understand the possible causes and effects of events.	52	Dr. Harold Edgerton and strobe photography	
				91	biomechanics application	
				92	applications of biomechanics	
				112	impact of technology	
				440	scientists have never found single magnetic poles	
				568	understanding how gravity works inside atoms	
				583	the meaning of the uncertainty principle	
				637	areas of active research in physics	
				640	unresolved questions of history of universe	
				641	research on future of the universe	
				641	research on future of the universe	

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Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page	Volume Two Investigation Manual Page
SC.H.3.4.4 Physics I	Science, technology, and society	Demonstrate understanding of the interactions among science, technology, and society.	The student knows that funds for science research come from federal government agencies, industry, and private foundations and that this funding often influences the areas of discovery.	12	all technology is based on fundamental laws of physics
				12	engineers design practical devices for solving problems
				14	using analysis and problem solving and an understanding of technology to make economic decisions
				31	use of nanotechnology
				31	use of nanotechnology
				51	analyzing motion with video and strobe photography
				72	antilock brakes application
				72	antilock brakes application
				112	relationship between science and engineering and technology
				112	designing a bridge
				138	use of robots
				155	geostationary satellites
				172	bicycle physics application
				196	hydroelectric power application
				196	hydroelectric power application

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Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page	Volume Two Investigation Manual Page
				209	
					range of power for common devices
				216	
					energy from ocean tides
				217	
					research into tidal power
				228	
					seat belts and air bags
				235	
					jet engines application
				235	
					jet engines application
				243	
					oscillators are used in communications and music and clocks
				257	
					quartz crystals application
				257	
					quartz crystals application
				263	
					waves can carry information
				280	
					microwave ovens application
				280	
					microwave ovens application
				293	
					uses of Doppler radar
				311	
					invention of electric light
				325	
					the printing press
				325	
					the printing press
				349	
					the telescope
				369	
					technological advances have allowed discovery of the expanding universe
				372	
					holography application

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Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page	Volume Two Investigation Manual Page
				378 importance of electricity	
				392 hybrid gas/electric cars application	
				392 hybrid gas/electric cars application	
				413 wiring application	
				413 wiring application	
				429 electron beam accelerators	
				434 how television works application	
				434 how television works application	
				451 MRI application	
				451 MRI application	
				472 maglev train application	
				473 how magplanes levitate	
				490 why computers are useful	
				492 computers and electronic addition of numbers application	
				516 refrigerator application	
				534 energy-efficient building application	
				534 energy-efficient building application	
				535 designing buildings to be energy efficient	

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Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page	Volume Two Investigation Manual Page
				560 deep water submarine Alvin application	
				585 economics of laser technology	
				585 laser application	
				615 smoke detectors	
				623 creation of CAT scans	
				623 creation of CAT scans	
				631 nuclear power application	
				631 nuclear power application	

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Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page	Volume Two Investigation Manual Page
SC.H.3.4.5 Physics I Honors	Science, technology, and society	Demonstrate understanding of the interactions among science, technology, and society.	The student knows that the value of a technology may differ for different people and at different times.	12	engineers design practical devices for solving problems
				12	all technology is based on fundamental laws of physics
				31	use of nanotechnology
				31	use of nanotechnology
				51	analyzing motion with video and strobe photography
				72	antilock brakes application
				72	antilock brakes application
				112	designing a bridge
				112	relationship between science and engineering and technology
				138	use of robots
				155	geostationary satellites
				172	bicycle physics application
				196	hydroelectric power application
				196	hydroelectric power application
				209	range of power for common devices
				216	energy from ocean tides
217	research into tidal power				

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Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page	Volume Two Investigation Manual Page
				228 seat belts and air bags	
				235 jet engines application	
				235 jet engines application	
				243 oscillators are used in communications and music and clocks	
				257 quartz crystals application	
				257 quartz crystals application	
				263 waves can carry information	
				280 microwave ovens application	
				280 microwave ovens application	
				293 uses of Doppler radar	
				311 invention of electric light	
				325 the printing press	
				325 the printing press	
				349 the telescope	
				369 technological advances have allowed discovery of the expanding universe	
				372 holography application	
				378 importance of electricity	
				392 hybrid gas/electric cars application	

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Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page	Volume Two Investigation Manual Page
				392 hybrid gas/electric cars application	
				413 wiring application	
				413 wiring application	
				429 electron beam accelerators	
				434 how television works application	
				434 how television works application	
				451 MRI application	
				451 MRI application	
				472 maglev train application	
				473 how magplanes levitate	
				490 why computers are useful	
				492 computers and electronic addition of numbers application	
				516 refrigerator application	
				534 energy-efficient building application	
				534 energy-efficient building application	
				560 deep water submarine Alvin application	
				585 laser application	
				615 smoke detectors	

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Student Text and Investigation Manual

Standard #: Course	Strand	Standard	Benchmark	Volume One Student Text Page	Volume Two Investigation Manual Page
				623 623 631 631	creation of CAT scans creation of CAT scans nuclear power application nuclear power application
SC.H.3.4.6 Physics I Honors	Science, technology, and society	Demonstrate understanding of the interactions among science, technology, and society.	The student knows that scientific knowledge is used by those who engage in design and technology to solve practical problems, taking human values and limitations into account.	31 73 113 113 113 113 389 543 543	nanotechnology application use of control computers in cars test and evaluate the prototype structure design build and test a prototype structure out of toothpicks conceptual design for a bridge the engineering design cycle electrical devices are designed to operate at a certain voltage evaluate three designs for a bridge failure analysis in the design process
				83 85 163 163 163 164 167 168 173 191	design and construct a pendulum create a system that oscillates design and test different electric motors propose solutions that will work for each disk apply steps of the design cycle to building different electric motors evaluate the performance of motor designs suggest improvements you could make to the generator design electronic devices are part of our daily lives designing and building logic circuits build an air-speed tester