

**Correlation to Sunshine State Science Content Assessed by FCAT grade 10
 Foundations of Physical Science with Earth and Space Science
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Standard #: Strand	Standard	Grade tested	Benchmark	student text pg	detail	investigation pg	detail
SC.A.1.4.1 The Nature of Matter	The student understands that all matter has observable, measurable properties.	10	The student knows that the electron configuration in atoms determines how a substance reacts and how much energy is involved in its reactions.	324 324 335 388	which element is more likely to combine with other elements? use the periodic table to predict chemical formulas chemical bonding and the periodic table showing valence electrons in a diagram	136 140 141 141 158	ions find the number of electrons in outermost level when an atom ionizes modeling a chemical bond measure energy changes in 3 different reactions
SC.A.1.4.2 The Nature of Matter	The student understands that all matter has observable, measurable properties.	10	The student knows that the vast diversity of the properties of materials is primarily due to variations in the forces that hold molecules together.	389 389 389	forces in the nucleus strong nuclear force electromagnetic force	136	strong force
SC.A.1.4.3 The Nature of Matter	The student understands that all matter has observable, measurable properties.	10	The student knows that a change from one phase of matter to another involves a gain or loss of energy.	284 405 455 461	states of matter and arrangement of molecules molecular structure of ice examples of flow of heat conduction and convection and radiation	118 118 188 203 204	molecules in a liquid investigate melting investigate heating water with an immersion heater investigate the temperature/time curves as water is cooled through a phase change to ice compare the shape of the water line and the ice line on the temperature/time graph

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SC.A.1.4.4 The Nature of Matter	The student understands that all matter has observable, measurable properties.	10	The student experiments and determines that the rates of reaction among atoms and molecules depend on the concentration, pressure, and temperature of the reactants and the presence or absence of catalysts.	364 422	formation of petroleum is a very slow chemical reaction acids and bases and enzymes in digestion	156	predict products in a double displacement reaction
SC.A.1.4.5 The Nature of Matter	The student understands that all matter has observable, measurable properties.	10	The student knows that connections (bonds) form between substances when outer-shell electrons are either transferred or shared between their atoms, changing the properties of substances.	324 324 330 331 332 335 388 409 410	which element is more likely to combine with other elements? use the periodic table to predict chemical formulas ionic bonds covalent bonds distinguishing between ionic and covalent bonds chemical bonding and the periodic table showing valence electrons in a diagram dissolving an ionic compound solute dissolution depends on chemical bonds	136 140 141 141 143 143	ions find the number of electrons in outermost level when an atom ionizes modeling a chemical bond classify ionic compounds ionic compounds

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SC.A.2.4.1 The Nature of Matter	The student understands the basic principles of atomic theory.	10	The student knows that the number and configuration of electrons will equal the number of protons in an electrically neutral atom and when an atom gains or losses electrons, the charge is unbalanced.	311	protons/neutrons/electrons	132	building atom models
				311	location/size/charge of subatomic particles	133	location of electrons in atom
				315	atoms of same element have same atomic number	133	protons and neutrons
						136	ions
				318	proton/electron attraction	136	model stable and neutral atoms
						137	importance of atomic number
						137	build atomic models
						140	review subatomic particles
						141	whan an atom ionizes
SC.A.2.4.2 The Nature of Matter	The student understands the basic principles of atomic theory.	10	The student knows the difference between an element, a molecule, and a compound.	279	summary of matter classification	114	investigate a homogeneous mixture
				288	create a poster of matter classification	169	investigate solutions and colloids and suspensions
SC.A.2.4.3 The Nature of Matter	The student understands the basic principles of atomic theory.	10	The student knows that a number of elements have heavier, unstable nuclei that decay, spontaneously giving off smaller particles and waves that result in a small loss of mass and release a large amount of energy.	387	fusion and fission explained	138	fusion and fission
				393	carbon dating	160	radioactive decay
				393	radioisotopes in science and medicine	161	research pros and cons of uses for radioactive elements
				400	research pros and cons of nuclear technology		
				623	nuclear fusion and the sun		

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SC.A.2.4.4 The Nature of Matter	The student understands the basic principles of atomic theory.	10	The student knows that nuclear energy is released when small, light atoms are fused into heavier ones.	387 623 640 640	fusion and fission explained nuclear fusion and the sun death of massive stars birth of elements	138 264 267	fusion and fission light emission and chemical composition spectral lines and elements
SC.A.2.4.5 The Nature of Matter	The student understands the basic principles of atomic theory.	10	The student knows that elements are arranged into groups and families based on similarities in electron structure and that their physical and chemical properties can be predicted.	320 321 329 330 332 335	groups of elements groups of elements and valence shells periodic table columns and valence electrons bonding and periodic table position periodic table and electronegativities periodic table and oxidation numbers	133 141 142	using the periodic table build model of Na and Cl atoms and explain why they bond to form a molecule arrangement of electrons and groups of elements
SC.A.2.4.6 The Nature of Matter	The student understands the basic principles of atomic theory.	10	The student understands that matter may act as a wave, a particle, or something else entirely different with its own characteristic behavior.	195 357 480 626	waves transmit energy chemical reactions involve rearrangement of atoms energy and radiation relationships the sun's energy reaches Earth in the form of electromagnetic waves		

