Correlation to Colorado Grade 10 Science CSAP Framework

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page
ES.4.1.a 9 - 12	Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space.	Students know and understand the composition of Earth, its history, and the natural processes that shape it.	describing the composition and structure of Earth's interior;	525 526 552	formation of Earth's layers description of Earth's layers formation of magma in Earth's mantle	

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Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
ES.4.1.b 9 - 12	Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space.	Students know and understand the composition of Earth, its history, and the natural processes that shape it.	using the theory of plate tectonics to explain relationships among earthquakes, volcanoes, mid-ocean ridges, and deep-sea trenches;	528 predicting what Earth might look like in 50 million years 528 definition of plate tectonics 532 theory of plate tectonics 533 describing plate boundaries 534 land features resulting from divergent plate boundaries 534 divergent plate boundaries 535 resulting land features from subduction 535 convergent plate boundaries 536 transform plate boundaries 536 land features resulting from transform plate boundaries 537 earthquakes and plate tectonics 547 predict separation of North America and Europe in 75 million years	229 identifying tectonic plates and plate boundaries 230 predicting plate movement over 50 million years and the resultant land features

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Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page
				548	predict effects of divergent plate boundaries on Great Rift Valley	
				552	formation of magma in Earth's mantle	
				552	geologic basis for volcanic eruptions	
				553	where volcanic activity occurs	
				555	geologic basis for shield volcanoes	
				556	geologic basis for stratovolcanoes	
				557	geologic bases for cinder cone volcanoes	
				563	mountain-building	
				564	changes in land features due to erosion	
				566	effect of glaciers on land	

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Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
ES.4.1.c 9 - 12	Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space.	Students know and understand the composition of Earth, its history, and the natural processes that shape it.	using evidence (for example, fossils, rock layers, ice cores, radiometric dating) to investigate how Earth has changed or remained constant over short and long periods of time (for example, Mount St. Helens' eruption);	481 global warming 522 relative dating 523 interpreting rock formations 523 faunal succession 524 table and description of the geologic time scale 566 ice ages 569 studying moon rocks on Earth	225 determining the relative ages of rock formations 226 sequencing events in a geologic cross-section

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Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page	
ES.4.1.d 9 - 12	Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space. (Focus: Geology, Meteorology, Astronomy, Oceanography)	Students know and understand the composition of Earth, its history, and the natural processes that shape it.	evaluating the feasibility of predicting and controlling natural events (for example, earthquakes, floods, landslides); and	537 539 540 541 554 555 555 556 556 567 580	causes and descriptions of earthquakes earthquakes rating scales where earthquakes occur earthquake hazard map types and shapes of volcanoes shield volcanoes formation of shield volcanoes due to hot spots stratovolcanoes formation of stratovolcanoes due to subduction geologic hazard maps using a geologic hazard map	228 229 236 237	reading a bathymetric map using a geologic hazard map of frequent earthquakes understanding the Volcanic Explosivity Index finding a pattern of volcanoes related to the locations of plate boundaries

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Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page	
ES.4.1.e 9 - 12	Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space.	Students know and understand the composition of Earth, its history, and the natural processes that shape it.	analyzing the costs, benefits, and consequences of natural resource exploration, development, and consumption.	391 400 411 414 433 435 436 436 437 437 437 443 444 445 471 471 472	impact of nuclear energy reducing pollution effects of PCB's in Great Lakes effect of electrical generating facilities on dissolved oxygen in water The Clean Water Act water quality testing nitrates and the nitrogen cycle water quality testing acid rain effects of acid rain on natural environments effects of acid rain on the soil impact of increased CO2 in oceans pollution and the ocean food chain pollution and the ocean food chain nitrogen cycle nitrogen cycle diagrammed the carbon cycle explained	52 178 178 178 179 182	the cost of using electrical appliances actions to take to improve water quality predict the quality of surface water to be tested and justify your answer predict the quality of surface water to be tested and justify your answer address what you can do to maintain or improve the water quality at the test site the effects of acid rain on organisms in aquatic environments

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Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page
				479	effects of CFC's on the ozone layer	
				482	effects of burning fossil fuels	
				515	permafrost	
				542	using seismic waves for oil and gas exploration	
				560	mineral deposits and diamonds	

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Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page	
ES.4.2.a 9 - 12	Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space.	Students know and understand the general characteristics of the atmosphere and fundamental processes of weather.	analyzing the structure of, and changes in, the atmosphere, and its significance for life on Earth;	437	acid rain	182	the effects of acid rain on organisms in aquatic environments
				438	causes and health effects of acid rain	185	effect of ocean on carbon dioxide levels in the atmosphere
				439	illustration of acid rain formation	186	accurately measuring temperature using thermometers
				440	oceans as part of the hydrosphere	194	construct and use an aneroid barometer
				451	thermometers	198	detecting ozone which is a protective atmosphere gas against high energy radiation
				452	thermometers	202	investigate the temperature effects of greenhouse gases
				471	description of Earth's atmosphere	213	exploring how temperature-dependent layering creates currents
				471	composition of Earth's atmosphere	218	using Doppler radar images to detect and track storms
				472	effect of life on Earth's atmosphere		
				473	definition of atmospheric pressure		
				474	measuring atmospheric pressure with barometers		
				475	how atmospheric pressure changes with altitude		
				476	graph showing atmospheric pressure vs. altitude		
				477	ozone layer		
				477	layers of the atmosphere		
				478	layers of the atmosphere		

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Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page
				479	ozone depletion	
				481	greenhouse effect and greenhouse gasses	
				482	changes to the oceans due to increasing global temperatures	
				493	convection currents in the atmosphere	
				495	global wind patterns	
				497	sling psychrometer	
				502	cold fronts	
				502	effects of moving air masses	
				503	jet streams	
				503	warm fronts	
				504	temperature inversion	
				568	how urban sprawl changes local climate	

