

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
A.12.01 Science Connections	by the end of grade 12		Apply the underlying themes of science to develop defensible visions of the future	7 306 498	creating theories based on observations explain why hearing can be damaged by loud sounds since wood is created from other matter it must not be a fundamental substance	13 16 18 18 19 33 37 38 42 43 58 65 80 87 90 92	predict speed of ball what do the results tell you? are the accelerations different? how would acceleration be different? does the ball accelerate? calculate the predicted speed use your graph to make a prediction use your graph to make a prediction predict exact landing location what would happen if...? explain why the angular acceleration is different predict where the ball moves fastest explain your observations explain how force applied causes the response explain why higher tension makes waves move faster explain how wind might cause big waves in water

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
						109 explain how the colored filters work	
						132 predict what the current will be	
						132 what conclusions can you draw?	
						133 analyze data and explain a rule	

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
A.12.02 Science Connections	by the end of grade 12		Show how conflicting assumptions about science themes lead to different opinions and decisions about evolution, health, population, longevity, education,...	7	in science inquiry is used to uncover truth	111	how does what you observed support the quantum theory?
				8	Comparing a theory and a natural law		
				8	testing hypotheses with experiments		
				136	determining formula for acceleration on a ramp		
				367	speed of light did not behave as expected for Michelson and Morley		
				369	proof of time dilation		
				375	explain Thomas Young's demonstration of the wave nature of light		
				560	deep water submarine Alvin application		
				641	research on future of the universe		
				644	proof of Einstein's theory of general relativity		
				645	astronomers find black holes by what is around them		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
A.12.03 Science Connections	by the end of grade 12		Give examples that show how partial systems, models, and explanations are used to give quick and reasonable solutions that are accurate enough for basic needs	2	analysis of a problem	13	predict speed of ball
				7	creating theories based on observations	16	what do the results tell you?
				67	solving motion problems with acceleration	18	are the accelerations different?
				306	explain why hearing can be damaged by loud sounds	18	how would acceleration be different?
				406	using a systematic approach to solving circuit problems	19	does the ball accelerate?
				440	scientists have never found single magnetic poles	33	calculate the predicted speed
				498	since wood is created from other matter it must not be a fundamental substance	37	use your graph to make a prediction
				568	understanding how gravity works inside atoms	38	use your graph to make a prediction
				583	the meaning of the uncertainty principle	42	predict exact landing location
				637	areas of active research in physics	43	what would happen if...?
				640	unresolved questions of history of universe	58	explain why the angular acceleration is different
				641	research on future of the universe	65	predict where the ball moves fastest
						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

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
						109 explain how the colored filters work	
						132 predict what the current will be	
						132 what conclusions can you draw?	
						133 analyze data and explain a rule	

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
A.12.04 Science Connections	by the end of grade 12		Construct arguments that show how conflicting models and explanations of events can start with similar evidence	306	explain why hearing can be damaged by loud sounds	16 18 19 43 58 80 87 90 92 109 132 133	what do the results tell you? are the accelerations different? does the ball accelerate? what would happen if...? explain why the angular acceleration is different explain your observations explain how force applied causes the response explain why higher tension makes waves move faster explain how wind might cause big waves in water explain how the colored filters work what conclusions can you draw? analyze data and explain a rule

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
A.12.05 Science Connections	by the end of grade 12		Show how the ideas and themes of science can be used to make real-life decisions about careers, work places, life-styles, and use of resources	7	developing models to explain observations	22	model for uniform accelerated motion
				7	in science inquiry is used to uncover truth	80	explain the physics of a diver's somersaults
				12	engineers design practical devices for solving problems	92	how does sound get through tiny cracks?
				12	engineers design practical devices for solving problems	126	explain how polarizing sunglasses work
				13	medical and health professions use physics	164	evaluate the performance of motor designs
				13	medical and health professions use physics	167	suggest improvements you could make to the generator design
				14	using analysis and problem solving and an understanding of technology to make economic decisions	168	electronic devices are part of our daily lives
				15	physics plays a role in nearly everything a person does		
				19	problems in the real world use both metric and English units		
				31	use of nanotechnology		
				31	nanotechnology application		
				40	creating useful models		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				52	Dr. Harold Edgerton and strobe photography		
				52	strobe photography		
				72	antilock brakes application		
				73	antilock braking systems		
				73	use of control computers in cars		
				79	what systems in a car overcome the law of inertia		
				80	applications of Newton's first law		
				80	seat belts and air bags and Newton's first law		
				80	Newton's laws and cup holders		
				87	explaining Newton's third law in terms of an astronaut moving through space		
				88	explaining Newton's third law in terms of moving a skateboard		
				90	examples of Newton's third law in the real world		
				90	examples of Newton's third law		
				91	careers in biomechanics		
				91	biomechanics application		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				91	biomechanics application		
				92	applications of biomechanics		
				101	a model for friction		
				102	a model for static friction		
				104	reducing friction and hovercraft and maglev trains		
				105	friction is useful for brakes and tires		
				109	jack-in-the-box uses a spring		
				112	impact of technology		
				112	designing a bridge		
				112	design of structures		
				113	test and evaluate the prototype structure design		
				118	examples of scalars		
				130	kicked soccer ball acts as a projectile launched at an angle		
				131	hang time		
				133	example of gymnast for forces applied at an angle		
				137	predicting motion in three dimensions and controlling force and acceleration in space missions		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				138	robot navigation application		
				138	use of robots		
				139	determining position by triangulation and inertial navigation		
				139	inertial navigation system		
				144	examples of objects moving in a circle		
				147	speedometers and odometers		
				149	centripetal force at the amusement park		
				150	using centripetal acceleration to create the feeling of gravity by rotating the space station		
				151	banked turns		
				155	satellite motion application		
				155	satellite motion application		
				155	geostationary satellites		
				156	HEO and geostationary orbit		
				156	satellites in orbit		
				167	SUV rollovers and center of gravity		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				172	bicycle physics application		
				196	hydroelectric power application		
				209	range of power for common devices		
				216	energy from ocean tides		
				217	research into tidal power		
				219	using energy efficient products		
				227	accident reconstruction		
				227	police forensic scientists		
				228	seat belts and air bags		
				228	seat belts and air bags		
				232	angular momentum of skater spinning and diver		
				234	gyroscopes and angular momentum		
				234	gyroscopes and the space shuttle		
				235	jet engines application		
				238	cars that crumple in a collision		
				240	forces in a car stopping		
				250	why airplanes have tails		
				257	quartz crystals application		
				262	examples of waves		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				280	microwave ovens application		
				289	careers in acoustics		
				290	stereo sound		
				293	uses of Doppler radar		
				296	ultrasound technology		
				299	understanding human hearing		
				311	invention of electric light		
				323	glow-in-the-dark plastic		
				325	the printing press		
				330	optics and optical instruments		
				337	rainbows are an example of dispersion		
				347	the compound microscope		
				349	the telescope		
				365	polarized sunglasses and LCD computer screens		
				378	importance of electricity		
				389	electrical devices are designed to operate at a certain voltage		
				390	breakdown voltage and lightning		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				392	hybrid cars combine advantages of gasoline fuel and electric power		
				392	hybrid gas/electric cars application		
				398	holiday lights wired in series		
				401	why aren't birds electrocuted?		
				404	electrical engineers		
				410	paying for electricity		
				413	wiring application		
				413	wiring application		
				413	circuits in your house		
				418	charge of everyday objects		
				430	almost all electric appliances use capacitors		
				433	cameras use capacitors to supply energy for flash bulbs		
				434	how television works application		
				448	how does a compass work?		
				449	Earth's magnetism		
				451	MRI application		
				458	where coils are used		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				462	electromagnet in a toaster		
				490	why computers are useful		
				492	the binary number system and its use in computers		
				527	windchill factor		
				534	energy-efficient building application		
				534	energy-efficient building application		
				535	designing buildings to be energy efficient		
				543	evaluate three designs for a bridge		
				560	deep water submarine Alvin application		
				585	economics of laser technology		
				604	balancing chemical equation of acid rain		
				607	impact of combustion reaction of gasoline		
				608	how engines work		
				621	exposure to UV radiation		
				621	sources of radiation in the environment		
				623	creation of CAT scans		
				631	nuclear power application		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				632	nuclear waste		
				644	proof of Einstein's theory of general relativity		
				645	astronomers find black holes by what is around them		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
A.12.06 Science Connections	by the end of grade 12		Identify and, using evidence learned or discovered, replace inaccurate personal models and explanations of science-related events	7	in science inquiry is used to uncover truth	13	compare prediction to measurement
				8	testing hypotheses with experiments	16	what do the results tell you?
				8	Comparing a theory and a natural law	18	are the accelerations different?
				11	Ptolemy model vs. Copernicus model of the solar system	19	does the ball accelerate?
				19	problems in the real world use both metric and English units	22	compare calculation with graph estimate
				40	making a good model	22	how do you measured positions compare to model?
				44	using a graphical model to make a prediction and checking the model's accuracy	29	does experiment agree with prediction?
				52	strobe photography	43	what would happen if...?
				73	antilock braking systems	43	how does the measurement compare to your prediction?
				80	applications of Newton's first law	58	explain why the angular acceleration is different
				90	examples of Newton's third law in the real world	76	compare predicted mass to actual mass
				104	reducing friction and hovercraft and maglev trains	80	explain the physics of a diver's somersaults
				105	friction is useful for brakes and tires	80	explain your observations
				109	jack-in-the-box uses a spring	87	explain how force applied causes the response