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SC.B.1.4.1 Energy	The students recognizes that energy may be changed in form with varying efficiency.	10	The student understands how knowledge of energy is fundamental to all the scientific disciplines (e.g., the energy required for biological processes in living organisms and the energy required for the building, erosion, and rebuilding of the Earth).	87	concept of energy as stored work	36	energy conservation and the roller coaster
				88	potential and kinetic energy explained	37	investigating conservation of energy with rollercoaster
				90	conservation of energy explained	38	identify potential/kinetic energy conversions
				91	following an energy transformation	38	explore energy transformations
				91	following an energy transformation	38	conservation of energy and energy transformations
				91	understand basic forms of energy	39	make an energy flow chart
				91	energy conversions	39	identify type of energy involved
				92	energy transformations and conservation	204	investigating latent heat and thermal buffering
				93	different forms of energy described		
				96	prove that energy is conserved		
				406	hydrogen bonding and the gaseous state of water		
				537	potential energy transformed to kinetic energy causes earthquakes		
				623	energy from the sun		
				626	harnessing the sun's energy		

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SC.B.1.4.2 Energy	The students recognizes that energy may be changed in form with varying efficiency.	10	The student understands that there is conservation of mass and energy when matter is transformed.	88 90 91 92 93 96	potential and kinetic energy explained conservation of energy explained energy conversions energy transformations and conservation different forms of energy described prove that energy is conserved	36 37 38 38 150	energy conservation and the roller coaster investigating conservation of energy with rollercoaster explore energy transformations conservation of energy and energy transformations investigate conservation of mass in effervescent tablet reaction
SC.B.1.4.3 Energy	The students recognizes that energy may be changed in form with varying efficiency.	10	The student knows that temperature is a measure of the average translational kinetic energy of motion of the molecules in an object.	451 453 454	temperature is a measure of average kinetic energy comparing temperature in Fahrenheit and Celsius scales changes in temperature are directly related to changes in energy	186 188	develop a way to convert between Fahrenheit and Celsius temperature scales investigate the increase of temperature of water as thermal energy is added

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SC.B.1.4.4 Energy	The students recognizes that energy may be changed in form with varying efficiency.	10	The student knows that as electrical charges oscillate, they create time-varying electric and magnetic fields that propagate away from the source as an electromagnetic wave.	105 106 107 108 108 159 163 171	charge is a fundamental property of matter static charge discussed explanation of coulomb how an electroscope works electroscopes magnetism explained understanding magnetic fields electromagnetic induction explained	42 73 73	investigate electric charge use magnetic induction to create an electric field exploring electric generators
SC.B.1.4.5 Energy	The students recognizes that energy may be changed in form with varying efficiency.	10	The student knows that each source of energy presents advantages and disadvantages to its use in society (e.g., political and economic implications may determine a society's selection of renewable or nonrenewable energy sources).	172 391 391 400 414 438 560 627 627	generating electric power nuclear vs. fossil fuels impact of nuclear energy reducing pollution environmental impact of electrical generating facilities impact of using fossil fuels description of geothermal energy using photovoltaic cells the efficiency of photovoltaic cells	52 262 262	the cost of using electrical appliances solar energy can be used to generate electricity without producing pollution determine the efficiency of a photovoltaic cell

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SC.B.1.4.6 Energy	The students recognizes that energy may be changed in form with varying efficiency.	10	The student knows that the first law of thermodynamics relates the transfer of energy to the work done and the heat transferred.	84 85 91 92 96	work input and output some input work is converted to heat energy conversions where does "spent" energy go? explain the "lost" energy	31 38	work output vs. work input explore energy transformations
SC.B.1.4.7 Energy	The students recognizes that energy may be changed in form with varying efficiency.	10	The student knows that the total amount of usable energy always decreases, even though the total amount of energy is conserved in any transfer.	85 88 90 91 92 92 93 96 96	some input work is converted to heat potential and kinetic energy explained conservation of energy explained energy conversions where does "spent" energy go? energy transformations and conservation different forms of energy described explain the "lost" energy prove that energy is conserved	36 37 38 38	energy conservation and the roller coaster investigating conservation of energy with rollercoaster explore energy transformations conservation of energy and energy transformations

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SC.B.2.4.1 Energy	The student understands the interaction of matter and energy.	10	The student knows that the structure of the universe is the result of interactions involving fundamental particles (matter) and basic forces (energy) and that evidence suggests that the universe contains all of the matter and energy that ever existed.	91 91 389 623 626 640 640	following an energy transformation understand basic forms of energy atoms and nuclear energy energy from the sun harnessing the sun's energy death of massive stars birth of elements	39 39 84 158 198 264 267	make an energy flow chart identify type of energy involved waves in motion energy in chemical reactions food energy light emission and chemical composition spectral lines and elements
SC.C.1.4.1 Force and Motion	The student understands that types of motion may be described, measured, and predicted.	10	The student knows that all motion is relative to whatever frame of reference is chosen and that there is no absolute frame of reference from which is observe all motion.	13 18 25	speed is relative what is the speed of an object that is standing still? conceptual models of motion		
SC.C.1.4.2 Force and Motion	The student understands that types of motion may be described, measured, and predicted.	10	The student knows that any change in velocity is an acceleration.	33 36	understanding acceleration examples of acceleration	14	acceleration is the rate at which speed changes