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Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
ES.4.2.b 9 - 12	Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space. (Focus: Geology, Meteorology, Astronomy, Oceanography)	Students know and understand the general characteristics of the atmosphere and fundamental processes of weather.	explaining and analyzing general weather patterns by collecting, plotting, and interpreting data;	451 thermometers 452 thermometers 474 measuring atmospheric pressure with barometers 485 computer modeling to predict greenhouse effects 492 Earth's tilt causes seasons 497 sling psychrometer 497 factors which influence the weather 498 phase changes in the atmosphere and dewpoint 499 cloud formation 501 forms of precipitation 505 description of thunderstorms 506 description of hurricanes 507 description of tornadoes 518 create a model to explain why Earth has seasons	186 accurately measuring temperature using thermometers 194 construct and use an aneroid barometer 209 investigating factors which cause the seasons 217 finding relative humidity 218 using Doppler radar images to detect and track storms 219 use radar to detect a tornado 220 using radar to track a hurricane

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Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
ES.4.2.c 9 - 12	Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space. (Focus: Geology, Meteorology, Astronomy, Oceanography)	Students know and understand the general characteristics of the atmosphere and fundamental processes of weather.	describing how energy transfer within the atmosphere influences weather (for example, the role of conduction, radiation, convection, and heat of condensation in clouds, precipitation, winds, storms);	480 distribution of incoming solar radiation 481 greenhouse effect and greenhouse gasses 481 Earth's "energy budget" 485 Earth's internal energy 491 Earth's temperature varies with latitude 493 convection currents in the atmosphere 494 the Coriolis effect 495 global wind patterns 496 effects of the Gulf Stream on climate of Great Britain 496 descriptions of ocean currents and their effects on climate 497 water in the atmosphere affects weather patterns 502 effects of moving air masses 502 cold fronts 503 jet streams 503 warm fronts 504 rotation of air masses due to Coriolis effect	185 effect of ocean on carbon dioxide levels in the atmosphere 202 investigate the temperature effects of greenhouse gases 207 research how large bodies of water affect climate 207 research how large bodies of water affect climate 213 exploring how temperature-dependent layering creates currents 215 understanding the Atlantic gyre 223 research a particular biome

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Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page
				508	causes and effects of the El Nino Southern Oscillation	
				510	effect of cold ocean currents on formation of fog desserts	
				510	different types of deserts and how they are formed	
				511	effect of warm ocean currents on formation of tropical rainforest	
				511	how tropical rainforests are formed	
				513	effect of large bodies of water on climate	
				515	alpine tundra occurs at high altitudes	

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Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page	
ES.4.2.d 9 - 12	Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space. (Focus: Geology, Meteorology, Astronomy, Oceanography)	Students know and understand the general characteristics of the atmosphere and fundamental processes of weather.	investigating and explaining the occurrence and effects of storms on human populations and the environment; and	497 499 505 506 507 518	factors which influence the weather cloud formation description of thunderstorms description of hurricanes description of tornadoes write an action plan to stay safe during a tornado	219 219 220	use radar to detect a tornado describe what safety precautions the National Weather Service recommends for tornado conditions using radar to track a hurricane

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Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
ES.4.2.e 9 - 12	Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space. (Focus: Geology, Meteorology, Astronomy, Oceanography)	Students know and understand the general characteristics of the atmosphere and fundamental processes of weather.	describing and explaining factors that may influence weather and climate (for example, proximity to oceans, prevailing winds, fossil fuel burning, volcanic eruptions).	481 greenhouse effect and greenhouse gasses 493 convection currents in the atmosphere 494 the Coriolis effect 495 global wind patterns 496 descriptions of ocean currents and their effects on climate 497 water in the atmosphere affects weather patterns 502 effects of moving air masses 502 cold fronts 503 warm fronts 503 jet streams 504 rotation of air masses due to Coriolis effect 508 causes and effects of the El Nino Southern Oscillation 510 different types of deserts and how they are formed 511 how tropical rainforests are formed	185 effect of ocean on carbon dioxide levels in the atmosphere 202 investigate the temperature effects of greenhouse gases 207 research how large bodies of water affect climate 213 exploring how temperature-dependent layering creates currents 215 understanding the Atlantic gyre 223 research a particular biome

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Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
ES.4.3.a 9 - 12	Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space. (Focus: Geology, Meteorology, Astronomy, Oceanography)	Students know major sources of water, its uses, importance, and cyclic patterns of movement through the environment.	identifying and explaining factors that influence the quality of water needed to sustain life;	411 effects of PCB's in Great Lakes 433 The Clean Water Act 433 water quality standards 434 importance of water analysis 435 water quality testing 436 water quality testing 437 acid rain 440 oceans in the water cycle 444 pollution and the ocean food chain 445 pollution and the ocean food chain 559 volcanoes and water vapor	178 predict the quality of surface water to be tested and justify your answer 179 address what you can do to maintain or improve the water quality at the test site 182 the effects of acid rain on organisms in aquatic environments

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Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
ES.4.3.b 9 - 12	Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space. (Focus: Geology, Meteorology, Astronomy, Oceanography)	Students know major sources of water, its uses, importance, and cyclic patterns of movement through the environment.	identifying and analyzing the costs, benefits, and consequences of using water resources;	411 effects of PCB's in Great Lakes 433 water quality standards 433 The Clean Water Act 434 importance of water analysis 435 water quality testing 436 nitrates and the nitrogen cycle 436 water quality testing 437 acid rain 437 effects of acid rain on natural environments 441 sources of salts in the ocean 442 composition of seawater 444 pollution and the ocean food chain 445 pollution and the ocean food chain 471 nitrogen cycle 471 nitrogen cycle diagrammed 472 the carbon cycle explained 564 landforms shaped by water	178 actions to take to improve water quality 178 predict the quality of surface water to be tested and justify your answer 179 address what you can do to maintain or improve the water quality at the test site 182 the effects of acid rain on organisms in aquatic environments 212 investigate how the ocean 's salinity affects its density