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				112	design of structures	90	explain why higher tension makes waves move faster
				118	examples of scalars		
				130	kicked soccer ball acts as a projectile launched at an angle	92	explain how wind might cause big waves in water
				131	hang time	92	how does sound get through tiny cracks?
				133	example of gymnast for forces applied at an angle	109	explain how the colored filters work
				136	determining formula for acceleration on a ramp	111	how does what you observed support the quantum theory?
				138	robot navigation application	114	are there differences between your prediction and measurement?
				139	inertial navigation system		
				144	examples of objects moving in a circle	126	explain how polarizing sunglasses work
				147	speedometers and odometers	132	what conclusions can you draw?
				149	centripetal force at the amusement park	133	analyze data and explain a rule
				155	satellite motion application		
				156	HEO and geostationary orbit		
				167	SUV rollovers and center of gravity		
				172	bicycle physics application		
				227	accident reconstruction		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				232	angular momentum of skater spinning and diver		
				234	gyroscopes and angular momentum		
				250	why airplanes have tails		
				262	examples of waves		
				290	stereo sound		
				297	frequency spectrum		
				299	understanding human hearing		
				306	explain why hearing can be damaged by loud sounds		
				323	glow-in-the-dark plastic		
				337	rainbows are an example of dispersion		
				347	the compound microscope		
				365	polarized sunglasses and LCD computer screens		
				367	speed of light did not behave as expected for Michelson and Morley		
				369	proof of time dilation		
				375	explain Thomas Young's demonstration of the wave nature of light		
				390	breakdown voltage and lightning		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				398	holiday lights wired in series		
				401	why aren't birds electrocuted?		
				410	paying for electricity		
				413	circuits in your house		
				413	wiring application		
				418	charge of everyday objects		
				430	almost all electric appliances use capacitors		
				433	cameras use capacitors to supply energy for flash bulbs		
				448	how does a compass work?		
				458	where coils are used		
				462	electromagnet in a toaster		
				527	windchill factor		
				560	deep water submarine Alvin application		
				608	how engines work		
				621	exposure to UV radiation		
				644	proof of Einstein's theory of general relativity		
				645	astronomers find black holes by what is around them		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
A.12.07 Science Connections	by the end of grade 12		Re-examine the evidence and reasoning that led to conclusions drawn from investigations, using the science themes	4	inquiry through observation	12	do your results agree with hypothesis?
				7	revising explanations through observation	13	compare prediction to measurement
				7	creating theories based on observations	13	predict speed of ball
				7	creating explanations through observation	16	what do the results tell you?
				8	testing hypotheses with experiments	18	are the accelerations different?
				8	refining theories based on observations	18	how would acceleration be different?
				8	Comparing a theory and a natural law	19	does the ball accelerate?
				8	forming hypotheses and testing with experiments	22	how do you measured positions compare to model?
				10	putting forth ideas and then testing them	22	compare calculation with graph estimate
				11	Ptolemy model vs. Copernicus model of the solar system	29	does experiment agree with prediction?
				40	making a good model	33	does your experiment confirm your hypothesis?
				44	using a graphical model to make a prediction and checking the model's accuracy	33	calculate the predicted speed
				136	determining formula for acceleration on a ramp	37	use your graph to make a prediction
				188	perpetual motion machines	38	use your graph to make a prediction
						42	predict exact landing location

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				297	frequency spectrum	43	how does the measurement compare to your prediction?
				306	explain why hearing can be damaged by loud sounds	43	what would happen if...?
				323	using glow-in-the-dark plastic to demonstrate photon energy levels	43	test your prediction
				367	speed of light did not behave as expected for Michelson and Morley	50	does your experiment provide confirmation?
				369	proof of time dilation	58	explain why the angular acceleration is different
				375	explain Thomas Young's demonstration of the wave nature of light	65	predict where the ball moves fastest
				423	charge by friction	65	where does the marble move the fastest?
				498	since wood is created from other matter it must not be a fundamental substance	66	does this agree with your hypothesis?
						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
						109	explain how the colored filters work
						111	do your observations support this hypothesis?

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
						111	how does what you observed support the quantum theory?
						114	are there differences between your prediction and measurement?
						132	what conclusions can you draw?
						132	predict what the current will be
						133	analyze data and explain a rule
						147	how did A and B tapes acquire different charge?