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SC.C.2.4.1 Force and Motion	The student understands that the types of force that act on an object and the effect of that force can be described, measured, and predicted.	10	The student knows that acceleration due to gravitational force is proportional to mass and inversely proportional to the square of the distance between the objects.	52 54 55 606	gravity depends on mass Newton's law of universal gravitation calculating gravitational force between objects Newton's law of universal gravitation	257	relating the relationship between orbital speed and distance to the equation of universal gravitation
SC.C.2.4.2 Force and Motion	The student understands that the types of force that act on an object and the effect of that force can be described, measured, and predicted.	10	The student knows that electrical forces exist between any two charged objects.	105 106 107 108 108 389 389 389	charge is a fundamental property of matter static charge discussed explanation of coulomb how an electroscope works electroscopes forces in the nucleus strong nuclear force electromagnetic force	42 136	investigate electric charge strong force
SC.C.2.4.3 Force and Motion	The student understands that the types of force that act on an object and the effect of that force can be described, measured, and predicted.	10	The student describes how magnetic force and electrical force are two aspects of a single force.	106 106 164 166 166	electrical forces electrical force is incredibly strong! what is an electromagnet? increased current vs. strength of magnetic field building an electromagnet	66 67	build an electromagnet find out what happens to strength of electromagnet when current is increased

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SC.C.2.4.4 Force and Motion	The student understands that the types of force that act on an object and the effect of that force can be described, measured, and predicted.	10	The student knows that the forces that hold the nucleus of an atom together are much stronger than electromagnetic force and that this is the reason for the great amount of energy released from the nuclear reactions in the sun and other stars.	389 389 389 638 639 640	forces in the nucleus strong nuclear force electromagnetic force the life cycle of stars description and illustration of the life cycle of stars elements formed by nuclear fusion in stars	136 255	strong force observe and describe the appearance of the moon and Jupiter and its moons
SC.C.2.4.5 Force and Motion	The student understands that the types of force that act on an object and the effect of that force can be described, measured, and predicted.	10	The student knows that most observable forces can be traced to electric forces acting between atoms or molecules.	105 106 106 106 107 108 108 389 389 389	charge is a fundamental property of matter electrical forces electrical force is incredibly strong! static charge discussed explanation of coulomb how an electroscope works electroscopes forces in the nucleus strong nuclear force electromagnetic force	42 136	investigate electric charge strong force

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SC.C.2.4.6 Force and Motion	The student understands that the types of force that act on an object and the effect of that force can be described, measured, and predicted.	10	The student explains that all forces come in pairs commonly called action and reaction.	45 59	Newton's third law summarized Newton's third law in detail	22 23	car and ramp and Newton's 3rd law using 3rd law to explain common phenomena

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SC.D.1.4.1 Processes that shape the Earth	The student recognizes that processes in the lithosphere, atmosphere, hydrosphere, and biosphere interact to shape the Earth.	10	The student knows how climatic patterns on Earth result from an interplay of many factors (Earth's topography, its rotation on its axis, solar radiation, the transfer of heat energy where the atmosphere interfaces with lands and ocean currents ect..	480	transfer of energy in and out of Earth's atmosphere	207	research how large bodies of water affect climate
				483	global temperature changing over time	207	research how large bodies of water affect climate
				491	Earth's temperature varies with latitude	209	investigating factors which cause the seasons
				492	Earth's tilt causes seasons	213	exploring how temperature-dependent layering creates currents
				493	convection currents in the atmosphere	215	understanding the Atlantic gyre
				494	the Coriolis effect	219	use radar to detect a tornado
				495	global wind patterns	220	using radar to track a hurricane
				496	descriptions of ocean currents and their effects on climate		
				496	effects of the Gulf Stream on climate of Great Britain		
				497	factors which influence the weather		
				499	cloud formation		
				502	effects of moving air masses		
				502	cold fronts		
				503	jet streams		
				503	warm fronts		
				504	rotation of air masses due to Coriolis effect		

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Standard #: Strand	Standard	Grade tested	Benchmark	student text pg	detail	investigation pg	detail
				505	description of thunderstorms		
				506	description of hurricanes		
				507	description of tornadoes		
				508	causes and effects of the El Nino Southern Oscillation		
				510	effect of cold ocean currents on formation of fog desserts		
				511	effect of warm ocean currents on formation of tropical rainforest		
				513	effect of large bodies of water on climate		
				515	alpine tundra occurs at high altitudes		
				518	create a model to explain why Earth has seasons		
				528	Earth's surface is changing		

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SC.D.1.4.2 Processes that shape the Earth	The student recognizes that processes in the lithosphere, atmosphere, hydrosphere, and biosphere interact to shape the Earth.	10	The student knows that the solid crust of earth consists of slow-moving, separate plates that float on a denser, molten layer of Earth and that these plates interact with each other, changing the Earth's surface in many ways.	528	definition of plate tectonics	228	listing which kind of plate boundary is associated with each geologic feature
				530	sea-floor spreading and mid-ocean ridges	229	identifying tectonic plates and plate boundaries
				531	magnetic patterns on the sea floor		
				532	theory of plate tectonics		
				533	describing plate boundaries		
				534	divergent plate boundaries		
				535	convergent plate boundaries		
				536	transform plate boundaries		