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Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page
ES.4.3.c 9 - 12	Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space. (Focus: Geology, Meteorology, Astronomy, Oceanography)	Students know major sources of water, its uses, importance, and cyclic patterns of movement through the environment.	explaining interactions between water and other Earth systems (for example, the biosphere, lithosphere, and atmosphere); and	439 440 471 472 477 478 482 568	illustration of acid rain formation oceans as part of the hydrosphere description of Earth's atmosphere effect of life on Earth's atmosphere layers of the atmosphere layers of the atmosphere changes to the oceans due to increasing global temperatures how urban sprawl changes local climate	

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Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page	
ES.4.3.d 9 - 12	Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space. (Focus: Geology, Meteorology, Astronomy, Oceanography)	Students know major sources of water, its uses, importance, and cyclic patterns of movement through the environment.	explaining interrelationships between the circulation of oceans and weather and climate.	496 508	descriptions of ocean currents and their effects on climate causes and effects of the El Nino Southern Oscillation	207 215	research how large bodies of water affect climate understanding the Atlantic gyre

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Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page	
ES.4.4.a 9 - 12	Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space. (Focus: Geology, Meteorology, Astronomy, Oceanography)	Students know the structure of the solar system, composition and interactions of objects in the universe, and how space is explored.	explaining the causes of and modeling the varied lengths of days, seasons, and phases of the Moon;	492 518 584 588 607 608 609 610 611	Earth's tilt causes seasons create a model to explain why Earth has seasons the lunar cycle lunar eclipses properties of the moon the moon as a satellite of Earth the moon's effect on tides on Earth the Earth-moon system giant impact theory	209 238 250 251	investigating factors which cause the seasons why studying the moon's surface is useful for understanding Earth modeling the lunar cycle constructing a lunar calendar

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Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page	
ES.4.4.b 9 - 12	Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space. (Focus: Geology, Meteorology, Astronomy, Oceanography)	Students know the structure of the solar system, composition and interactions of objects in the universe, and how space is explored.	describing the effect of gravitation on the motions observed in the solar system and beyond;	52 612 612 613 619 620	the effect of gravity orbits of planets around the sun Johannes Kepler Kepler's elliptically shaped orbits asteroids and comets meteors and meteorites and the Kuiper Belt	20 256	investigate effect of gravity on motion simulate an object in orbit and investigate how orbital period varies within distance

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Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page
ES.4.4.c 9 - 12	Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space. (Focus: Geology, Meteorology, Astronomy, Oceanography)	Students know the structure of the solar system, composition and interactions of objects in the universe, and how space is explored.	describing electromagnetic radiation produced by the Sun and other stars (for example, X-ray, ultraviolet, visible light, infrared, radio);	237 479	light waves and the electromagnetic spectrum ultraviolet and infrared light	

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Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page
ES.4.4.d 9 - 12	Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space. (Focus: Geology, Meteorology, Astronomy, Oceanography)	Students know the structure of the solar system, composition and interactions of objects in the universe, and how space is explored.	comparing the Sun with other stars (for example, size, color, temperature); and	615 622 624 625 635 637	classifying the planets descriptions of the sun and comparisons to other stars features and diagram of the sun features and emissions of the sun size of the sun compare to other stars H-R diagrams comparing temperature and brightness of stars	

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Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
ES.4.4.e 9 - 12	Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space. (Focus: Geology, Meteorology, Astronomy, Oceanography)	Students know the structure of the solar system, composition and interactions of objects in the universe, and how space is explored.	identifying and describing the everyday impact of recent space technology (for example, more sophisticated computers, remote sensing, medical imaging).	433 the clean water act 439 catalytic converters and scrubbing reduce acid rain 483 hydrogen powered cars 538 what we can learn from seismographs 544 understanding earhquakes allows engineers to design safer buildings 594 history of the telescope 595 types and uses of telescopes 596 types and uses of telescopes 597 satellites as tools of astronomy 598 spacecraft as tools of astronomy 599 how the space shuttle works 634 the use of spectroscopy to analyze stars	264 understand why spectroscopy is an important tool of astronomers 268 measuring apparent brightness to calculate the distance to stars and galaxies

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Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page	
INQ.1.a 9 - 12	Students understand the processes of scientific investigation and design, conduct, communicate about, and evaluate such investigations.		asking questions and stating hypotheses, using prior scientific knowledge to help guide their development;	10	the research question and hypothesis	6	how do we ask questions and get answers from nature?
				429	why haven't we run out of water	170	devise hypothesis and explain
				434	what is in your tap water	170	which method will give fastest dissolving rate?
				437	what is acid rain	182	formulate hypothesis
				441	why are oceans salty	208	formulate a hypothesis about why the seasons occur
				451	what is temperature		
				456	asking questions pertaining to specific heat and heat flow		
				472	why is Earth's atmosphere different from other planets		
				473	why do ears pop		
				492	why does Earth have seasons		
				501	how does rain form		
				509	how do animals survive in the desert		
				515	what is a carbon sink		
				530	proving hypotheses for sea-floor spreading		
				534	why doesn't Earth get bigger and bigger		
				580	form a hypothesis (#7)		
				588	what causes eclipses		

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Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page	
				621	is Pluto a planet		
INQ.1.b 9 - 12	Students understand the processes of scientific investigation and design, conduct, communicate about, and evaluate such investigations.		creating and defending a written plan of action for a scientific investigation;	7 19 42	experimentation begins with a question design your own experiment devise an experiment	7 9 16 26 75 93 151 170 233	design your own experiment design three experiments using car and ramp decide how to vary the force on the car for this experiment what variables can be changed? design pendulum experiment decision trees and the advantage of doing multiple trials design experiment to find out if mass is conserved what three factors influence dissolving rate? identifying how the earthquake model represents an earthquake