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
B.12.01 Nature of Science	by the end of grade 12		Show how cultures and individuals have contributed to the development of major ideas in the earth and space, life and environmental, and physical sciences	41	Galileo and Newton conducted experiments with balls on ramps		
				52	Dr. Harold Edgerton and strobe photography		
				78	Newton's laws of motion		
				81	Newton's discovery of the connection between force and mass and acceleration		
				152	Sir Isaac Newton and law of universal gravitation		
				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		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				349	Galileo and telescopes		
				350	Newtonian reflecting telescope		
				361	Young's double-slit experiment		
				368	Einstein's thinking revolutionized physics		
				382	Ben Franklin and current		
				420	Charles-Augustin de Coulomb		
				447	discovering and using magnetism		
				501	search for elements and alchemy		
				561	the Alvin research submarine		
				575	discovery of helium		
				580	Newton and classical physics		
				614	Marie Curie		
				615	Henri Bequerel and beta rays		
				625	turning lead into gold		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
B.12.02 Nature of Science	by the end of grade 12		Identify the cultural conditions that are usually present during great periods of discovery, scientific development, and invention	7	in science inquiry is used to uncover truth		
				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		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				368	Einstein's thinking revolutionized physics		
				447	discovering and using magnetism		
				501	search for elements and alchemy		
				560	deep water submarine Alvin application		
				561	the Alvin research submarine		
				575	discovery of helium		
				625	turning lead into gold		
				641	research on future of the universe		
				644	proof of Einstein's theory of general relativity		
				645	astronomers find black holes by what is around them		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
B.12.03 Nature of Science	by the end of grade 12		Relate the major themes of science to human progress in understanding science and the world	7	developing models to explain observations	22	model for uniform accelerated motion
				12	engineers design practical devices for solving problems	147	Gilbert built the first electroscope
				12	engineers design practical devices for solving problems		
				12	all technology is based on fundamental laws of physics		
				13	medical and health professions use physics		
				14	using analysis and problem solving and an understanding of technology to make economic decisions		
				15	physics plays a role in nearly everything a person does		
				31	use of nanotechnology		
				31	use of nanotechnology		
				40	creating useful models		
				41	Galileo and Newton conducted experiments with balls on ramps		
				51	analyzing motion with video and strobe photography		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				52	Dr. Harold Edgerton and strobe photography		
				52	Dr. Harold Edgerton and strobe photography		
				52	Dr. Harold Edgerton and strobe photography		
				72	antilock brakes application		
				72	antilock brakes application		
				78	Newton's laws of motion		
				81	Newton's discovery of the connection between force and mass and acceleration		
				91	biomechanics application		
				91	careers in biomechanics		
				92	applications of biomechanics		
				101	a model for friction		
				102	a model for static friction		
				112	relationship between science and engineering and technology		
				112	designing a bridge		
				138	use of robots		
				152	Sir Isaac Newton and law of universal gravitation		
				155	geostationary satellites		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				155	first artificial human-made Earth satellite was Sputnik		
				172	bicycle physics application		
				178	Great Pyramid of Giza and simple machines		
				196	hydroelectric power application		
				196	hydroelectric power application		
				208	James Watt		
				209	range of power for common devices		
				216	energy from ocean tides		
				217	research into tidal power		
				227	police forensic scientists		
				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	Pierre and Jacques Curie and the piezoelectric effect		
				257	quartz crystals application		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				257	Pierre and Jacques Curie and the piezoelectric effect		
				263	waves can carry information		
				269	wave motion and equilibrium		
				280	microwave ovens application		
				280	microwave ovens application		
				289	careers in acoustics		
				290	technological breakthrough of sound recording		
				293	uses of Doppler radar		
				296	ultrasound technology		
				310	past theories of light		
				311	Thomas Edison and the electric light		
				311	invention of electric light		
				314	Einstein and the speed of light		
				316	Albert Einstein		
				325	the printing press		
				325	history of printing		
				325	the printing press		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				330	optics and optical instruments		
				348	the usefulness of recorded images		
				349	the telescope		
				349	Galileo and telescopes		
				349	the telescope		
				350	Newtonian reflecting telescope		
				361	Young's double-slit experiment		
				361	Thomas Young		
				366	Albert Einstein's theory of special relativity		
				367	Einstein and theory of special relativity		
				367	Albert A. Michelson and Edward R. Morley		
				368	Einstein's thinking revolutionized physics		
				369	technological advances have allowed discovery of the expanding universe		
				372	holography application		
				378	importance of electricity		
				382	Ben Franklin and current		
				392	hybrid gas/electric cars application		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				392	hybrid gas/electric cars application		
				400	Gustav Robert Kirchhoff		
				404	electrical engineers		
				413	wiring application		
				413	wiring application		
				420	Charles-Augustin de Coulomb		
				429	electron beam accelerators		
				434	how television works application		
				434	how television works application		
				447	discovering and using magnetism		
				451	MRI application		
				451	MRI application		
				456	Hans Christian Oersted		
				472	maglev train application		
				472	Dr. D. Bruce Montgomery		
				473	how magplanes levitate		
				490	why computers are useful		
				492	the binary number system and its use in computers		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				492	computers and electronic addition of numbers application		
				499	Albert Einstein		
				499	Democritus		
				501	search for elements and alchemy		
				516	refrigerator application		
				534	energy-efficient building application		
				534	energy-efficient building application		
				535	designing buildings to be energy efficient		
				560	deep water submarine Alvin application		
				560	deep water submarine Alvin application		
				561	the Alvin research submarine		
				574	Niels Bohr		
				575	discovery of helium		
				575	Johann Balmer		
				578	Wolfgang Pauli		
				580	Max Planck and Albert Einstein		
				580	Newton and classical physics		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				585	economics of laser technology		
				585	laser application		
				614	Marie Curie		
				615	Henri Bequerel and beta rays		
				615	smoke detectors		
				623	creation of CAT scans		
				623	creation of CAT scans		
				625	turning lead into gold		
				630	Wolfgang Pauli		
				631	nuclear power application		
				631	nuclear power application		
				641	research on future of the universe		
				644	proof of Einstein's theory of general relativity		
				647	Paul Dirac		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
B.12.04 Nature of Science	by the end of grade 12		Show how basic research and applied research contribute to new discoveries, inventions, and applications	7	developing models to explain observations	22	model for uniform accelerated motion
				7	in science inquiry is used to uncover truth	75	the discovery of atom's nucleus
				12	all technology is based on fundamental laws of physics	147	Gilbert built the first electroscope
				12	engineers design practical devices for solving problems		
				12	engineers design practical devices for solving problems		
				13	medical and health professions use physics		
				13	medical and health professions use physics		
				14	using analysis and problem solving and an understanding of technology to make economic decisions		
				15	physics plays a role in nearly everything a person does		
				31	use of nanotechnology		
				31	use of nanotechnology		
				40	creating useful models		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				41	Galileo and Newton conducted experiments with balls on ramps		
				51	analyzing motion with video and strobe photography		
				52	Dr. Harold Edgerton and strobe photography		
				72	antilock brakes application		
				72	antilock brakes application		
				78	Newton's laws of motion		
				81	Newton's discovery of the connection between force and mass and acceleration		
				91	careers in biomechanics		
				91	biomechanics application		
				101	a model for friction		
				102	a model for static friction		
				112	designing a bridge		
				112	relationship between science and engineering and technology		
				112	impact of technology		
				138	use of robots		
				152	Sir Isaac Newton and law of universal gravitation		
				155	geostationary satellites		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				172	bicycle physics application		
				196	hydroelectric power application		
				196	hydroelectric power application		
				208	James Watt		
				209	range of power for common devices		
				216	energy from ocean tides		
				217	research into tidal power		
				227	police forensic scientists		
				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	Pierre and Jacques Curie and the piezoelectric effect		
				257	quartz crystals application		
				263	waves can carry information		
				280	microwave ovens application		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				280	microwave ovens application		
				289	careers in acoustics		
				293	uses of Doppler radar		
				296	ultrasound technology		
				311	invention of electric light		
				311	Thomas Edison and the electric light		
				314	Einstein and the speed of light		
				316	Albert Einstein		
				325	the printing press		
				325	the printing press		
				330	optics and optical instruments		
				349	the telescope		
				349	Galileo and telescopes		
				350	Newtonian reflecting telescope		
				361	Thomas Young		
				366	Albert Einstein's theory of special relativity		
				367	Einstein and theory of special relativity		
				367	Albert A. Michelson and Edward R. Morley		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				369	technological advances have allowed discovery of the expanding universe		
				372	holography application		
				378	importance of electricity		
				382	Ben Franklin and current		
				392	hybrid gas/electric cars application		
				392	hybrid gas/electric cars application		
				400	Gustav Robert Kirchhoff		
				404	electrical engineers		
				413	wiring application		
				413	wiring application		
				420	Charles-Augustin de Coulomb		
				429	electron beam accelerators		
				434	how television works application		
				434	how television works application		
				449	Earth's magnetism		
				451	MRI application		
				451	MRI application		
				456	Hans Christian Oersted		
				472	maglev train application		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				472	Dr. D. Bruce Montgomery		
				473	how magplanes levitate		
				490	why computers are useful		
				492	the binary number system and its use in computers		
				492	computers and electronic addition of numbers application		
				499	development of atomic theory		
				499	Democritus		
				499	Albert Einstein		
				516	refrigerator application		
				534	energy-efficient building application		
				534	energy-efficient building application		
				535	designing buildings to be energy efficient		
				560	deep water submarine Alvin application		
				560	deep water submarine Alvin application		
				560	deep water submarine Alvin application		
				574	Niels Bohr		
				575	Johann Balmer		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				578	Wolfgang Pauli		
				580	Max Planck and Albert Einstein		
				580	Newton and classical physics		
				585	laser application		
				585	economics of laser technology		
				614	Marie Curie		
				615	Henri Bequerel and beta rays		
				615	smoke detectors		
				621	UV radiation and thinning of ozone layer		
				623	creation of CAT scans		
				623	creation of CAT scans		
				630	Wolfgang Pauli		
				631	nuclear power application		
				631	nuclear power application		
				641	research on future of the universe		
				644	proof of Einstein's theory of general relativity		
				644	proof of Einstein's theory of general relativity		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				645	astronomers find black holes by what is around them		
				647	Paul Dirac		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
B.12.05 Nature of Science	by the end of grade 12		Explain how science is based on assumptions about the natural world and themes that describe the natural world	7	in science inquiry is used to uncover truth	13	predict speed of ball
				7	creating theories based on observations	13	compare prediction to measurement
				11	Ptolemy model vs. Copernicus model of the solar system	13	create a graph
						16	create a graph
				12	all technology is based on fundamental laws of physics	16	describe the graph
						16	what do the results tell you?
				19	problems in the real world use both metric and English units	18	are the accelerations different?
						18	how would acceleration be different?
				31	use of nanotechnology	19	does the ball accelerate?
				40	making a good model	22	how do you measured positions compare to model?
				43	constructing a graph		
				43	graphs are a way of representing data	22	create graphs
				44	using a graphical model to make a prediction and checking the model's accuracy	22	compare calculation with graph estimate
				44	graphical models	29	does experiment agree with prediction?
				45	recognizing patterns using graphs	33	calculate the predicted speed
51	analyzing motion with video and strobe photography	37	use your graph to make a prediction				
		37	make a graph				
52	strobe photography	38	make a graph				

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				54	understanding patterns in relationships between variables	38	use your graph to make a prediction
				54	constructing a graph	42	predict exact landing location
				55	create a graph from a data table	43	what would happen if...?
				56	indicate relationships between variables in graphs	43	how does the measurement compare to your prediction?
				72	antilock brakes application	43	sketch four graphs
				73	antilock braking systems	56	create a graph
				80	applications of Newton's first law	58	explain why the angular acceleration is different
				90	examples of Newton's third law in the real world	65	predict where the ball moves fastest
				104	reducing friction and hovercraft and maglev trains	66	create a graph of speed vs. position
				105	friction is useful for brakes and tires	76	compare predicted mass to actual mass
				109	jack-in-the-box uses a spring	80	explain the physics of a diver's somersaults
				112	relationship between science and engineering and technology	80	explain your observations
				112	design of structures	82	make three different graphs
				118	examples of scalars	87	sketch a graph
						87	explain how force applied causes the response
						90	explain why higher tension makes waves move faster