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SC.D.1.4.3 Processes that shape the Earth	The student recognizes that processes in the lithosphere, atmosphere, hydrosphere, and biosphere interact to shape the Earth.	10	The student knows that changes in Earth's climate, geological activity, and life forms may be traced and compared.	439	illustration of acid rain formation	230	predicting plate movement over 50 million years and the resultant land features
				481	global warming		
				482	changes to the oceans due to increasing global temperatures		
				521	origin of fossils		
				523	faunal succession		
				524	table and description of the geologic time scale		
				524	extinction of the dinosaurs due to giant meteor hitting Earth		
				528	predicting what Earth might look like in 50 million years		
				534	land features resulting from divergent plate boundaries		
				535	resulting land features from subduction		
				536	land features resulting from transform plate boundaries		
				547	predict separation of North America and Europe in 75 million years		

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				548	predict effects of divergent plate boundaries on Great Rift Valley		
				563	mountain-building		
				564	changes in land features due to erosion		
				566	ice ages		
				566	effect of glaciers on land		
				568	how urban sprawl changes local climate		
				619	how an asteroid event may have caused the extinction of dinosaurs		
SC.D.1.4.4 Processes that shape the Earth	The student recognizes that processes in the lithosphere, atmosphere, hydrosphere, and biosphere interact to shape the Earth.	10	The student knows that Earth's systems and organisms are the result of a long, continuous change over time.	481	global warming		
				483	global temperature changing over time		
				523	faunal succession		
				524	extinction of the dinosaurs due to giant meteor hitting Earth		
				524	table and description of the geologic time scale		
				528	Earth's surface is changing		
				566	ice ages		
				619	how an asteroid event may have caused the extinction of dinosaurs		

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SC.D.2.4.1 Processes that shape the Earth	The student understands the need for protection of the natural systems on Earth.	10	The student understands the interconnectedness of the systems on Earth and the quality of life.	389	atoms and nuclear energy	84	waves in motion
				414	effect of electrical generating facilities on dissolved oxygen in water	158	energy in chemical reactions
				429	the water cycle	178	actions to take to improve water quality
				435	pond ecosystem and water quality	178	predict the quality of surface water to be tested and justify your answer
				437	effects of acid rain on natural environments		
				438	acid rain formation system	198	food energy
				439	illustration of acid rain formation		
				443	impact of increased CO2 in oceans		
				471	nitrogen cycle		
				479	effects of CFC's on the ozone layer		
				482	effects of burning fossil fuels		
				482	changes to the oceans due to increasing global temperatures		
				515	permafrost		
				568	how urban sprawl changes local climate		

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SC.E.1.4.1 Earth and Space	The student understands the interaction and organization in the Solar System and the universe and how this affects life on Earth.	10	The student understands the relationships between events on Earth and the movements of the Earth, its moon, the other planets, and the sun.	491	the effects of Earth's rotation on daytime heating and nighttime cooling	208	developing a hypothesis about why the seasons occur
				492	Earth's tilt causes seasons	210	investigating how the distance of Earth from the sun affects its intensity
				494	the Coriolis effect		
				504	rotation of air masses due to Coriolis effect	211	investigating how Earth's tilt affects the sun's intensity
				584	the lunar cycle		
				585	Earth's rotation and patterns of day and night	238	why studying the moon's surface is useful for understanding Earth
				587	axial tilt causes the seasons	248	building a sundial to keep track of daily time based on the cycles between Earth and the sun
				588	solar eclipses		
				588	lunar eclipses		
				589	solar eclipses	250	modeling the lunar cycle
				589	solar eclipses	251	constructing a lunar calendar
				591	characteristics of the universe		
				601	identify seasons		
				607	properties of the moon		
				608	the moon as a satellite of Earth		
				609	the moon's effect on tides on Earth		
				610	the Earth-moon system		
				611	giant impact theory		

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				633	what is a star?		
				642	what is a galaxy?		
				652	research and describe astronomical objects		
SC.E.1.4.2 Earth and Space	The student understands the interaction and organization in the Solar System and the universe and how this affects life on Earth.	10	The student knows how the characteristics of other planets and satellites are similar to and different from those of the Earth.	472	comparison of Earth's atmosphere to other planets	256	simulate an object in orbit and investigate how orbital period varies within distance
				612	orbits of planets around the sun	258	setting up a scale model of the solar system
				613	explanation and illustration of the solar system	259	determining scale distances for the planets
				614	relative sizes and distances within the solar system	260	determining scale sizes of the planets
				615	what makes Earth capable of supporting life		
				619	asteroids and comets		
				620	meteors and meteorites and the Kuiper Belt		
				641	the existence of other planetary systems		

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SC.E.1.4.3 Earth and Space	The student understands the interaction and organization in the Solar System and the universe and how this affects life on Earth.	10	The student knows the various reasons that Earth is the only planet in our Solar System that appears to be capable of supporting life as we know it.	472 615 616 617 618 621	comparison of Earth's atmosphere to other planets what makes Earth capable of supporting life classifying the planets classifying the planets comparing properties of the planets is Pluto a planet		
SC.E.2.4.1 Earth and Space	The student recognizes the vastness of the universe and the Earth's place in it.	10	The student knows that the stages in the development of three categories of stars are based on mass: stars that have the approximate mass of our sun, stars that are two-to-three-stellar masses and develop into neutron stars ect.	638 639 639 640 640	the life cycle of stars death of small to medium stars results in white dwarfs and planetary nebula and black dwarfs description and illustration of the life cycle of stars death of massive stars results in supernovas and neutron stars and black holes elements formed by nuclear fusion in stars	255 264	observe and describe the appearance of the moon and Jupiter and its moons using spectroscopy to analyze the light emitted by stars and identify most common elements
SC.E.2.4.2 Earth and Space	The student recognizes the vastness of the universe and the Earth's place in it.	10	The student identifies the arrangement of bodies found within and outside our galaxy.	643	the structure of the Milky Way Galaxy		