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Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page	
INQ.1.c 9 - 12	Students understand the processes of scientific investigation and design, conduct, communicate about, and evaluate such investigations.		selecting and using appropriate technologies to gather, process, and analyze data and to report information related to an investigation;	24	using an electronic timer		data tables and graphs can be created on computer or graphing calculator
						7	use a ruler to make a measurement
						9	design three experiments and choose technology
						12	using photogates
						14	using photogates
						16	use a force scale
						17	use photogates to study car on ramp
						18	use a balance to find mass of car
						30	use force scale
						40	choose circuit parts to light a bulb
						44	using electrical meter
						46	using electrical meter
						48	using electrical meter
						50	using electrical meter
						86	use CPO Timer to measure frequency
						107	study reflection of laser beam
						108	study refraction of laser beam

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Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
					113 trace critical angle with a laser beam 158 use a thermometer
INQ.1.d 9 - 12	Students understand the processes of scientific investigation and design, conduct, communicate about, and evaluate such investigations.		identifying major sources of error or uncertainty within an investigation (for example, particular measuring devices and experimental procedures);	11 controlling variables in experiments 19 did you run a controlled experiment? 20 what factors could explain the variability in their data? 485 what percentage comes from this source? (problem 4) 543 determining distance to an epicenter 547 what explains the difference in density? (#5) 605 how big is Earth?	7 what variables should be controlled? 11 calculate % error 76 calculate % error 129 control the height of the liquid 169 why was plain water tested? 169 what does the word control mean? 197 calculating error between your barometer and a commercial barometer 199 importance of good record keeping in order to avoid error

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Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page	
INQ.1.e 9 - 12	Students understand the processes of scientific investigation and design, conduct, communicate about, and evaluate such investigations.		constructing and revising scientific explanations and models, using evidence, logic, and experiments that include identifying and controlling variables;	11	control and experimental variables	7	doing a controlled experiment
				24	making a graph	13	graph distance vs. time
				26	independent and dependent variables	15	construct a quantitative graphical model
				26	creating graphs	21	choose independent and dependent variables for graph
				41	make a graph	21	construct reasonable explanation based on data
						27	recognize variables
						35	study data and determine importance of height on speed of marble
						37	organize data into a graph of speed vs. height
						45	analyze data and explain a rule
						51	graph voltage vs. current
						121	graph mass vs. volume
						147	organize observations into a category table
						151	does your experiment agree with law of conservation of mass?
						157	add new rules to list based on findings
						185	constructing a graph of drops of acid vs pH

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Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
					187 construct a graphical model 189 construct a temperature vs. time graph 190 effect of changing mass on collected data 197 evaluating your aneroid barometer design 197 constructing a graph from atmospheric pressure data 203 graphing water and ice temperature readings 206 constructing a graph of time vs. temperature 211 determining whether distance from light source or axial tilt plays a more significant role in causing the seasons 231 evaluating your completed bathymetric map 247 evaluate your ability to interpret rock formations

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Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page	
INQ.1.f 9 - 12	Students understand the processes of scientific investigation and design, conduct, communicate about, and evaluate such investigations.		communicating and evaluating scientific thinking that leads to particular conclusions;	10	process of reviewing hypothesis explained	15	interpret a speed vs. time graph
				24	interpretations of patterns in data	21	think about percent change
				27	reading a graph	21	construct reasonable explanation based on data
				78	analyze lever diagram	35	what evidence is there in support of your hypothesis?
				476	atmospheric pressure at various altitudes graph	35	study data and determine importance of height on speed of marble
				524	Kelvin's calculations of Earth's age	39	analyze energy transformations in different scenarios
				645	apparent brightness vs. distance graph	45	analyze data and explain a rule
				651	use the diagram to answer the questions (#2)	77	compare law of conservation of energy to motion of pendulum
				651	arrange the items in the table (#3)	151	review your hypothesis
				651	use the diagram to answer the questions (#4)	151	do the data support the hypothesis
						171	did you prove or disprove your hypothesis?
						171	what was happening at molecular level?

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Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
					217 determining relationship between temperature of the atmosphere and relative humidity 218 interpreting Doppler radar images 237 finding a pattern of volcanoes on a bathymetric map
INQ.1.g 9 - 12	Students understand the processes of scientific investigation and design, conduct, communicate about, and evaluate such investigations.		recognizing and analyzing alternative explanations and models; and	19 which group did the best experiment?	18 evaluate graphs as to whether or not they show relationships between variables 21 evaluate percent change for data collected 75 evaluate statistical significance 157 add new rules to list based on findings 171 evaluate method based on data 197 evaluating your aneroid barometer design 200 evaluating your qualitative ozone strips

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Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page	
INQ.1.h 9 - 12	Students understand the processes of scientific investigation and design, conduct, communicate about, and evaluate such investigations.		explaining the difference between a scientific theory and a scientific hypothesis.	10	process of reviewing hypothesis explained	35	what evidence is there in support of your hypothesis?
				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	151	review your hypothesis
				611	theories of origin of the moon	171	did you prove or disprove your hypothesis?
				612	early theories of the solar system		
				647	Big Bang theory		

Correlation to Colorado Grade 10 Science CSAP Framework

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page	
INQ.5.a 9 - 12	Students know and understand interrelationships among science, technology, and human activity and how they can affect the world.		analyzing benefits, limitations, costs, and consequences involved in using technology or resources (for example, X-rays, agricultural chemicals, natural gas reserves);	368 379 379 379 379 395 400 400 400 433 435 436 437 448 448	limiting reactants research economic impact of fuel cells hydrogen-powered cars and the environment research fuel cells research environmental impact of fuel cells fossil fuels economic impact of reducing air pollution economic impact of pollution problems caused by airborne pollutants wise use of water water usage and quality effect of excess nitrates on environment acid rain explained research economic impact of producing gases that cause acid rain research the issue of acid rain	163 163 163 163 163 164 178 180 182 201	economic impact of end-product of combustion reaction too much CO2 research how trees offset accumulation of CO2 research how trees offset accumulation of CO<subscript>2</> can trees compensate for manmade CO2 from vehicles and industry? perform water quality tests wise use of water supply perform water quality tests investigate effect of acid rain on microorganisms research the causes of ozone in the lower atmosphere