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				130	kicked soccer ball acts as a projectile launched at an angle	92	how does sound get through tiny cracks?
				131	hang time	92	explain how wind might cause big waves in water
				133	example of gymnast for forces applied at an angle	109	explain how the colored filters work
				138	robot navigation application	114	are there differences between your prediction and measurement?
				139	inertial navigation system		
				144	examples of objects moving in a circle	126	explain how polarizing sunglasses work
				147	speedometers and odometers	132	what conclusions can you draw?
				149	centripetal force at the amusement park	132	predict what the current will be
				155	satellite motion application	133	analyze data and explain a rule
				156	HEO and geostationary orbit	135	graph voltage vs. current
						136	graph voltage vs. current
				167	SUV rollovers and center of gravity	151	make a graph of voltage vs. time
				172	bicycle physics application	160	create a graph
				172	bicycle physics application	167	make a graph of voltage vs. number of magnets
				196	hydroelectric power application	169	make a current vs. voltage graph for the diode
				227	accident reconstruction		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				232	angular momentum of skater spinning and diver		
				234	gyroscopes and angular momentum		
				235	jet engines application		
				243	oscillators are used in communications and music and clocks		
				246	understanding graphs of harmonic motion		
				250	why airplanes have tails		
				257	quartz crystals application		
				262	examples of waves		
				263	waves can carry information		
				280	microwave ovens application		
				290	stereo sound		
				290	the process of digital sound reproduction		
				297	frequency spectrum		
				299	understanding human hearing		
				304	comparison of wave forms from guitar sounds		
				306	explain why hearing can be damaged by loud sounds		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				307	decibel level vs. frequency graph for human hearing		
				323	glow-in-the-dark plastic		
				325	the printing press		
				337	rainbows are an example of dispersion		
				347	the compound microscope		
				365	polarized sunglasses and LCD computer screens		
				369	technological advances have allowed discovery of the expanding universe		
				372	holography application		
				390	breakdown voltage and lightning		
				392	hybrid gas/electric cars application		
				398	holiday lights wired in series		
				401	why aren't birds electrocuted?		
				410	paying for electricity		
				411	the waveform of AC electricity		
				413	wiring application		
				413	wiring application		
				413	circuits in your house		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				418	charge of everyday objects		
				427	diagramming electric fields using field lines		
				429	electron beam accelerators		
				430	almost all electric appliances use capacitors		
				433	cameras use capacitors to supply energy for flash bulbs		
				434	how television works application		
				443	diagramming magnetic fields using magnetic field lines		
				448	how does a compass work?		
				451	MRI application		
				458	where coils are used		
				462	electromagnet in a toaster		
				472	maglev train application		
				473	how magplanes levitate		
				479	current vs.voltage graph for a transistor		
				492	computers and electronic addition of numbers application		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				498	since wood is created from other matter it must not be a fundamental substance		
				516	refrigerator application		
				527	windchill factor		
				534	energy-efficient building application		
				560	deep water submarine Alvin application		
				560	deep water submarine Alvin application		
				585	laser application		
				608	how engines work		
				615	smoke detectors		
				621	exposure to UV radiation		
				623	creation of CAT scans		
				631	nuclear power application		
				644	proof of Einstein's theory of general relativity		
				645	astronomers find black holes by what is around them		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #:	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
C.12.01 Science Inquiry	12	by the end of grade	When studying science content, ask questions suggested by current social issues, scientific literature, and observations of phenomena, build hypotheses that might answer some of these questions, ...	13	x-ray and ultrasound technology are used in medicine	143	the cost of using electrical appliances
				31	nanotechnology application	168	electronic devices are part of our daily lives
				73	use of control computers in cars		
				196	environmental impacts of hydroelectric power		
				197	efficiency of the Hoover Dam		
				217	advantages of tidal energy		
				219	using energy efficient products		
				234	gyroscopes and the space shuttle		
				236	rocket engines		
				259	measuring mass in space		
				263	medical technology using waves		
				289	stethoscopes used to hear sound vibrations		
				296	ultrasound technology		
				336	fiber optics are used for surgical inspections		
				392	environmental impact of auto pollution		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				392	hybrid cars combine advantages of gasoline fuel and electric power		
				443	magnetic resonance imaging		
				451	MRI application		
				531	infrared thermometers		
				534	energy-efficient building application		
				602	hydrogen as a fuel		
				604	balancing chemical equation of acid rain		
				607	impact of combustion reaction of gasoline		
				608	alternate fuels to gasoline		
				618	power released by radioactive decay		
				621	sources of radiation in the environment		
				621	human technology contributes to radiation in environment		
				622	x-ray machines		
				623	CAT scans		
				628	nuclear waste		
				631	nuclear power application		
				632	nuclear waste		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				632	nuclear energy		
				632	nuclear energy		
				634	comparison of fission and fusion		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #:	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
C.12.02 Science Inquiry	12	by the end of grade	Identify issues from an area of science study, write questions that could be investigated, review previous research on these questions, and design and conduct responsible and safe investigations to help answer the questions	2	understanding natural laws	6	collecting data with precision
				3	inquiry starts with questions	10	calculate percent difference
				3	connecting cause and effect through observation	11	recognizing and controlling variables
				3	using life experiences and common sense	12	cause and effect relationships
				4	inquiry through observation	12	was this experiment better or worse than the first?
				7	revising explanations through observation	12	do your results agree with hypothesis?
				7	creating theories based on observations	13	predict speed of ball
				7	creating explanations through observation	13	find percent error
				8	testing hypotheses with experiments	15	collect time data with precision
				8	Comparing a theory and a natural law	16	what do the results tell you?
				8	forming hypotheses and testing with experiments	18	collect time data with precision
				8	refining theories based on observations	18	how would acceleration be different?
				9	connecting cause and effect through analysis	18	are the accelerations different?
				9	testing ideas against scientific evidence	19	does the ball accelerate?
						21	conduct the experiment
						21	plan the experiment

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				10	the usefulness of phlogiston theory despite being incorrect	28	set up the ultimate pulley
				10	putting forth ideas and then testing them	33	does your experiment confirm your hypothesis?
				11	acceptance of the Copernican model of the solar system on the basis of scientific evidence	33	calculate the predicted speed
				40	defining variables	37	calculate percent difference
				42	control and experimental variables	37	use your graph to make a prediction
				43	dependent and independent variables in graphs	38	calculate percent difference
				44	checking a graphical model's accuracy	38	use your graph to make a prediction
				45	recognizing patterns and cause and effect relationships	42	predict exact landing location
				54	importance of changing one variable at a time in an experiment	43	calculate percent difference
				71	parachutes and air resistance	43	what would happen if...?
				103	evaluating perpetual motion claims	43	perform experiment
				136	determining formula for acceleration on a ramp	43	test your prediction
						50	does your experiment provide confirmation?
						58	explain why the angular acceleration is different
						65	where does the marble move the fastest?
						65	investigate motion on a roller coaster

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				188	perpetual motion machines	65	predict where the ball moves fastest
				242	finding a basic cycle of harmonic motion	65	studying motion of ball on loop track
				251	changing the natural frequency of a stretched rubber band	66	does this agree with your hypothesis?
				293	demonstrating the Doppler effect	67	investigate motion on a roller coaster
				306	explain why hearing can be damaged by loud sounds	67	set up the straight track
						79	safety note
				323	using glow-in-the-dark plastic to demonstrate photon energy levels	80	explain your observations
						82	determine which variable has the greatest effect
				367	speed of light did not behave as expected for Michelson and Morley	82	design an experiment
						82	plan three experiments to determine which variable affects the period of a pendulum
				369	proof of time dilation		
				375	explain Thomas Young's demonstration of the wave nature of light	82	dependent and independent variables
						83	calculate percent error
				423	charge by friction	85	select appropriate technology to make measurements
				432	making a simple capacitor		
				440	scientists have never found single magnetic poles	85	design and test a way to increase natural frequency
				456	an experiment with a wire and compass	87	explain how force applied causes the response

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				463	building an electromagnet with wire and a nail	89	what is it that moves in the case of a wave?
				467	experiment demonstrating electromagnetic induction	90	what effect does changing the tension have?
				498	since wood is created from other matter it must not be a fundamental substance	90	explain why higher tension makes waves move faster
				543	safety factors	92	explain how wind might cause big waves in water
				568	understanding how gravity works inside atoms	97	did the method give an accurate result?
				583	the meaning of the uncertainty principle	97	reliability of a double-blind test
				637	areas of active research in physics	109	explain how the colored filters work
				640	unresolved questions of history of universe	111	do your observations support this hypothesis?
				641	research on future of the universe	111	how does what you observed support the quantum theory?
				641	research on future of the universe	129	safety precautions
						129	choose circuit parts to light a bulb
						131	safety precautions
						132	predict what the current will be
						132	what conclusions can you draw?

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
						133	analyze data and explain a rule
						147	how did A and B tapes acquire different charge?
						150	safety note
						159	safety note
						160	electromagnet safety
						166	variables that affect the performance of the generator
						176	heat safety
						176	safety note
						185	safety tip
						192	gas pressure safety note
						201	design a procedure to separate a mixture
						201	determine the equipment you will need
						202	find percent composition
						202	conduct your experiment
						204	build models of Na and Cl and use them to explain bonding
						206	acid safety
						208	calculating percent yield

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #:	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
C.12.03 Science Inquiry	12	by the end of grade	Evaluate the data collected during an investigation, critique the data-collection procedures and results, and suggest ways to make any needed improvements	43	constructing a graph	12	do your results agree with hypothesis?
				44	graphical models	13	create a graph
				54	constructing a graph	16	create a graph
				55	create a graph from a data table	16	describe the graph
				113	conceptual design for a bridge	22	create graphs
				113	test and evaluate the prototype structure design	33	does your experiment confirm your hypothesis?
				188	perpetual motion machines	37	make a graph
				290	the process of digital sound reproduction	38	make a graph
				389	electrical devices are designed to operate at a certain voltage	43	sketch four graphs
				411	the waveform of AC electricity	50	does your experiment provide confirmation?
				543	evaluate three designs for a bridge	56	create a graph
						66	create a graph of speed vs. position
						66	does this agree with your hypothesis?
						82	make three different graphs
						87	sketch a graph
						135	graph voltage vs. current
						136	graph voltage vs. current
						151	make a graph of voltage vs. time
						160	create a graph

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
						163 propose solutions that will work for each disk 164 evaluate the performance of motor designs 167 make a graph of voltage vs. number of magnets 167 suggest improvements you could make to the generator design 169 make a current vs. voltage graph for the diode	

