



COLORADO
Science Standards Grade 10
Physical Science with Earth Science © 2006

OBJECTIVES	PAGE REFERENCES
SCIENCE STANDARD #1	
Students understand the processes of scientific investigation and design, conduct, communicate about and evaluate such investigations.	
<ul style="list-style-type: none"> ■ Asking questions and stating hypotheses, using prior scientific knowledge to help guide their development. 	SE: 7-8 <i>Design Your Own Lab</i> 88-89, 242-243, 414-415, 446-447, 568-569 <i>Lab</i> 51 <i>Launch Lab</i> 287 <i>Science Skill Handbook</i> 850-853 <i>Use the Internet Lab</i> 508-509
<ul style="list-style-type: none"> ■ Creating and defending a written plan of action for a scientific investigation. 	SE: <i>Lab</i> 88-89, 242-243, 344-345, 414-415, 446-447, 476-477, 540-541, 568-569 <i>Science Skill Handbook</i> 853 <i>Use the Internet Lab</i> 508-509
<ul style="list-style-type: none"> ■ Selecting and using appropriate technologies to gather, process, and analyze data and to report information related to an investigation. 	SE: 24, 55 <i>Integrate Earth Science</i> 11 <i>Math Skill Handbook</i> 872-876 <i>Science Skill Handbook</i> 850, 854-858 <i>Use the Internet Lab</i> 476-477, 508-509 TWE: D 11 VL 55
<ul style="list-style-type: none"> ■ Identifying major sources of error or uncertainty within an investigation (<i>for example, particular measuring devices and experimental procedures</i>). 	SE: <i>Communicating Your Data</i> 134, 637, 777 <i>Lab</i> 380-381 <i>Math Skill Handbook</i> 868 TWE: AYD 89, 243, 345, 415, 447
<ul style="list-style-type: none"> ■ Constructing and revising scientific explanations and models, using evidence, logic, and experiments that include identifying and controlling variables. 	SE: 7-9 <i>Lab</i> 87, 118-119, 278-279, 310-311, 380-381, 676-677, 742-743, 776-777 <i>Science Skill Handbook</i> 853-858
<ul style="list-style-type: none"> ■ Communicating and evaluating scientific thinking that lead to particular conclusions. 	SE: 38-39, 218-220, 354-361, 721-722 <i>Accidents in Science</i> 210 <i>Integrate Astronomy</i> 105 <i>Lab</i> 51, 380-381 <i>National Geographic</i> 66-67 <i>Science and History</i> 478
<ul style="list-style-type: none"> ■ Recognizing and analyzing alternative explanations and models. 	SE: 11, 38-39, 218-220, 354-361, 581-583, 836-837 <i>Accidents in Science</i> 60, 210, 712 <i>Science and History</i> 478 <i>Science and Society</i> 510