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SC.E.2.4.3 Earth and Space	The student recognizes the vastness of the universe and the Earth's place in it.	10	The student knows astronomical distance and time.	592 593 594 595 596 597 598 634	calculating and using light years light years and time history of the telescope types and uses of telescopes types and uses of telescopes satellites as tools of astronomy spacecraft as tools of astronomy the use of spectroscopy to analyze stars	264 268 268	understand why spectroscopy is an important tool of astronomers calculating the distance to stars and galaxies using apparent brightness and absolute brightness measuring apparent brightness to calculate the distance to stars and galaxies
SC.E.2.4.4 Earth and Space	The student recognizes the vastness of the universe and the Earth's place in it.	10	The student understands stellar equilibrium.	638 639 639 640 640	the life cycle of stars death of small to medium stars results in white dwarfs and planetary nebula and black dwarfs description and illustration of the life cycle of stars death of massive stars results in supernovas and neutron stars and black holes elements formed by nuclear fusion in stars	255 264	observe and describe the appearance of the moon and Jupiter and its moons using spectroscopy to analyze the light emitted by stars and identify most common elements

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SC.E.2.4.5 Earth and Space	The student recognizes the vastness of the universe and the Earth's place in it.	10	The student knows various scientific theories on how the universe was formed.	611 612 621 647 648 649	historical theories of the origin of the moon historical theories about the solar system historical theories of which objects were planets the Big Bang theory of the origin of the universe evidence for the Big Bang theory evidence for the Big Bang theory		
SC.E.2.4.6 Earth and Space	The student recognizes the vastness of the universe and the Earth's place in it.	10	The student knows the various ways in which scientists collect and generate data about our universe (e.g., X-ray telescopes, computer simulations of gravitational systems, nuclear reactions, space probes, and supercollider simulations).	594 595 596 597 598 634 648 649	history of the telescope types and uses of telescopes types and uses of telescopes satellites as tools of astronomy spacecraft as tools of astronomy the use of spectroscopy to analyze stars evidence for the Big Bang theory evidence for the Big Bang theory	264 268	understand why spectroscopy is an important tool of astronomers measuring apparent brightness to calculate the distance to stars and galaxies

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SC.E.2.4.7 Earth and Space	The student recognizes the vastness of the universe and the Earth's place in it.	10	The student knows that mathematical models and computer simulations are used in studying evidence from many sources to form a scientific account of the universe.	594	history of the telescope	264	using spectroscopy to analyze the light emitted by stars and identify most common elements
				595	types and uses of telescopes		
				596	types and uses of telescopes	264	understand why spectroscopy is an important tool of astronomers
				597	satellites as tools of astronomy		
				598	spacecraft as tools of astronomy	268	calculating the distance to stars and galaxies using apparent brightness and absolute brightness
				634	the use of spectroscopy to analyze stars		
				639	death of small to medium stars results in white dwarfs and planetary nebula and black dwarfs	268	measuring apparent brightness to calculate the distance to stars and galaxies
				640	death of massive stars results in supernovas and neutron stars and black holes		
				648	evidence for the Big Bang theory		
				649	evidence for the Big Bang theory		

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Standard #: Strand	Standard	Grade tested	Benchmark	student text pg	detail	investigation pg	detail
SC.G.2.4.5 How Living Things Interact with Their Environment	The student understands the consequences of using limited natural resources.	10	The student understands that the amount of life any environment can support is limited and that human activities can change the flow of energy and reduce the fertility of the Earth.	414	effect of electrical generating facilities on dissolved oxygen in water	178	actions to take to improve water quality
				437	effects of acid rain on natural environments	178	predict the quality of surface water to be tested and justify your answer
				437	acid rain		
				438	causes and health effects of acid rain	182	the effects of acid rain on organisms in aquatic environments
				439	illustration of acid rain formation		
				443	impact of increased CO2 in oceans		
				443	impact of increased CO2 on oceans		
				471	nitrogen cycle		
				479	effects of CFC's on the ozone layer		
				482	effects of burning fossil fuels		
				482	changes to the oceans due to increasing global temperatures		
				504	temperature inversion		
				515	permafrost		
				568	how urban sprawl changes local climate		
				568	environmental impact of urban sprawl		