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #:	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
C.12.04 Science Inquiry	12	by the end of grade	During investigations, choose the best data-collection procedures and materials available, use them competently, and calculate the degree of precision of the resulting data	25	why accuracy and precision are important	6	collecting data with precision
				42	controlling variables in experiments	13	create a graph
				43	constructing a graph	15	collect time data with precision
				44	graphical models	15	collect time data
				54	constructing a graph	16	describe the graph
				55	create a graph from a data table	16	create a graph
				113	test and evaluate the prototype structure design	18	collect time data with precision
				290	the process of digital sound reproduction	22	create graphs
				389	electrical devices are designed to operate at a certain voltage	37	make a graph
						38	make a graph
						43	sketch four graphs
				411	the waveform of AC electricity	43	discuss sources of error
						45	discuss sources of errors
				543	evaluate three designs for a bridge	56	create a graph
						66	create a graph of speed vs. position
						82	make three different graphs
						87	sketch a graph
						135	graph voltage vs. current
						136	graph voltage vs. current
						151	make a graph of voltage vs. time

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
						160 create a graph	
						164 evaluate the performance of motor designs	
						167 suggest improvements you could make to the generator design	
						167 make a graph of voltage vs. number of magnets	
						169 make a current vs. voltage graph for the diode	
						202 identify two sources of experimental error	

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #:	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
C.12.05 Science Inquiry	12	by the end of grade	Use the explanations and models found in the earth and space, life and environmental, and physical sciences to develop likely explanations for the results of their investigations	7	creating theories based on observations	12	do your results agree with hypothesis?
				11	Ptolemy model vs. Copernicus model of the solar system	13	compare prediction to measurement
				40	making a good model	13	is there a trend in measurements?
				44	using a graphical model to make a prediction and checking the model's accuracy	13	predict speed of ball
						16	find the slope of the line
				48	slope of a position vs. time graph	16	what do the results tell you?
				63	acceleration and slope of a speed vs. time graph	18	how would acceleration be different?
				188	perpetual motion machines	18	are the accelerations different?
				297	frequency spectrum	19	does the ball accelerate?
				306	explain why hearing can be damaged by loud sounds	19	find the slope of the line
						22	how do you measured positions compare to model?
				498	since wood is created from other matter it must not be a fundamental substance	22	compare calculation with graph estimate
						29	does experiment agree with prediction?
						33	calculate the predicted speed
						33	does your experiment confirm your hypothesis?
						37	use your graph to make a prediction

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
						38	use your graph to make a prediction
						42	predict exact landing location
						43	how does the measurement compare to your prediction?
						43	what would happen if...?
						50	does your experiment provide confirmation?
						58	explain why the angular acceleration is different
						63	as mechanical advantage increases what happens to length of pulled string?
						65	predict where the ball moves fastest
						66	does this agree with your hypothesis?
						66	what does the graph tell you?
						76	compare predicted mass to actual mass
						80	explain your observations
						82	analyze data
						87	explain how force applied causes the response

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
						90	explain why higher tension makes waves move faster
						92	explain how wind might cause big waves in water
						109	explain how the colored filters work
						114	are there differences between your prediction and measurement?
						132	what conclusions can you draw?
						132	predict what the current will be
						133	did battery voltage change?
						133	analyze data and explain a rule

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #:	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
C.12.06 Science Inquiry	12	by the end of grade	Present the results of investigations to groups concerned with the issues, explaining the meaning and implications of the results, and answering questions in terms the audience can understand	5	identify what you know	122	communicate your findings
				9	physics vocabulary is very specific	122	present your findings
				37	understanding the word "per"		
				39	identify what information you have		
				42	writing procedures in a lab notebook helps make sure your results are repeatable		
				60	understanding the Greek letter delta		
				96	terms of mass and weight		
				97	understanding symbols		
				406	using a systematic approach to solving circuit problems		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #:	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
C.12.07 Science Inquiry	12	by the end of grade	Evaluate articles and reports in the popular press, in scientific journals, on television, and on the Internet, using criteria related to accuracy, degree of error, sampling, treatment of data, and other standards of experimental design	3	inquiry starts with questions	12	was this experiment better or worse than the first?
				11	Ptolemy model vs. Copernicus model of the solar system	13	is there a trend in measurements?
				11	acceptance of the Copernican model of the solar system on the basis of scientific evidence	13	create a graph
				25	why accuracy and precision are important	13	compare prediction to measurement
				40	making a good model	16	create a graph
				42	controlling variables in experiments	16	describe the graph
				42	writing procedures in a lab notebook helps make sure your results are repeatable	22	how do you measured positions compare to model?
				43	graphs are a way of representing data	22	compare calculation with graph estimate
				43	constructing a graph	22	create graphs
				44	checking a graphical model's accuracy	25	find the average time
				44	using a graphical model to make a prediction and checking the model's accuracy	29	does experiment agree with prediction?
				44	graphical models	37	make a graph
				45	recognizing patterns using graphs	38	make a graph
						43	discuss sources of error
						43	sketch four graphs
						43	how does the measurement compare to your prediction?
						45	discuss sources of errors

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				54	constructing a graph	56	create a graph
				54	understanding patterns in relationships between variables	58	find average of three trials
				55	create a graph from a data table	63	as mechanical advantage increases what happens to length of pulled string?
				56	indicate relationships between variables in graphs	66	create a graph of speed vs. position
				103	evaluating perpetual motion claims	66	what does the graph tell you?
				246	understanding graphs of harmonic motion	67	calculate average of three times
				290	the process of digital sound reproduction	71	calculate average work and power
				297	frequency spectrum	76	compare predicted mass to actual mass
				304	comparison of wave forms from guitar sounds	82	analyze data
				307	decibel level vs. frequency graph for human hearing	82	make three different graphs
				411	the waveform of AC electricity	87	sketch a graph
				412	average voltage and current of AC power	89	what is it that moves in the case of a wave?
				427	diagramming electric fields using field lines	97	reliability of a double-blind test
				443	diagramming magnetic fields using magnetic field lines	97	did the method give an accurate result?
						114	are there differences between your prediction and measurement?
						122	present your findings

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				479	current vs.voltage graph for a transistor	122	communicate your findings
						133	did battery voltage change?
						135	graph voltage vs. current
						136	graph voltage vs. current
						151	make a graph of voltage vs. time
						160	create a graph
						167	make a graph of voltage vs. number of magnets
						169	make a current vs. voltage graph for the diode
						202	identify two sources of experimental error

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
D.12.07 Physical Science	by the end of grade 12	Motions and Forces	Qualitatively and quantitatively analyze changes in the motion of objects and the forces that act on them and represent analytical data both algebraically and graphically	13	biomechanics	9	collect data and calculate speed of car
				13	physics and bicycles	9	calculate speed of rolling marble
				13	physics applies to the internal working of the body	10	make object move with speed of 1 m/sec
				18	definition of distance and length	12	finding speed of ball with one photogate
				26	calculating weight from mass	13	graph speed versus position
				26	weight is a measure of the force of gravity pulling on mass	14	find the speed of the ball
				26	inertia is an effect of mass	15	find speed of the ball
				27	understanding and measuring mass	16	create a position vs. time graph
				36	speed is relative	16	create a speed vs. time graph
				36	the precise meaning of speed	17	learn techniques for finding acceleration
				37	how to calculate speed	17	find the acceleration
				37	calculating speed	17	studying acceleration
				38	the speed formula and calculating speed	17	find two speeds
				38	compare and contrast speed and velocity	19	make a speed vs. time graph
				41	effect of friction on motion of a ball on a ramp	20	understanding equation for uniform accelerated motion
				41	speed of a ball on a ramp	20	speed vs. time graph for uniform acceleration

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				43	draw a smooth curve; do NOT simply connect the dots	21	calculate speed of ball
				46	definitions of position and distance	22	create a speed vs. time graph
				46	speed is the rate of change of position	22	create a position vs. time graph
				47	average and instantaneous speed	23	investigate the effect of gravity
				47	position vs. time graph	25	derive acceleration equation
				48	graphs showing changes in speed	26	study Newton's first law
				48	determining speed from the slope of a position vs. time graph	26	make ball roll at constant speed
				48	determining speed from the slope of a position vs. time graph	27	explain how Newton's first law applies
				48	determining speed from the slope of a position vs. time graph	27	were any forces acting on the ball?
				49	speed vs. time graph for constant speed	27	collect data on Newton's first law
				49	distance on the speed vs. time graph	28	investigate Newton's second law
				50	speed vs. time graph for downhill motion	29	calculate the acceleration
				50	graphs for motion of increasing speed and decreasing speed	30	investigate Newton's third law
				54	graphing speed vs. time	30	Newton's third law and free body diagrams
				55	analyzing distance vs. time graph	31	draw free body diagrams and identify action-reaction pairs

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				55	calculate the average speed and distance traveled	33	calculate the predicted speed
				58	acceleration is the rate of change in the speed of an object	34	investigate static and sliding friction
				59	comparing speed and acceleration	34	calculate the weight
				60	formula for acceleration	39	investigating vectors
				60	calculating acceleration from experiments	39	studying position vectors
				61	any acceleration must come from a force	42	find initial speed of ball
				61	constant speed and constant acceleration	43	calculate the velocity vector
				61	general definition of acceleration	44	investigating force vectors
				61	zero acceleration vs. constant acceleration vs. acceleration with zero speed	45	balancing a specified force
				62	acceleration is total change of speed divided by total change in time	46	investigating angular speed
				62	speed vs. time graph for accelerated motion	46	contrasting linear and angular motion
				63	calculating acceleration from a speed vs. time graph	49	draw a free body diagram and label forces
						49	consider forces acting on the ball
						49	investigating centripetal force
						50	calculate the speed of the ball
						51	investigate law of universal gravitation