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<ul style="list-style-type: none"> ■ Explaining the differences between a scientific theory and a scientific hypothesis. 	SE: 8, 12, 218-220, 356-360, 836-837 <i>Science and History</i> 120, 478 <i>Science Skill Handbook</i> 853-858 TWE: AIL 242 IL 12
SCIENCE STANDARD #2 Physical Science – Students know and understand common properties, forms and changes in matter and energy. (Focus: Physics and Chemistry)	
<ul style="list-style-type: none"> ■ Examining, describing, measuring, classifying, and predicting common properties of substances (<i>for example, electrical charge, chemical reactivity, acidity, electrical conductivity, radioactivity, relationships in the periodic table</i>). 	SE: 398-399, 560-561, 609-611, 759-761, 771-772, 788-790 <i>Lab</i> 559, 653, 775 <i>Mini LAB</i> 267 TWE: DIN 561
<ul style="list-style-type: none"> ■ Describing and explaining properties and composition of samples of matter using models (<i>for example, atomic and molecular structure, the periodic table</i>). 	SE: 260-261, 428-429, 581-583, 592-595, 690-692, 694-702 <i>Lab</i> 693 <i>Mini LAB</i> 789 <i>Model and Invent Lab</i> 710-711, 808-809
<ul style="list-style-type: none"> ■ Separating substances based on their chemical and physical properties (<i>for example, color, solubility, chemical reactivity, melting point, boiling point</i>). 	SE: 561-565, 732 <i>Applying Science</i> 428 <i>Launch Lab</i> 551 TWE: CUL 565 DIN 561 MM 563
<ul style="list-style-type: none"> ■ Using word and chemical equations to relate observed changes in matter to its composition and structure. 	SE: 723-724, 726-729, 730-733, 769, 772 TWE: AS 725, 733 DI 729 FYI 727 QD 731
<ul style="list-style-type: none"> ■ Identifying, measuring, calculating, and analyzing quantitative relationships involved with energy forms (<i>for example, heat transfer in a system involving mass, specific heat, and change in temperature of matter</i>). 	SE: 130-132, 257-259, 263, 410-412, 738-739 <i>National Geographic</i> 737 TWE: DIN 136 IL 141 QD 156 SJ 411
<ul style="list-style-type: none"> ■ Identifying, measuring, calculating and analyzing qualitative and quantitative relationships associated with energy transfer or energy transformation (<i>for example, changes in temperature, velocity, potential energy, kinetic energy, conduction, convection, radiation, voltage, current</i>). 	SE: 135-139, 259, 266-270, 520 <i>Applying Math</i> 258 <i>Lab</i> 134, 144-145, 271, 278-279 TWE: DI 133 IM 256
<ul style="list-style-type: none"> ■ Identifying, describing, and explaining physical and chemical changes involving the conservation of matter and energy (<i>for example, oscillating pendulum/spring, chemical reactions, nuclear reactions</i>). 	SE: 135-140, 163, 567, 721-722, 734 <i>Design Your Own Lab</i> 144-145, 568-569 TWE: DIN 136 FF 140 LD 138

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<ul style="list-style-type: none"> ■ Observing, measuring, and calculating quantities to demonstrate conservation of matter and energy in chemical changes (<i>for example, acid-base, precipitation, oxidation-reduction reactions</i>), and physical interactions of matter (<i>for example, force, work, power</i>). 	SE: 135-140, 163, 567, 721-722, 734 <i>Applying Math</i> 566 <i>Design Your Own Lab</i> 144-145, 568-569 TWE: DIN 136 LD 138
<ul style="list-style-type: none"> ■ Describing and predicting chemical changes (<i>for example, combustion, simple chemical reactions</i>), and physical interactions of matter (<i>for example, velocity, force, work, power</i>), using word or symbolic equations. 	SE: 86, 98-103, 156-159 <i>Applying Math</i> 566 <i>Design Your Own Lab</i> 568-569 <i>Lab</i> 87 TWE: DI 567 DIN 155 FYI 566 IL 564
<ul style="list-style-type: none"> ■ Describing and explaining physical interactions of matter using conceptual models (<i>for example, conservation laws of matter and energy, particle model of gaseous behavior</i>). 	SE: 76-79, 82-85, 107-108, 139-140, 254-256, 260-261, 364-368, 836-837 <i>Integrate Astronomy</i> 74 <i>Integrate History</i> 218-219
SCIENCE STANDARD #4 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)	
<ul style="list-style-type: none"> ■ Describing the composition and structure of Earth's interior. 	SE: 360-361, 370-372, 608-609 TWE: D 371 QD 360 VL 372
<ul style="list-style-type: none"> ■ Using the theory of plate tectonics to explain relationships among earthquakes, volcanoes, mid-ocean ridges, and deep-sea trenches. 	SE: 354-361, 362-367, 373-378 <i>Lab</i> 379, 380-381 <i>Launch Lab</i> 353 TWE: QD 365 UA 357 VL 356
<ul style="list-style-type: none"> ■ Using evidence (<i>for example, fossils, rock layers, ice cores, radiometric dating</i>) to investigate how Earth has changed or remained constant over short and long periods of time (<i>for example, Mountain St. Helens' eruption</i>). 	SE: 355-356, 646-651, 654-662, 669-675 <i>Lab</i> 676-677 <i>Science and History</i> 382, 600 TWE: CB 673 IM 649 LD 659
<ul style="list-style-type: none"> ■ Evaluating the feasibility of predicting and controlling natural events). 	SE: 7, 369, 376, 527-528 <i>Science and History</i> 600 TWE: A 526 CUR 377 FF 520
<ul style="list-style-type: none"> ■ Analyzing the costs, benefits, and consequences of natural resource exploration, development, and consumption. 	SE: 486-493 TWE: A 488, 492 CUR 489 D 491 DI 493 DIN 487 FYI 490, 497, 609