Correlation to Colorado Grade 10 Science CSAP Framework

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page	
INQ.5.b 9 - 12	Students know and understand interrelationships among science, technology, and human activity and how they can affect the world.		analyzing how the introduction of a new technology has affected or could affect human activity (for example, invention of the telescope, applications of modern telecommunications);	433 437 439 448 483 538 544	the clean water act acid rain explained catalytic converters and scrubbing reduce acid rain research the issue of acid rain hydrogen powered cars what we can learn from seismographs understanding earhquakes allows engineers to design safer buildings	182	investigate effect of acid rain on microorganisms

Correlation to Colorado Grade 10 Science CSAP Framework

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page	
INQ.5.c 9 - 12	Students know and understand interrelationships among science, technology, and human activity and how they can affect the world.		demonstrating the interrelationships between science and technology (for example, building a bridge, designing a better running shoe); and	73	relationship between science and technology	70	using engineering design cycle
				433	the clean water act		
				439	catalytic converters and scrubbing reduce acid rain		
				483	hydrogen powered cars		
				530	using echo sounders to map the sea floor		
				538	what we can learn from seismographs		
				544	understanding earhquakes allows engineers to design safer buildings		
				597	using satellite technology		
				599	space shuttle		
INQ.5.d 9 - 12	Students know and understand interrelationships among science, technology, and human activity and how they can affect the world.		explaining the use of technology in an occupation.	548	describe the work of a geologist and paleontologist and seismologist	177	chemistry and photography
						178	water quality testing

Correlation to Colorado Grade 10 Science CSAP Framework

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
INQ.6.a 9 - 12	Students understand that science involves a particular way of knowing and understand common connections among scientific disciplines.		evaluating print and visual media for scientific evidence, bias, or opinion;	110 study appliance labels and instructions 142 create pamphlet on utility's energy saver programs 448 study claims made by bottled water companies	76 analyze watch manufacturer's claims 162 inferences from promotional materials for vehicles 181 study water filtration device claims

Correlation to Colorado Grade 10 Science CSAP Framework

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
INQ.6.b 9 - 12	Students understand that science involves a particular way of knowing and understand common connections among scientific disciplines.		explaining that the scientific way of knowing uses a critique and consensus process (for example, peer review, openness to criticism, logical arguments, skepticism);	20 explain your reasoning 73 impact of Da Vinci's work 529 critiquing Wegener's theories of continental drift 612 early theories of the solar system	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 35 what evidence is there in support of your hypothesis? 37 describe the flow of energy based on experimental graph 39 critique group's explanation of energy transformations 39 give a brief presentation to the class 47 discuss an explanation with your group 47 present and defend an explanation 77 show how energy loss data could be applied to designing a real clock 129 explain your answer and justify 145 present findings and methods used

Correlation to Colorado Grade 10 Science CSAP Framework

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
					151 present results to the class 163 evaluating choice of favorite car

Correlation to Colorado Grade 10 Science CSAP Framework

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page	
INQ.6.c 9 - 12	Students understand that science involves a particular way of knowing and understand common connections among scientific disciplines.		using graphs, equations, or other models to analyze systems involving change and constancy (for example, comparing the geologic time scale to shorter time frames);	24 24 26 27 41 42 78 459 476 645 645 651 651 651	making a graph interpretations of patterns in data creating graphs reading a graph make a graph interpreting distance/time graph analyze lever diagram heat equation atmospheric pressure at various altitudes graph inverse square law apparent brightness vs. distance graph use the diagram to answer the questions (#2) arrange the items in the table (#3) use the diagram to answer the questions (#4)	13 15 15 25 27 28 37 51 121 147 185 187 187 189 197 203	graph distance vs. time interpret a speed vs. time graph construct a quantitative graphical model create a mathematical model find math rule for lever equilibrium derive a math formula organize data into a graph of speed vs. height graph voltage vs. current graph mass vs. volume organize observations into a category table constructing a graph of drops of acid vs pH construct a graphical model find equation for trend line construct a temperature vs. time graph constructing a graph from atmospheric pressure data graphing water and ice temperature readings

Correlation to Colorado Grade 10 Science CSAP Framework

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
					206 constructing a graph of time vs. temperature 217 determining relationship between temperature of the atmosphere and relative humidity 218 interpreting Doppler radar images 237 finding a pattern of volcanoes on a bathymetric map 257 inverse square law 268 discovering the mathematical relationship betwen apparent brightness and distance

Correlation to Colorado Grade 10 Science CSAP Framework

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page	
INQ.6.d 9 - 12	Students understand that science involves a particular way of knowing and understand common connections among scientific disciplines.		analyzing and comparing models of cyclic change as used within and among scientific disciplines (for example, water cycle, circular motion, sound waves, weather cycles);	222 222 440 492 518 559 584 588 607 608 609 610 611	effect of temperature on speed of sound wave effect of medium on speed of sound wave oceans in the water cycle Earth's tilt causes seasons create a model to explain why Earth has seasons volcanoes and water vapor the lunar cycle lunar eclipses properties of the moon the moon as a satellite of Earth the moon's effect on tides on Earth the Earth-moon system giant impact theory	94 209 238 250 251	does sound behave like other waves? investigating factors which cause the seasons why studying the moon's surface is useful for understanding Earth modeling the lunar cycle constructing a lunar calendar