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				63	complex speed vs. time graphs	51	calculate gravitational force of attraction
				64	calculate speed in accelerated motion	52	converting mass to weight
				64	calculating the speed of an object that is accelerating	53	relationship between force and torque
				64	calculate speed in accelerated motion	53	calculating torque
				64	calculate speed in accelerated motion	54	explore rotational equilibrium and net torque
				65	calculating distance from speed vs. time graph	57	investigating rotational inertia
				67	calculate time and distance from acceleration	58	rotational application of Newton's second law
				68	free fall and acceleration due to gravity	59	investigate block and tackle machine
				69	motion formulas for free fall	60	operate and study a block and tackle machine
				70	solving problems with free fall	61	find the mechanical advantage
				70	calculating height and time of flight in free fall problems	61	what effect does friction have on mechanical advantage?
				71	air resistance and terminal speed	62	investigate block and tackle machine
				71	acceleration of gravity does not depend on mass	66	find the speed of the ball
				72	friction and traction and antilock brakes	68	what is speed of the ball?
				72	friction and traction and antilock brakes	73	momentum is a vector
				74	describing motion with speed vs. time graph	73	calculating momentum

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				74	understanding average speed and instantaneous speed	75	investigate collisions and conservation of momentum
				74	sketching speed vs. time graphs for different changes of motion	76	calculate speeds of projectile and target balls
				75	problem using frames of reference	77	relationship between force and motion and the second law
				75	calculations of speed	77	the momentum form of Newton's second law
				75	problem understanding acceleration due to gravity	78	which ball had a greater change in momentum?
				76	analyzing graph for changes in motion	79	investigate angular momentum
				78	force is an action that can change motion	80	torque changes the direction of angular momentum vector
				78	changes in motion only occur through force	80	angular momentum behaves like a vector
				79	descriptions of inertia and Newton's first law	80	explain life application of conservation of momentum
				79	what systems in a car overcome the law of inertia	84	restoring forces and equilibrium
				79	all objects tend to resist changes in motion	85	where is the mass that provides inertia?
				80	Newton's laws and cup holders	90	calculate the speed of the wave pulse
				80	seat belts and air bags and Newton's first law	128	relativity and frames of reference
				81	force is related to acceleration		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				81	Newton's second law of motion	191	calculate speed of air in homemade air-speed tester
				82	English unit of force is the pound		
				83	calculation using Newton's second law		
				83	finding the net force		
				84	calculating net force		
				84	direction of net force and acceleration and speed		
				84	Newton's second law and dynamics problems		
				85	force problems		
				85	if there is acceleration there must be force		
				85	finding force from acceleration		
				86	zero acceleration means net zero force		
				87	explaining Newton's third law in terms of an astronaut moving through space		
				87	forces always come in pairs		
				87	forces always occur in action-reaction pairs		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				88	Newton's third law operates on pairs of objects		
				88	explaining Newton's third law in terms of moving a skateboard		
				89	solving problems with action-reaction forces		
				89	identifying which force is acting on which object		
				90	the natural jet engine in a squid		
				90	examples of Newton's third law		
				91	force platform used to analyze forces from running and walking		
				92	force from a vertical jump		
				92	measuring forces from a vertical jump		
				93	problems using Newton's first law and second law		
				93	explain the difference between mass and weight		
				94	force calculations in different units		
				94	seat belt problem		
				94	inertia problem		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				96	differences between mass and weight		
				97	strength of gravity on Earth and Jupiter		
				97	calculating weight with mass and gravity		
				98	effects of g forces and zero gravity on the human body		
				98	weight and acceleration		
				98	gravity and acceleration and weightlessness		
				99	balanced force problems		
				99	weight calculations		
				99	weight is a force but mass is not		
				100	friction is a force that resists motion		
				100	the force of friction and the different types of friction		
				101	a model for friction		
				102	the normal force as the reaction in an action-reaction pair		
				102	calculating the force of friction		
				103	calculate the acceleration of a car including friction		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				103	net force includes the force of friction		
				103	friction and motion		
				104	reducing friction force		
				105	friction applications		
				105	friction is the force that keeps nails and screws in place		
				106	net force must be zero in equilibrium		
				106	Newton's second law and net force		
				107	forces on a free-body diagram		
				107	net force of zero and free-body diagram		
				108	use equilibrium to find an unknown force		
				108	equilibrium and Newton's second law		
				109	restoring force of a spring		
				110	Hooke's law and restoring force of a spring		
				110	restoring force of a spring		
				111	understanding reaction forces in terms of springs and deformation		
				111	solid materials exert restoring force		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				112	analysis of forces on a bridge		
				115	friction of a pulled sled		
				115	explain weight and mass		
				116	calculate mass from weight		
				116	calculate the acceleration of a toy		
				118	vectors have magnitude and direction		
				119	displacement vectors		
				119	the displacement vector and measuring displacement		
				124	projectiles and trajectories		
				124	definition of the velocity vector		
				124	effects of friction on trajectories		
				125	the velocity vector		
				125	speed is the magnitude of the velocity vector		
				126	components of the velocity vector		
				127	adding velocity vectors		
				127	calculating velocity vectors may require knowing frames of reference		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				128	constant velocity of horizontal component of projectile motion		
				128	gravity only accelerates vertical motion		
				129	vertical motion of a projectile		
				129	analyze a horizontally launched projectile		
				130	projectiles launched at an angle		
				130	analyzing changing velocity in vertical component of projectile motion		
				131	range of projectiles		
				132	the force vector describes the strength and direction of a force		
				133	balancing forces in two dimensions		
				134	forces on an inclined plane		
				134	resolving force of gravity in ramp coordinates		
				135	acceleration down an inclined plane		
				135	normal force of an inclined plane		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				135	frictional force on an inclined plane		
				136	calculating acceleration on a ramp accounting for friction		
				136	calculating acceleration on a ramp		
				136	calculate the acceleration of a skier on a slope		
				137	the vector form of Newton's second law		
				137	calculating acceleration from 3-D forces		
				137	predicting motion in three dimensions and controlling force and acceleration in space missions		
				139	determining position by triangulation and inertial navigation		
				141	effects of gravity on motion of a projectile		
				141	calculate the net force		
				142	effects of friction on acceleration		
				142	calculating acceleration for sled on slope		
				144	rotation and revolution and angular speed		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				145	calculating angular speed in radians per second		
				146	calculating linear speed of a moving wheel		
				146	the relationship between linear and angular speed		
				146	angular speed of a moving wheel		
				147	the linear speed of a rolling wheel		
				147	speedometers and odometers		
				148	direction of force determines linear or rotational motion		
				148	centripetal force causes circular motion		
				148	acceleration can be a change in the direction of motion		
				149	calculating centripetal force		
				149	calculating centripetal force		
				150	formula for centripetal acceleration		
				150	calculate the centripetal acceleration of a motorcycle		
				150	centripetal acceleration		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				150	using centripetal acceleration to create the feeling of gravity by rotating the space station		
				151	centrifugal force is actually an example of inertia		
				151	banked turns		
				152	law of universal gravitation and orbital motion		
				152	attractive force between mass of person and mass of object is weight		
				152	description of law of universal gravitation		
				153	formula and calculations for law of universal gravitation		
				154	orbits and gravitational force		
				154	satellites and orbital motion		
				154	orbital motion		
				155	centripetal force and the law of universal gravitation combine to form the orbit equation		
				155	satellite motion application		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				155	satellite motion application		
				155	centripetal force and the law of universal gravitation combine to form the orbit equation		
				156	satellites in orbit		
				156	HEO and geostationary orbit		
				157	compare linear and angular speeds		
				158	compare projectile motion to orbital motion		
				158	calculate weight and acceleration due to gravity on Pluto		
				158	calculating centripetal force		
				160	center of rotation		
				160	using torque in household devices		
				160	how torque and force differ		
				160	translation and rotation		
				161	line of action and the torque created by a force		
				161	force on a wrench		
				161	calculating torque using torque equation		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				162	combining torques to find the net torque		
				162	calculating torque		
				163	in rotational equilibrium the net torque is zero		
				163	solve a rotational equilibrium problem		
				164	calculate a torque from an angled force		
				164	when force and lever arm are not perpendicular		
				165	the motion of a tossed object		
				166	centers of mass and gravity may differ		
				168	rotational inertia and mass distribution		
				168	Newton's first law and rotational inertia		
				169	Newton's second law applies to rotational motion		
				169	rotational inertia		
				169	relationship between angular acceleration and linear acceleration		
				170	moment of inertia		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				171	Newton's second law for rotational motion variables		
				171	rotational motion and linear motion		
				171	angular acceleration of a wheel		
				172	force and torque transformations in bicycles		
				173	changing gears in a bicycle		
				173	force and torque transformations in bicycles		
				174	compare force and torque		
				174	calculating torque		
				178	input and output for simple machines		
				178	how simple machines manipulate forces		
				179	how to calculate mechanical advantage		
				179	types of simple machines		
				180	mechanical advantage of human arm		
				180	the mechanical advantage of a lever		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				181	crowbar as an example of a lever		
				181	how a lever works		
				181	how a lever works		
				181	torque and mechanical advantage of a lever		
				182	mechanical advantage of ropes and pulleys		
				183	friction and mechanical advantage of wheel and axle		
				183	small drills use gears		
				183	mechanical advantage of gears		
				183	how wheels and gears work		
				184	ramps and screws		
				184	friction and mechanical advantage of ramps and screws		
				184	screw turns rotating motion into linear motion		
				186	work done by a force at an angle to the distance		
				187	work done against gravity		
				191	potential energy comes from gravity		
				200	calculate fulcrum point of a lever		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				209	estimating power requirements based on force		
				216	tides are due to force of gravity		
				222	comparison of kinetic energy and momentum		
				222	Newton's first law and momentum		
				223	momentum formula and calculating momentum		
				223	momentum is a vector		
				224	momentum and Newton's third law		
				224	law of conservation of momentum		
				225	conservation of momentum in collisions		
				226	applying conservation of momentum		
				226	solving elastic and inelastic collision problems		
				227	momentum conservation for collisions in two and three dimensions		
				228	Newton's second law relating force and momentum		
				228	seat belts and air bags		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				228	car crash safety		
				229	momentum form of Newton's second law		
				229	force on a rocket from change in momentum		
				230	calculate change in momentum for elastic vs. inelastic collisions		
				230	impulse formula		
				231	linear and angular momentum		
				231	conservation of angular momentum examples		
				231	what is angular momentum		
				232	conservation of angular momentum		
				232	angular momentum depends on speed and mass and shape		
				233	formula for angular momentum		
				233	moment of inertia examples		
				234	gyroscopes and the space shuttle		
				234	torque resists change in angular momentum		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				235	jet engines work because of conservation of momentum		
				236	momentum conservation of turbofan engine		
				237	why is momentum a vector		
				238	difference between impact and impulse		
				238	compare linear and angular momentum		
				238	cars that crumple in a collision		
				238	momentum in billiards		
				239	calculate momentum		
				240	forces in a car stopping		
				243	orbit is a type of cycle		
				245	friction causes damping in oscillators		
				249	harmonic motion in machines		
				249	inertia and restoring force cause harmonic motion		
				252	Newton's second law and natural frequency		
				254	definition of periodic force		
				256	friction and steady state		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				260	velocity vs. time graph of harmonic motion		
				260	position vs. time graph of harmonic motion		
				276	natural frequency and harmonics		
				366	special relativity and time dilation		
				367	relative motion and speed of light		
				369	frequency of light depends on relative motion		
				370	Einstein's thinking about momentum of particles moving near the speed of light		
				371	simultaneity depends on the relative motion of your frame of reference		
				425	electric forces always occur in pairs according to Newton's third law		
				440	the difference between magnetic poles and electric charge		
				442	torque between two magnets		
				448	biological compasses of animals		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				460	orbital motion of a charge		
				548	Newton's third law and pressure in a fluid		
				550	pressure and the third law		
				557	pressure of gases		
				629	conservation of momentum in nuclear reactions		
				642	inertial mass		
				642	Newton's laws and gravity		
				643	frame of reference and the equivalence principle		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
D.12.08 Physical Science	by the end of grade 12	Motions and Forces	Understand the forces of gravitation, the electromagnetic force, intermolecular force, and explain their impact on the universal system	79	what systems in a car overcome the law of inertia	51	calculate gravitational force of attraction
				80	seat belts and air bags and Newton's first law	51	investigate law of universal gravitation
				87	explaining Newton's third law in terms of an astronaut moving through space	95	waves carry energy from one place to another
				88	explaining Newton's third law in terms of moving a skateboard	122	study properties of the electromagnetic spectrum
				90	examples of Newton's third law	152	investigate magnetic forces
				137	predicting motion in three dimensions and controlling force and acceleration in space missions	154	how are magnetic field lines similar to electric field lines?
				139	determining position by triangulation and inertial navigation	154	draw magnetic field lines for a bar magnet
				150	using centripetal acceleration to create the feeling of gravity by rotating the space station	155	test materials to see if they are affected by magnets
				151	banked turns	157	study how a compass works
				152	description of law of universal gravitation	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?