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<ul style="list-style-type: none"> ■ Analyzing the structure of, and changes in, the atmosphere, and its significance for life on Earth. 	SE: 225, 269, 518-522, 528 <i>Lab 523</i> TWE: AS 528 D 520 FYI 519
<ul style="list-style-type: none"> ■ Explaining and analyzing the general weather patterns by collecting, plotting, and interpreting data. 	SE: 39, 52, 524-528 <i>Lab 523</i> <i>Science Online 256</i> TWE: CUR 39 SJ 526 VL 525
<ul style="list-style-type: none"> ■ Describing how energy transfer within the atmosphere influences weather (<i>for example, the role of conduction, radiation, convection, and heat of condensation in clouds*, precipitation, winds, storms</i>). 	SE: 269, 520, 524-527 <i>Lab 523</i> <i>Mini LAB 519</i> <i>National Geographic 268</i> TWE: FYI 526
<ul style="list-style-type: none"> ■ Investigating and explaining the occurrence and effects of storms on human populations and the environment. 	SE: 39, 52, 527-528 TWE: AS 528 CUR 39
<ul style="list-style-type: none"> ■ Describing and explaining factors that may influence weather and climate (<i>for example, proximity to oceans, prevailing winds, and fossil fuel burning, volcanic eruptions</i>). 	SE: 518-522, 524-525, 529-533, 535-539 <i>Lab 523</i> <i>Launch Lab 517</i> TWE: D 520 FYI 519, 537, 538
<ul style="list-style-type: none"> ■ Identifying and explaining factors that influence the quality of water needed to sustain life. 	SE: 522, 536, 663-664, 667-668 <i>National Geographic 44</i> <i>Science and Society 678</i> TWE: AS 668 IM 497
<ul style="list-style-type: none"> ■ Identifying and analyzing the costs, benefits, and consequences of using water resources. 	SE: 503-504, 663-665, 667-668 <i>Science and Society 678</i> TWE: AS 668 FYI 504 IM 497
<ul style="list-style-type: none"> ■ Explaining interactions between water and other Earth systems (<i>for example, the biosphere, lithosphere, and atmosphere</i>). 	SE: 522, 529-530, 536-537, 663-665, 667-668 <i>National Geographic 666</i> TWE: MM 530 QD 533
<ul style="list-style-type: none"> ■ Explaining interrelationships between the circulation of oceans and weather and climate. 	SE: 521-522, 532-533, 539, 655-657, 663 TWE: D 532
<ul style="list-style-type: none"> ■ Explaining the causes of and modeling the varied lengths of days, seasons, and phases of the Moon. 	SE: 193-195, 199-200, 535 <i>Lab 196</i> TWE: A 193, 199 FYI 194 VL 200
<ul style="list-style-type: none"> ■ Describing the effect of gravitation on the motions observed in the solar system and beyond. 	SE: 218-222, 236-237, 823-825 <i>Integrate Astronomy 105</i> TWE: AS 222 D 234