Correlation to Colorado Grade 10 Science CSAP Framework

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page	
INQ.6.e 9 - 12	Students understand that science involves a particular way of knowing and understand common connections among scientific disciplines.		identifying and predicting cause-effect relationships within a system (for example, the effect of temperature on gas volume, effect of carbon dioxide level on the greenhouse effect, effects of changing nutrients at the base of a food pyramid);	28 41 438 456 460 481 497 608	identifying cause and effect relationships identify cause and effect what causes acid rain determining effect of changing mass on temperature changes thermal equilibrium greenhouse effect and greenhouse gasses factors that shape the weather relationship between orbital speed and distance between two objects	21 185 190 197 202 206 224 235 241 256	determine effect of increasing mass effect of ocean on carbon dioxide levels in the atmosphere effect of changing mass on data identifying relationships between air pressure and weather investigate the temperature effects of greenhouse gases identifying relationship between percent of Earth covered in water and temperature range sequencing events concluding which conditions affect the timeing and duration and intensity of an earthquake based on observation justify which scenario was most likely investigation discovering relationship between orbital speed and distance

Correlation to Colorado Grade 10 Science CSAP Framework

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page
INQ.6.f 9 - 12	Students understand that science involves a particular way of knowing and understand common connections among scientific disciplines.		identifying and describing the dynamics of natural systems (for example, weather systems, ecological systems, body systems, systems at dynamic equilibrium);	51 415 415 429 435 438 460	what is equilibrium? solubility equilibrium equilibrium and solubility the water cycle pond ecosystem and water quality acid rain formation system thermal equilibrium	

Correlation to Colorado Grade 10 Science CSAP Framework

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page	
INQ.6.g 9 - 12	Students understand that science involves a particular way of knowing and understand common connections among scientific disciplines.		identifying and testing a model to analyze systems involving change and constancy (for example, a mathematical expression for gas behavior; constructing a closed ecosystem such as an aquarium);	23	why make models?	13	graph distance vs. time
				24	what is a scientific model?	15	construct a quantitative graphical model
				24	scientific models	25	create a mathematical model
				24	making a graph	27	find math rule for lever equilibrium
				26	creating graphs	28	derive a math formula
				41	make a graph	37	organize data into a graph of speed vs. height
				42	interpreting distance/time graph	51	graph voltage vs. current
				459	heat equation	121	graph mass vs. volume
				485	computer modeling to predict greenhouse effects	147	organize observations into a category table
				494	modeling air currents	185	constructing a graph of drops of acid vs pH
				518	create a model (#1)	187	find equation for trend line
				524	model of Earth's history	187	construct a graphical model
				533	modeling plate boundaries	189	construct a temperature vs. time graph
				576	rock cycle model	197	constructing a graph from atmospheric pressure data
				614	solar system modeling	202	modeling the effect of greenhouse gases on Earth's temperature
				624	model of the sun's anatomy	203	graphing water and ice temperature readings
				645	inverse square law		

Correlation to Colorado Grade 10 Science CSAP Framework

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
					206 constructing a graph of time vs. temperature 212 modeling underwater rivers and waterfalls and springs 232 construct a model that simulates an earthquake 257 inverse square law 258 setting up a scale model of the solar system 268 discovering the mathematical relationship betwen apparent brightness and distance
INQ.6.h 9 - 12	Students understand that science involves a particular way of knowing and understand common connections among scientific disciplines.		explaining an exponential model (for example, pH scale, population growth, Richter scale); and	420 pH and pH scale 420 defining and determining pH 421 pH of substances you use or consume 421 table of pH of common substances 537 conversion of energy in rocks causes seismic waves 538 seismic waves	181 testing pH of tap water samples 184 determining pH of water as carbon dioxide dissolves

Correlation to Colorado Grade 10 Science CSAP Framework

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page	
INQ.6.i 9 - 12	Students understand that science involves a particular way of knowing and understand common connections among scientific disciplines.		refining a hypothesis based on an accumulation of data over time (for example, Alvarez's theory on dinosaur extinction).	34 45 54 105 107 312 313 324 332 393 528 529 529 612 648	Aristotle vs. Newton Newton's Laws of Motion Newton and the force of gravity Benjamin Franklin Charles-Augustin Coulomb contributions of Fermi development of atomic theory research and create a poster to illustrate development of atomic model plate tectonic history contributions of Marie and Pierre Curie development of plate tectonic theory continental drift theory history continental drift theory changing ideas about the solar system development of Big Bang theory	130	investigate Rutherford's gold foil experiment

Correlation to Colorado Grade 10 Science CSAP Framework

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page	
PS.2.1.a 9 - 12	Physical Science: Students know and understand common properties, forms, and changes in matter and energy. (Focus: Physics and Chemistry)	Students know that matter has characteristic properties, which are related to its composition and structure.	examining, describing, measuring, classifying, and predicting common properties of substances (for example, electrical charge, chemical reactivity, acidity, electrical conductivity, radioactivity, relationships in the periodic table);	105 106 107 108 108 321 329 330 332 335 388 417 417	charge is a fundamental property of matter static charge discussed explanation of coulomb electroscopes how an electroscope works 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 nuclear vs chemical reactions define and compare acids and bases acids and bases compared/contrasted	42 138 141 142 160 160 176	investigate electric charge nuclear reactions build model of Na and Cl atoms and explain why they bond to form a molecule arrangement of electrons and groups of elements radioactive decay how do you simulate nuclear decay? investigate acids and bases

Correlation to Colorado Grade 10 Science CSAP Framework

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
PS.2.1.b 9 - 12	Physical Science: Students know and understand common properties, forms, and changes in matter and energy. (Focus: Physics and Chemistry)	Students know that matter has characteristic properties, which are related to its composition and structure.	describing and explaining properties and composition of samples of matter using models (for example, atomic and molecular structure, the periodic table);	311 protons/neutrons/electrons 311 location/size/charge of subatomic particles 315 atoms of same element have same atomic number 318 proton/electron attraction 320 groups of elements 321 studying the periodic table 332 metals nonmetals and metalloids 388 showing valence electrons in a diagram	132 atomic number determines what element that atom is 132 building atom models 133 using the periodic table 133 protons and neutrons 133 location of electrons in atom 136 building and studying the periodic table 136 model stable and neutral atoms 137 importance of atomic number 137 build atomic models 140 find the number of electrons in outermost level 140 review subatomic particles