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				153	formula and calculations for law of universal gravitation	161	experiment with pushes and pulls of permanent magnet in a rotor
				154	orbital motion		
				154	satellites and orbital motion		
				155	satellite motion application		
				156	HEO and geostationary orbit		
				156	satellites in orbit		
				158	calculate weight and acceleration due to gravity on Pluto		
				216	tides are due to force of gravity		
				228	seat belts and air bags		
				234	gyroscopes and the space shuttle		
				238	cars that crumple in a collision		
				243	orbit is a type of cycle		
				262	waves transmit energy		
				262	waves are all around us		
				263	waves are a form of traveling energy		
				272	waves transfer energy through absorption		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				277	standing waves are used to store energy		
				277	energy of a wave		
				281	microwaves		
				281	use of microwaves in microwave ovens		
				310	light is a form of energy		
				312	the intensity of light		
				313	light carries information		
				314	the speed of light		
				320	visible light has just the right energy for life		
				328	how is light used for communication?		
				356	light can be described in terms of waves		
				356	electricity and magnetism oscillations		
				357	frequency and wavelength of light		
				358	speed of light is frequency multiplied by length		
				359	descriptions of radio waves and microwaves and infrared rays		
				359	waves of the electromagnetic spectrum		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				360	x-rays and gamma rays		
				360	visible light waves		
				373	wave fronts of light		
				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		
				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		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				443	understanding magnetic fields		
				445	alignment of domains responds to magnetic fields		
				446	creating permanent magnets		
				447	the magnetic field of Earth		
				448	a compass is a magnet that lines up with Earth's magnetic field		
				448	how does a compass work?		
				449	the strength of Earth's magnetic field		
				450	compensating for magnetic declination		
				451	magnetic field of a nucleus		
				452	MRI uses radio waves		
				453	how a compass is used		
				454	magnetic field between two unlike poles		
				456	magnetic field of a wire		
				457	force on a current in a magnetic field		
				458	the magnetic field of loops and coils		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				459	the magnetic field of coils and permanent magnets		
				460	magnetic force on a moving charge		
				461	calculating magnetic fields and forces		
				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		
				472	electromagnet-based maglev		
				475	diagram of electromagnet		
				530	energy and radiation relationships		
				568	forces in the atom		
				626	strong force and electromagnetic force in the nucleus		
				642	Newton's laws and gravity		
				649	four forces in nature		
				649	every field has an associated particle		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
D.12.09 Physical Science	by the end of grade 12	Motions and Forces	Describe models of light, heat, and sound and through investigations describe similarities and differences in the way these energy forms behave	189	energy appears in different forms	72	draw an energy flow diagram
				190	conversions of energy	88	if frequency is increased what happens to total energy?
				190	different forms of energy		
				194	the law of conservation of energy	89	study characteristics of a wave pulse on a string
				194	conservation of energy explained	90	measure speed of a wave pulse
				194	energy transformations	90	study the speed of the wave pulse
				195	conservation of energy in a closed system	91	is your water wave transverse or longitudinal?
				196	energy transformation hydroelectric plant	93	investigate frequency and wavelength
				202	efficiency and energy conversions	94	investigate the wavelength of standing waves
				203	efficiency and conservation of energy	94	investigate the frequency of standing waves
				205	efficiency in biological systems	95	waves carry energy from one place to another
				206	connection between efficiency and time	96	investigate range of frequencies the ear can detect
				212	understand basic forms of energy	122	study properties of the electromagnetic spectrum
				212	energy conversion	125	study the polarization of a transverse spring wave
				213	the conversion process of energy flow		
				215	energy flows in biological systems		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				219	energy flow of a model solar car	178	explore the connection between temperature and heat and energy
				227	kinetic energy conservation for elastic collisions	182	investigate convection in a liquid
				256	resonant systems accumulate energy		
				262	waves transmit energy		
				263	waves are a form of traveling energy		
				264	frequency and amplitude and wavelength in waves		
				264	basic properties of frequency and wavelength and amplitude		
				265	concept of speed of a wave		
				266	formula for speed of a wave		
				267	transverse and longitudinal waves		
				268	creating plane waves and circular waves		
				272	waves transfer energy through absorption		
				277	energy of a wave		
				277	energy of a wave is proportional to frequency and amplitude		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				277	waves propagate by exchanging energy between two forms		
				278	modes of a wave		
				278	wavelength of a standing wave		
				279	modes of vibration		
				281	microwaves		
				282	describe relationship between wave characteristics		
				283	type of wave represented by a spring		
				286	sound is a wave of pressure		
				286	sound waves require matter to traverse		
				286	properties of sound waves		
				287	how we hear sound waves		
				287	frequency and pitch of sound		
				288	loudness and decibels and the sensitivity of the ear		
				288	relationship of loudness and amplitude and pressure in sound wave		
				289	vibrations create sound		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				291	sound vibrates the eardrum		
				291	pressure and amplitude of sound waves		
				291	how we know sound is a wave		
				292	importance of wavelength of sound waves		
				292	frequency and wavelengths of sound		
				292	sound is a longitudinal wave		
				294	effect of medium and temperature on speed of sound wave		
				298	constructing meaning from sound		
				299	how the ear works		
				300	pitch and frequency in music		
				300	music and sound		
				303	design of a guitar		
				306	list evidence that sound is a wave		
				308	wave amplitude and harmonics of tuning fork and musical instrument		
				310	light is a form of energy		
				310	light is a form of energy		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				312	the intensity of light		
				313	light carries information		
				314	the speed of light		
				320	visible light has just the right energy for life		
				320	photosynthesis converts light energy to chemical energy		
				322	photons are bundles of light energy		
				324	light from chemical reactions		
				328	how is light used for communication?		
				356	electromagnetic waves exchange energy between electricity and magnetic parts		
				356	light can be described in terms of waves		
				357	frequency and wavelength of light		
				358	speed of light is frequency multiplied by length		
				359	waves of the electromagnetic spectrum		
				360	visible light waves		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				370	relationship and conservation of mass and energy		
				373	wave fronts of light		
				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		
				506	temperature and addition of heat energy		
				506	temperature measures average kinetic energy		
				509	temperature change and thermal energy		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				512	temperature and thermal energy and heat		
				513	definition of calorie		
				513	transfer of thermal energy		
				514	the heat equation		
				515	thermodynamics and conservation of energy		
				516	refrigerator application		
				517	air conditioners		
				520	relationship between temp and average kinetic energy		
				522	heat conduction		
				523	heat conduction		
				524	conduction in solids and liquids and gases		
				526	convection in liquids		
				527	convection depends on speed and surface area		
				528	convection and weather		
				530	energy and radiation relationships		
				530	radiation		
				530	electromagnetic radiation		
				535	sources of heat transfer in buildings		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				535	sources of heat transfer in buildings		
				552	explanation of pressure and energy		
				552	conservation of energy in fluids		
				553	energy conservation and Bernoulli's equation		
				619	radiation as a flow of energy		
				622	energy of x-rays		
				629	conservation of energy in nuclear reactions		
				647	energy from antimatter		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
D.12.10 Physical Science	by the end of grade 12	Conservation of Energy and the Increase in Disorder	Using the science themes, illustrate the law of conservation of energy during chemical and nuclear reactions	189	energy appears in different forms	72	draw an energy flow diagram
				190	conversions of energy	206	is this reaction endothermic or exothermic?
				190	different forms of energy		
				194	energy transformations	210	simulate radioactive decay
				194	conservation of energy explained	211	types of radiation
				194	the law of conservation of energy	213	fusion and fission
				195	conservation of energy in a closed system		
				196	energy transformation hydroelectric plant		
				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		
				212	understand basic forms of energy		
				213	the conversion process of energy flow		
				215	energy flows in biological systems		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				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		
				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	relationship and conservation of mass and energy		
				378	electrical energy		
				384	batteries use chemical energy		
				393	conversion of energy in regenerative braking		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				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		
				502	elements past #92 are radioactive and decay		
				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		
				570	radioactive isotopes		
				570	use of radioactive isotopes in medicine		
				573	fusion		
				573	nuclear reactions		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				596	noble gases and alkali metals		
				597	the energy of chemical bonds is described		
				603	endothermic vs. exothermic reactions		
				603	chemical reactions and energy		
				610	energy in reaction of dynamite		
				614	three kinds of radioactivity		
				614	radioactive decay		
				615	alpha and beta and gamma radiation		
				616	energy and radioactivity		
				619	radiation as a flow of energy		
				620	danger of gamma rays and alpha particles		
				622	x-ray machines		
				622	energy of x-rays		
				623	CAT scans		
				625	energy changes in nuclear reactions		
				625	nuclear reactions		
				626	source of energy in nuclear reactions		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				627	fusion reactions		
				627	energy of fusion reactions		
				628	energy of fission reactions		
				628	fission reactions		
				629	conservation of energy in nuclear reactions		
				632	nuclear energy		
				634	three kinds of radioactive decay		
				635	differences between fission and fusion		
				647	energy from antimatter		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
D.12.11 Physical Science	by the end of grade 12	Interactions of Matter and Energy	Using the science themes, explain common occurrences in the physical world	13	physics applies to the internal working of the body	66	law of conservation of energy
				19	problems in the real world use both metric and English units	68	find the total energy at each position
				52	strobe photography	73	calculating momentum
				60	calculating acceleration from experiments	74	investigating collisions and conservation of energy
				70	calculating height and time of flight in free fall problems	75	investigate collisions and conservation of momentum
				73	antilock braking systems	77	the momentum form of Newton's second law
				80	applications of Newton's first law	80	explain the physics of a diver's somersaults
				90	examples of Newton's third law in the real world	89	making wave pulses on a string
				90	the natural jet engine in a squid	89	study characteristics of a wave pulse on a string
				91	force platform used to analyze forces from running and walking	89	study wave pulses on elastic cord
				92	force from a vertical jump	90	measure speed of a wave pulse
				98	effects of g forces and zero gravity on the human body	91	making plane waves in a ripple tank
				103	calculate the acceleration of a car including friction	91	make different types of waves in a ripple tank
						91	making circular waves in a ripple tank