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Standard #: Strand	Standard	Grade tested	Benchmark	student text pg	detail	investigation pg	detail
SC.G.2.4.6 How Living Things Interact with Their Environment	The student understands the consequences of using limited natural resources.	10	The student knows the ways in which humans today are placing their environmental support systems at risk (e.g., rapid human population growth, environmental degradation, and resource depletion).	411	effects of PCB's in Great Lakes	178	actions to take to improve water quality
				414	effect of electrical generating facilities on dissolved oxygen in water	178	predict the quality of surface water to be tested and justify your answer
				433	The Clean Water Act	178	predict the quality of surface water to be tested and justify your answer
				435	water quality testing		
				436	water quality testing	179	address what you can do to maintain or improve the water quality at the test site
				437	acid rain		
				437	effects of acid rain on natural environments	182	the effects of acid rain on organisms in aquatic environments
				437	acid rain		
				437	effects of acid rain on the soil	182	the effects of acid rain on organisms in aquatic environments
				438	causes and health effects of acid rain		
				443	impact of increased CO2 on oceans	443	impact of increased CO2 in oceans
				443	impact of increased CO2 on oceans		
				443	impact of increased CO2 in oceans		
				444	pollution and the ocean food chain	445	pollution and the ocean food chain
				445	pollution and the ocean food chain		
				471	nitrogen cycle		

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Standard #: Strand	Standard	Grade tested	Benchmark	student text pg	detail	investigation pg	detail
				479	effects of CFC's on the ozone layer		
				482	effects of burning fossil fuels		
				504	temperature inversion		
				515	permafrost		

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Standard #: Strand	Standard	Grade tested	Benchmark	student text pg	detail	investigation pg	detail
SC.H.1.4.1 The Nature of Science	The student uses the scientific processes and habits of mind to solve problems.	10	The student knows that investigations are conducted to explore new phenomena, to check on previous results, to test how well a theory predicts, and to compare different theories.	7	experimentation begins with a question	6	asking questions and learning about natural world
				9	steps in the scientific method	7	design your own experiment
				10	forming a hypothesis	7	perform your own experiment
				19	design your own experiment	7	compare results with hypothesis
				19	design your own experiment	9	design three experiments using car and ramp
				42	devise an experiment	10	conduct car/ramp experiment
				448	describe steps you would take to determine whether pH affects frog population	16	investigate Newton's 2nd law
				473	why do ears pop	16	decide how to vary the force on the car for this experiment
				504	meteorologists use atmospheric pressure data to understand movement of weather systems	26	what variables can be changed?
				648	evidence for Big Bang theory	34	investigate motion on a rollercoaster
						75	design pendulum experiment
						75	plan three experiments to determine which variable affects the period of a pendulum
						75	perform self-designed experiment

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Standard #: Strand	Standard	Grade tested	Benchmark	student text pg	detail	investigation pg	detail
						151	design experiment to find out if mass is conserved
						170	what three factors influence dissolving rate?
						170	which factor will produce fastest dissolving rate?
						182	simulating the effect of acid rain on daphnia
						188	conducting investigation of efficiency of immersion heater
						193	conducting experiments on heat transfer
						205	investigating how specific heat of water regulates Earth's temperature
						215	the food paradox of the oceans
						233	identifying how the earthquake model represents an earthquake
						237	develop a research plan for studying volcanoes

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Standard #: Strand	Standard	Grade tested	Benchmark	student text pg	detail	investigation pg	detail
SC.H.1.4.2 The Nature of Science	The student uses the scientific processes and habits of mind to solve problems.	10	The student knows that from time to time, major shifts occur in the scientific view of how the world works, but that more often the changes that take place in the body of scientific knowledge are small modifications of prior knowledge.	10	process of reviewing hypothesis explained	35	what evidence is there in support of your hypothesis?
				34	Aristotle vs. Newton	39	critique group's explanation of energy transformations
				45	Newton's Laws of Motion	39	review energy theory in context of everyday scenarios
				54	Newton and the force of gravity	39	analyze energy transformations in different scenarios
				105	Benjamin Franklin	77	show how energy loss data could be applied to designing a real clock
				107	Charles-Augustin Coulomb	77	compare law of conservation of energy to motion of pendulum
				312	contributions of Fermi	151	review your hypothesis
				321	contributions of Mendeleev	151	do the data support the hypothesis
				393	contributions of Marie and Pierre Curie	157	add new rules to list based on findings
				521	relative dating and modern geology based on Steno's theories	171	did you prove or disprove your hypothesis?
				524	Kelvin's calculations of Earth's age	171	what was happening at molecular level?
				528	theory of plate tectonics	197	evaluating your aneroid barometer design
				529	critiquing Wegener's theories of continental drift		
				563	Darwin's theories of the Andes formation		
				566	what causes ice ages		
				611	theories of origin of the moon		

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Standard #: Strand	Standard	Grade tested	Benchmark	student text pg	detail	investigation pg	detail
				612	early theories of the solar system		
				647	Big Bang theory		
SC.H.1.4.3 The Nature of Science	The student uses the scientific processes and habits of mind to solve problems.	10	The student understands that no matter how well one theory fits observations, a new theory might fit them as well or better, or might fit a wider range of observations, because in science, the testing, revising, and occasional discarding ect.			21	construct reasonable explanation based on data
						35	study data and determine importance of height on speed of marble
						45	analyze data and explain a rule
						151	does your experiment agree with law of conservation of mass?
						157	add new rules to list based on findings
						197	evaluating your aneroid barometer design
						231	evaluating your completed bathymetric map
						247	evaluate your ability to interpret rock formations