Correlation to Colorado Grade 10 Science CSAP Framework

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page	Volume 2 Investigation Manual Page
PS.2.1.c 9 - 12	Physical Science: Students know and understand common properties, forms, and changes in matter and energy. (Focus: Physics and Chemistry)	Students know that matter has characteristic properties, which are related to its composition and structure.	separating substances based on their chemical and physical properties (for example, color, solubility, chemical reactivity, melting point, boiling point); and	278 mixtures can be separated by physical means 284 changes of state 291 density is independent of amount of substance 292 elasticity is a physical property of matter 292 hardness is a physical property of matter 293 brittleness is a physical property of matter 294 malleability is a physical property of matter 294 tensile strength is a physical property of matter 294 development of Kevlar brand fiber 412 effect of temperature on solubility 412 effect of nature of solvent on solubility 413 temperature-solubility graphs 414 effect of temperature on solubility of gasses 457 engineers use specific heat of substances to design better products	114 separating a homogeneous mixture 119 energy and phase changes 170 design experiments to explore dissolving rate 170 solubility and temperature 172 investigate solubility of sugar

Correlation to Colorado Grade 10 Science CSAP Framework

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page	
				498	phases changes in the atmosphere		
PS.2.1.d 9 - 12	Physical Science: Students know and understand common properties, forms, and changes in matter and energy. (Focus: Physics and Chemistry)	Students know that matter has characteristic properties, which are related to its composition and structure.	using word and chemical equations to relate observed changes in matter to its composition and structure.	336 338 339 371	writing a chemical formula summary of chemical formula writing rules naming compounds which of the equations is balanced?	143 143 145 149	name chemical compounds predict chemical formulas determine empirical formula balance these equations
PS.2.2.a 9 - 12	Physical Science: Students know and understand common properties, forms, and changes in matter and energy. (Focus: Physics and Chemistry)	Students know that energy appears in different forms, and can move (be transferred) and change (be transformed).	identifying, measuring, calculating, and analyzing quantitative relationships involved with energy forms (for example, heat transfer in a system involving mass, specific heat, and change in temperature of matter); and	455 455 456 456 458 459 468	definition of calorie description and use of BTUs definition of specific heat specific heat water’s specific heat helps regulate Earth’s temperature heat equation use of "R value"	190 205	calculating thermal energy in calories investigating how the high specific heat of water helps regulate Earth ’s temperature

Correlation to Colorado Grade 10 Science CSAP Framework

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page	
PS.2.2.b 9 - 12	Physical Science: Students know and understand common properties, forms, and changes in matter and energy. (Focus: Physics and Chemistry)	Students know that energy appears in different forms, and can move (be transferred) and change (be transformed).	identifying, measuring, calculating, and analyzing relationships associated with energy transfer (changes in temperature, velocity, potential energy, kinetic energy, conduction, convection, radiation, voltage, current).	32	average speed discussed	8	calculating speed
				36	examples of acceleration	36	energy conservation and the roller coaster
				91	following an energy transformation	38	identify potential/kinetic energy conversions
				101	concept of electric current	44	investigate concept of voltage
				102	concept of electric circuits	45	battery chemicals and electrical charge
				103	circuit diagrams	46	investigate concept of electric current
				113	battery uses chemical energy to produce electrical charge	50	Ohm’s law
				114	voltage and potential energy	56	build a parallel circuit
				115	how to measure voltage	56	build a series circuit
				117	electrical current explained	58	build a series circuit and find total resistance
				119	how to measure current	60	parallel circuit and Ohm’s law
				131	Ohm’s law explained	119	investigate temperature and energy transfer in melting process
				132	using Ohm’s law to analyze circuits	186	develop a way to convert between Fahrenheit and Celsius temperature scales
				145	parallel circuit defined	188	investigate the increase of temperature of water as thermal energy is added
				145	series circuit defined		
				146	household wiring		
				147	current and voltage in series circuits		
				151	voltage and resistance in parallel circuits		
				155	analyze a parallel circuit		

Correlation to Colorado Grade 10 Science CSAP Framework

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page	
				156	analyze a series circuit	192	investigate convection in liquids
				453	comparing temperature in Fahrenheit and Celsius scales		
				454	changes in temperature are directly related to changes in energy		
				460	thermal equilibrium		
				462	heat transfer through air		
				462	densely packed solids are good conductors of heat		
				463	convection currents and weather		
				463	warming hands over candle		
				464	convection currents in water		
				465	transfer of heat by radiation		
				465	solid road surface emits radiation		
				482	global warming and heat transfer by radiation		
				493	apply knowledge of heat transfer to different situations		
				537	potential energy transformed to kinetic energy causes earthquakes		

Correlation to Colorado Grade 10 Science CSAP Framework

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page	
PS.2.3.a 9 - 12	Physical Science: Students know and understand common properties, forms, and changes in matter and energy. (Focus: Physics and Chemistry)	Students understand that interactions can produce changes in a system, although the total quantities of matter and energy remain unchanged.	identifying, describing, and explaining physical and chemical changes involving the conservation of matter and energy (for example, oscillating pendulum/spring, chemical reactions, nuclear reactions);	88 90 92 93 96 363	potential and kinetic energy explained conservation of energy explained energy transformations and conservation different forms of energy described prove that energy is conserved history of law of conservation of mass	36 37 38 150	energy conservation and the roller coaster investigating conservation of energy with rollercoaster conservation of energy and energy transformations investigate conservation of mass in effervescent tablet reaction