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				104	reducing friction and hovercraft and maglev trains	92	how does sound get through tiny cracks?
				105	friction is useful for brakes and tires	93	investigate frequency and wavelength
				109	jack-in-the-box uses a spring	125	study the polarization of a transverse spring wave
				112	design of structures	126	explain how polarizing sunglasses work
				118	examples of scalars		
				129	analyze a horizontally launched projectile		
				130	kicked soccer ball acts as a projectile launched at an angle		
				131	hang time		
				133	example of gymnast for forces applied at an angle		
				138	robot navigation application		
				139	inertial navigation system		
				142	calculating acceleration for sled on slope		
				144	examples of objects moving in a circle		
				147	speedometers and odometers		
				149	centripetal force at the amusement park		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				150	calculate the centripetal acceleration of a motorcycle		
				155	satellite motion application		
				156	HEO and geostationary orbit		
				160	using torque in household devices		
				161	force on a wrench		
				167	SUV rollovers and center of gravity		
				172	bicycle physics application		
				181	crowbar as an example of a lever		
				183	small drills use gears		
				184	screw turns rotating motion into linear motion		
				191	calculate the potential energy of a cart		
				192	calculating kinetic energy depends on speed and mass		
				193	calculate the kinetic energy of a moving car		
				195	applying conservation of energy for a marble rolling on a hilly track		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				197	conservation of energy for Hoover Dam		
				197	calculating energy supplied by Hoover Dam		
				199	trace the energy transformations from sun to a flashing taillight		
				204	efficiency of Earth		
				205	calories in food		
				207	power is the rate of doing work or using energy		
				208	units of power		
				209	calculating power for common devices		
				209	estimating power requirements based on force		
				210	energy from the sun drives the weather on Earth		
				211	estimate average input power of a person		
				215	energy flows in biological systems		
				216	estimating the energy in tides		
				220	calculate energy and power for humans		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				223	momentum formula and calculating momentum		
				226	solving elastic and inelastic collision problems		
				227	accident reconstruction		
				229	force on a rocket from change in momentum		
				230	calculate change in momentum for elastic vs. inelastic collisions		
				232	angular momentum of skater spinning and diver		
				234	gyroscopes and angular momentum		
				236	momentum conservation of turbofan engine		
				238	momentum in billiards		
				239	calculate momentum		
				249	harmonic motion in machines		
				250	why airplanes have tails		
				262	examples of waves		
				264	basic properties of frequency and wavelength and amplitude		
				265	wave pulse		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				267	water waves are transverse and Slinky is longitudinal		
				268	creating plane waves and circular waves		
				268	one- and two- and three-dimensional waves		
				275	standing waves on a string		
				276	natural frequency and harmonics		
				277	standing waves on a string		
				286	properties of sound waves		
				290	stereo sound		
				299	understanding human hearing		
				303	design of a guitar		
				308	wave amplitude and harmonics of tuning fork and musical instrument		
				323	glow-in-the-dark plastic		
				337	rainbows are an example of dispersion		
				347	the compound microscope		
				365	polarized sunglasses and LCD computer screens		
				390	breakdown voltage and lightning		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				398	holiday lights wired in series		
				401	why aren't birds electrocuted?		
				410	paying for electricity		
				413	wiring application		
				413	circuits in your house		
				418	charge of everyday objects		
				430	almost all electric appliances use capacitors		
				433	cameras use capacitors to supply energy for flash bulbs		
				448	how does a compass work?		
				448	biological compasses of animals		
				458	where coils are used		
				462	electromagnet in a toaster		
				527	windchill factor		
				546	types of solid materials and their properties		
				579	shape of a molecule influences what it does		
				579	structure of water molecule		

Correlation to Wisconsin Model Academic Standards for Science

Foundations of Physics

Student Text and Investigation Manual

Standard #: Content Stand	grade	topic	Performance Standard	student text pg	detail	investigation pg	detail
				593	creating materials with useful properties through chemical changes		
				593	chemical change example of burning		
				602	formation of rust is a chemical reaction		
				608	how engines work		
				621	exposure to UV radiation		
				627	fusion reactions and the sun		