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Standard #: Strand	Standard	Grade tested	Benchmark	student text pg	detail	investigation pg	detail
SC.H.1.4.4 The Nature of Science	The student uses the scientific processes and habits of mind to solve problems.	10	The student knows that scientists in any one research group tend to see things alike and that therefore scientific teams are expected to seek out the possible sources of bias in the design of their investigations and in their data analysis.	23	why make models?	202	modeling the effect of greenhouse gases on Earth's temperature
				24	scientific models		
				24	what is a scientific model?	212	modeling underwater rivers and waterfalls and springs
				34	Aristotle vs. Newton		
				45	Newton's Laws of Motion	232	construct a model that simulates an earthquake
				54	Newton and the force of gravity	258	setting up a scale model of the solar system
				73	impact of Da Vinci's work		
				105	Benjamin Franklin		
				107	Charles-Augustin Coulomb		
				312	contributions of Fermi		
				321	contributions of Mendeleev		
				393	contributions of Marie and Pierre Curie		
				485	computer modeling to predict greenhouse effects		
				494	modeling air currents		
				518	create a model (#1)		
				524	model of Earth's history		
				533	modeling plate boundaries		
				576	rock cycle model		
				614	solar system modeling		

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Standard #: Strand	Standard	Grade tested	Benchmark	student text pg	detail	investigation pg	detail
				624	model of the sun's anatomy		
SC.H.1.4.5 The Nature of Science	The student uses the scientific processes and habits of mind to solve problems.	10	The students understands that new ideas in science are limited by the context in which they are conceived, are often rejected by the scientific establishment, sometimes spring from unexpected finding, and usually grow slowly from many contributors.	320 391 583 585 586 589 594	the quests of alchemists scientific discovery and the atomic age history of calendars counting the days in a year the history of clocks and the division of time ancient beliefs about solar eclipses history of the telescope	198	contributions of Schönbein

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Standard #: Strand	Standard	Grade tested	Benchmark	student text pg	detail	investigation pg	detail
SC.H.1.4.6 The Nature of Science	The student uses the scientific processes and habits of mind to solve problems.	10	The student understands that, in the short run, new ideas that do not mesh well with mainstream ideas in science often encounter vigorous criticism and that, in the long run, theories are judged by how they fit with other theories.	521	relative dating and modern geology based on Steno's theories	39	critique group's explanation of energy transformations
				524	Kelvin's calculations of Earth's age	39	review energy theory in context of everyday scenarios
				528	theory of plate tectonics	39	analyze energy transformations in different scenarios
				529	critiquing Wegener's theories of continental drift	77	show how energy loss data could be applied to designing a real clock
				563	Darwin's theories of the Andes formation	77	compare law of conservation of energy to motion of pendulum
				566	what causes ice ages		
				611	theories of origin of the moon		
				612	early theories of the solar system		
				647	Big Bang theory		

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Standard #: Strand	Standard	Grade tested	Benchmark	student text pg	detail	investigation pg	detail
SC.H.1.4.7 The Nature of Science	The student uses the scientific processes and habits of mind to solve problems.	10	The student understands the importance of a sense of responsibility, a commitment to peer review, truthful reporting of the methods and outcomes of investigations, and making the public aware of the findings.	20	explain your reasoning	9	reporting on an experiment
						9	present conclusions to the class
						15	discuss and test ideas with your group
						19	explain how you arrived at your answer
						29	discuss what you learned about gears
						37	describe the flow of energy based on experimental graph
						39	give a brief presentation to the class
						47	present and defend an explanation
						47	discuss an explanation with your group
						129	explain your answer and justify
						145	present findings to the class
						145	present findings and methods used
						151	present results to the class
						179	create water quality report

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Standard #: Strand	Standard	Grade tested	Benchmark	student text pg	detail	investigation pg	detail
						181	write paragraph to explain results
						183	write summary of findings
SC.H.2.4.1 The Nature of Science	The student understands that most natural events occur in comprehensible, consistent patterns.	10	The student knows that scientists assume that the universe is a vast system in which basic rules exist that may range from very simple to extremely complex, but scientists operate on the belief that the rules can be discovered by careful, systemic study.	473	why do ears pop	6	asking questions and learning about natural world
				504	meteorologists use atmospheric pressure data to understand movement of weather systems	215	the food paradox of the oceans
				648	evidence for Big Bang theory		

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Standard #: Strand	Standard	Grade tested	Benchmark	student text pg	detail	investigation pg	detail
SC.H.2.4.2 The Nature of Science	The student understands that most natural events occur in comprehensible, consistent patterns.	10	The student knows that scientists control conditions in order to obtain evidence, but when that is not possible for practical or ethical reasons, they try to observe a wide range of natural occurrences to discern patterns.	11	control and experimental variables	6	asking questions and learning about natural world
				26	independent and dependent variables	7	doing a controlled experiment
				28	identifying cause and effect relationships	21	determine effect of increasing mass
				41	identify cause and effect	27	recognize variables
				438	what causes acid rain	190	effect of changing mass on data
				456	determining effect of changing mass on temperature changes	190	effect of changing mass on collected data
				460	thermal equilibrium	197	identifying relationships between air pressure and weather
				473	why do ears pop	206	identifying relationship between percent of Earth covered in water and temperature range
				497	factors that shape the weather	211	determining whether distance from light source or axial tilt plays a more significant role in causing the seasons
				504	meteorologists use atmospheric pressure data to understand movement of weather systems	215	the food paradox of the oceans
				608	relationship between orbital speed and distance between two objects	224	sequencing events
				648	evidence for Big Bang theory		