Correlation to Colorado Grade 10 Science CSAP Framework

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page	
PS.2.3.b 9 - 12	Physical Science: Students know and understand common properties, forms, and changes in matter and energy. (Focus: Physics and Chemistry)	Students understand that interactions can produce changes in a system, although the total quantities of matter and energy remain unchanged.	observing, measuring, and calculating quantities to demonstrate conservation of matter and energy in chemical changes (for example, acid-base, precipitation reactions), and physical interactions of matter (for example, force, work, power);	68	compound machines	29	design and construct complex gear machines
				83	how to calculate work	31	calculate work done on block
				85	efficiency and bicycles	31	work = force X distance
				86	how to calculate power	156	investigate double displacement reactions
				86	power explained	158	measure energy changes in 3 different reactions
				87	concept of energy as stored work	176	investigate acids and bases
				96	decide whether or not work is done	181	testing pH of tap water samples
				96	calculate work done	184	determining pH of water as carbon dioxide dissolves
				97	calculate work output from efficiency data	191	find efficiency of water heater
				97	calculate work accomplished by a motor	191	calculating work input and work output
				97	compare different amounts of work done	191	power of an immersion heater
				97	calculate power	263	calculate the power output of a photovoltaic cell
				97	calculate power of two different machines		
				97	analyze power of motor		
				138	how to calculate electrical power		
				375	synthesis or addition reactions		
				376	decomposition reactions		
				377	single displacement reactions		

Correlation to Colorado Grade 10 Science CSAP Framework

Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page
				377	double displacement reactions	
				417	acids and bases compared/contrasted	
				417	H and OH ions	
				417	properties of acids	
				417	define and compare acids and bases	
				418	strong vs. weak acids	
				418	properties of bases	
				419	strong vs. weak bases	
				419	weak and strong acids and bases	
				420	pH and pH scale	
				420	defining and determining pH	
				421	pH of substances you use or consume	
				421	table of pH of common substances	

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Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page	
PS.2.3.c 9 - 12	Physical Science: Students know and understand common properties, forms, and changes in matter and energy. (Focus: Physics and Chemistry)	Students understand that interactions can produce changes in a system, although the total quantities of matter and energy remain unchanged.	describing and predicting chemical changes (for example, combustion, simple chemical reactions), and physical interactions of matter (for example, velocity, force, work, power),	13	speed is relative	9	collect data and calculate speed of car
				14	how to calculate speed	10	calculate speed of the car
				15	compare and contrast speed and velocity	12	find speed of car at different positions
				18	what is the speed of an object that is standing still?	13	make a position vs. time graph
				20	calculate speed of car	14	calculate speed of car at two places on the ramp
				20	find speed of bumblebee	15	make a speed vs. time graph
				24	accurate speed measurements	16	thinking about force
				25	conceptual models of motion	17	caclulate speed of car
				30	position vs. time graphs	21	effect of friction on the car
				32	average speed vs. instantaneous	23	using 3rd law to explain common phenomena
				37	speed vs. time graphs	24	measure force in newtons
				42	calculate speed from distance/time graph	36	find speed of marble
				45	Newton’s third law summarized	134	using a spectrometer
				45	Newton’s second law summarized	135	observing different light sources with a spectrometer
				45	Newton’s first law summarized	148	chemical equations
				48	Newton’s first law in detail	156	investigate double displacement reactions
				49	Newton’s second law in detail	162	carbon reactions and the environment

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Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page	
				56	friction explained	162	structure of fossil fuels
				59	Newton's third law in detail	162	importance of fossil fuels
				64	research effect of friction on human joints	162	investigating combustion reactions
				69	newtons and pounds		
				319	fireworks displays and electron excitation		
				354	chemical reactions and digestion		
				357	combustion reaction		
				361	heartburn reaction		
				361	chemical reactions in living systems		
				364	carbon chains		
				375	synthesis or addition reactions		
				376	decomposition reactions		
				377	double displacement reactions		
				377	single displacement reactions		
				378	consumer chemistry		
				378	combustion reactions		
				381	MRE ration heater reaction		

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Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page
				394	photosynthesis and carbon reactions	
				395	chemistry of the atmosphere	
				395	fossil fuels and carbon reactions	
				395	chemistry of the atmosphere	
				397	carbon reactions	
				419	dissociation of water	
				438	chemical reactions and the formation of acid rain	

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Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page	
PS.2.3.d 9 - 12	Physical Science: Students know and understand common properties, forms, and changes in matter and energy. (Focus: Physics and Chemistry)	Students understand that interactions can produce changes in a system, although the total quantities of matter and energy remain unchanged.	describing and explaining physical interactions of matter using conceptual models (for example, conservation laws of matter and energy, particle model for gaseous behavior).	88	potential and kinetic energy explained	36	energy conservation and the roller coaster
				90	conservation of energy explained	37	investigating conservation of energy with rollercoaster
				91	energy conversions	38	explore energy transformations
				92	energy transformations and conservation	38	conservation of energy and energy transformations
				93	different forms of energy described	94	does sound behave like other waves?
				96	prove that energy is conserved	104	investigate RGB model of color
				196	waves are all around us	118	observe melting process and study quantitatively
				222	effect of temperature on speed of sound wave	118	investigate melting
				222	effect of medium on speed of sound wave	118	molecules in a liquid
				237	radio and television signals	119	adding heat energy to melt an ice cube
				237	microwave ovens		
				243	RGB model of color		
				250	identify uses of electromagnetic waves		
				272	identify uses of electromagnetic waves		
				284	states of matter and arrangement of molecules		
				285	characteristics of matter related to its state		

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Foundations of Physical Science with Earth and Space Science

Student Text and Investigation Manual

Standard #: Grade	Standard	Objective	Benchmark	Volume 1 Student Text Page		Volume 2 Investigation Manual Page
				363	history of law of conservation of mass	
				405	molecular structure of ice	
				451	increasing temperature means increasing motion of molecules	
				452	molecular motion increases when temperature increases	