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<ul style="list-style-type: none"> ■ Describing electromagnetic radiation produced by the Sun and other stars (<i>for example, X-ray, ultraviolet, infrared, radio</i>). 	SE: 269, 464-467, 520, 827-829 TWE: D 466
SCIENCE STANDARD #5 Students know and understand interrelationships among science, technology, and human activity and how they can affect the world.	
<ul style="list-style-type: none"> ■ Analyzing benefits, limitations, costs and consequences involved in using technology or resources (<i>for example, x-rays, agricultural chemicals, natural gas reserves</i>). 	SE: 45, 46-50, 494-499 <i>Lab 51</i> <i>National Geographic 44</i> <i>Science and History 312, 448</i> <i>Science and Society 510, 778</i> TWE: AS 45
<ul style="list-style-type: none"> ■ Analyzing how the introduction of a new technology has affected or could affect human activity (<i>for example, invention of the telescope, application of modern telecommunications</i>). 	SE: 469-475, 818-821 <i>Integrate History 273</i> <i>National Geographic 115, 805</i> <i>Science and History 312</i> TWE: FF 471
<ul style="list-style-type: none"> ■ Demonstrating the interrelationships between science and technology (<i>for example, building a bridge, designing a better running shoe</i>). 	SE: 13, 38-41, 52-57 <i>Accidents in Science 744</i> <i>Applying Science 428, 586</i> <i>Lab 468</i> <i>National Geographic 66-67</i> <i>Science and Society 638</i> TWE: MM 56
<ul style="list-style-type: none"> ■ Explaining the use of technology in an occupation. 	SE: 52-55 <i>Accidents in Science 60, 712</i> <i>Integrate Career 56, 408, 753</i> <i>Integrate Health 307</i> <i>National Geographic 44, 66-67</i> TWE: FYI 53
SCIENCE STANDARD #6 Students understand that science involves a particular way of knowing and understand common connections among scientific disciplines.	
<ul style="list-style-type: none"> ■ Evaluating print and visual media for scientific evidence, bias, or opinion. 	SE: 10 <i>Accidents in Science 210</i> <i>Science and History 146</i> <i>Science Skill Handbook 850</i> TWE: AS 26 DIN 23
<ul style="list-style-type: none"> ■ Refining a hypothesis based on an accumulation of data over time (<i>for example, Alvarez's theory on dinosaur extinction</i>). 	SE: 38-39, 218-219, 354-361, 581-583, 801-802, 833-839 <i>Science and History 810</i> TWE: IM 355 UA 357 VL 832
<ul style="list-style-type: none"> ■ Identifying and predicting cause-effect relationships within a system. 	SE: 38-39, 98-101, 201-202, 225-226, 535-539, 565-566 <i>Integrate Astronomy 105</i> <i>Science and Society 778</i> <i>Science Skill Handbook 851-853</i> TWE: DI 539

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<ul style="list-style-type: none"> ■ Identifying and describing the dynamics of natural cycles (<i>for example, weather systems, ecological systems, body systems</i>). 	SE: 193-194, 199-202, 522, 536-537, 634-635, 663 <i>Integrate Environment</i> 139 TWE: DI 522 LD 634
<ul style="list-style-type: none"> ■ Using graphs, equations, or other models to analyze systems involving change and constancy (<i>for example, comparing the geologic time scale to shorter time frames</i>). 	SE: 22-26, 74-75, 535 <i>Applying Math</i> 357, 537 <i>Lab</i> 27, 51, 118-119 <i>Math Skill Handbook</i> 875-876 <i>National Geographic</i> 78
<ul style="list-style-type: none"> ■ Analyzing and comparing models of cyclic change as used within and among scientific disciplines (<i>for example, water cycle, circular motion, sound waves, and weather cycles</i>). 	SE: 77, 193-194, 199-200, 294-299, 438-439, 458-461, 522, 536-537, 634-635, 663
<ul style="list-style-type: none"> ■ Identifying and testing a model to analyze systems involving change and constancy (<i>for example, math expression for gas behavior, constructing a closed ecosystem such as an aquarium</i>). 	SE: 22-26, 74-75, 535 <i>Applying Math</i> 357, 537 <i>Lab</i> 27, 51, 118-119 <i>Math Skill Handbook</i> 875-876 <i>National Geographic</i> 78
<ul style="list-style-type: none"> ■ Explaining an exponential model (<i>for example, pH scale, population growth, Richter scale</i>). 	SE: 366-367, 773 <i>Applying Math</i> 798 TWE: FYI 772

Codes Used for TWE Pages

A	Activity
AIL	Alternative Inquiry Lab
AS	Assessment
AYD	Analyze Your Data
CB	Content Background
CU	Check for Understanding
CUL	Cultural Diversity
CUR	Curriculum Connection
D	Discussion
DI	Daily Intervention
DIN	Differentiated Instruction
FF	Fun Fact
FYI	Teacher FYI
IL	Inquiry Lab
IM	Identifying Misconceptions
LD	Lab Demonstration
MM	Make a Model
QD	Quick Demo
SJ	Science Journal
UA	Use an Analogy
VL	Visual Learning