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Standard #: Strand	Standard	Grade tested	Benchmark	student text pg	detail	investigation pg	detail
						235	concluding which conditions affect the timing and duration and intensity of an earthquake based on observation
						241	justify which scenario was most likely
						256	investigation discovering relationship between orbital speed and distance

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SC.H.3.4.1 The Nature of Science	The student understands that science, technology, and society are interwoven and interdependent.	10	The student knows that performance testing is often conducted using small-scale models, computer simulations, or analogous systems to reduce the chance of system failure.	11	controlling variables in experiments	13	graph distance vs. time
				19	did you run a controlled experiment?	15	construct a quantitative graphical model
				20	what factors could explain the variability in their data?	37	organize data into a graph of speed vs. height
				23	why make models?	51	graph voltage vs. current
				24	what is a scientific model?	70	designing and testing different electric motors
				24	making a graph	121	graph mass vs. volume
				24	scientific models	147	organize observations into a category table
				26	creating graphs	151	does your experiment agree with law of conservation of mass?
				41	make a graph	169	why was plain water tested?
				485	computer modeling to predict greenhouse effects	169	what does the word control mean?
				494	modeling air currents	185	constructing a graph of drops of acid vs pH
				518	create a model (#1)	187	construct a graphical model
				524	model of Earth's history	189	construct a temperature vs. time graph
				533	modeling plate boundaries	194	design and construct an aneroid barometer
				576	rock cycle model	197	constructing a graph from atmospheric pressure data
				614	solar system modeling		
				624	model of the sun's anatomy		

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Standard #: Strand	Standard	Grade tested	Benchmark	student text pg	detail	investigation pg	detail
						202	modeling the effect of greenhouse gases on Earth's temperature
						203	graphing water and ice temperature readings
						206	constructing a graph of time vs. temperature
						212	modeling underwater rivers and waterfalls and springs
						222	design a scale model of a zoo
						231	evaluating your completed bathymetric map
						232	simulate an earthquake
						232	construct a model that simulates an earthquake
						247	design a metamorphism simulation
						247	evaluate your ability to interpret rock formations
						248	design a sundial
						258	setting up a scale model of the solar system

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Standard #: Strand	Standard	Grade tested	Benchmark	student text pg	detail	investigation pg	detail
SC.H.3.4.2 The Nature of Science	The student understands that science, technology, and society are interwoven and interdependent.	10	The student knows that technological problems often create a demand for new scientific knowledge and that new technologies make it possible for scientists to extend their research in a way that advances science.	73 433 439 483 530 538 544 597 599	relationship between science and technology the clean water act catalytic converters and scrubbing reduce acid rain hydrogen powered cars using echo sounders to map the sea floor what we can learn from seismographs understanding earthquakes allows engineers to design safer buildings using satellite technology space shuttle	70	using engineering design cycle
SC.H.3.4.3 The Nature of Science	The student understands that science, technology, and society are interwoven and interdependent.	10	The student knows that scientists can bring information, insights, and analytical skills to matters of public concern and help people understand the possible causes and effects of events.	34 73 73 542 545	Newton's research impacted mathematics impact of Da Vinci's work impact of technology studying seismic waves leads to information used in oil and gas exploration predicting tsunamis		

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Standard #: Strand	Standard	Grade tested	Benchmark	student text pg	detail	investigation pg	detail
SC.H.3.4.4 The Nature of Science	The student understands that science, technology, and society are interwoven and interdependent.	10	The student knows that funds for science research come from federal government agencies, industry, and private foundations and that this funding often influences the areas of discovery.	400 429 448 448 448 479 483	clean air act of 1970 governments managing water resources how is the government addressing the problem of acid rain? is acid rain a problem in your community? what is the history of your community's water supply and treatment London Agreement of 1991 should governments enforce changes for lowering greenhouse gas levels		

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Standard #: Strand	Standard	Grade tested	Benchmark	student text pg	detail	investigation pg	detail
SC.H.3.4.5 The Nature of Science	The student understands that science, technology, and society are interwoven and interdependent.	10	The student knows that the value of a technology may differ for different people and at different times.	73 433 439 483 530 538 544 597 599	relationship between science and technology the clean water act catalytic converters and scrubbing reduce acid rain hydrogen powered cars using echo sounders to map the sea floor what we can learn from seismographs understanding earthquakes allows engineers to design safer buildings using satellite technology space shuttle	70	using engineering design cycle

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Standard #: Strand	Standard	Grade tested	Benchmark	student text pg	detail	investigation pg	detail
SC.H.3.4.6 The Nature of Science	The student understands that science, technology, and society are interwoven and interdependent.	10	The student knows that scientific knowledge is used by those who engage in design and technology to solve practical problems, taking human values and limitations into account.	74 135	sample engineering problem circuit board explained	70 70 71 71 71 194 222 222 232 232 247 247 248 248	designing and testing different electric motors proposing and comparing different electric motor designs testing a motor for performance which motor gave the highest speed and why? did draining the batteries affect motor speed? design and construct an aneroid barometer design a scale model of a zoo design a scale model of a zoo simulate an earthquake simulate an earthquake design a metamorphism simulation design a metamorphism simulation design a sundial design a sundial