



OFFICE OF CURRICULUM, INSTRUCTION, & PROFESSIONAL DEVELOPMENT

MIDDLE SCHOOL COURSE OUTLINE

(Revised September 2011)

Department	Science	Course Code	4102
Course Title	Science 6 SDAIE		
Abbreviation	Sci 6 SDA	Grade Level	6
Course Length	1 year	Co-requisites	ELD English 3
Teacher Certification	BCLAD / BCC or CLAD / LDS / SB 395, 1969		

COURSE DESCRIPTION:

Sixth grade SDAIE science is designed specifically for the needs of English Language Learners (ELLs) who are at the High Intermediate and Early Advanced levels of listening, speaking, reading, and writing proficiency in English. Students in this course cover the same content and utilize the same basic textbook as their Fluent English Speaker counterparts. The course delivery varies in pacing, instructional methodology, and supplemental materials. It is designed to provide depth versus breadth of the content standards, and provide more comprehensible input, primary language support, and literacy development in the content area.

Sixth grade science is a standards and laboratory based program. Students should spend approximately forty percent (40%) of their class time on hands-on activities. Introductory principles of earth science will be explored in detail, with some related topics from physical and life sciences included. Constructivist methods of teaching are employed to ensure the best possible comprehension and retention of science concepts. Science activities will be based on the California Science Standards as delineated in the California Science Framework and will utilize the skills and techniques outlined in the Investigation and Experimentation Strand of the Content Standards.

GOALS: (Student needs this course is intended to meet)

- Students will learn all of the California State Standards for 6th Grade Science, which emphasize Earth sciences. The use of well-designed, memorable experiences and the application of scientific knowledge and methodology are essential in helping students achieve appropriate comprehension of the content.
- Students will improve their ability to learn independently by drawing generalizations from science related articles, books, graphs, charts, and diagrams. Regular opportunities are provided for students to clearly communicate their understanding through oral and written explanations of science concepts.
- Students will study the applications of science in everyday life to inspire them to consider pursuing advanced studies in science and explore the wide variety of related career choices available.

ACADEMIC LITERACY IN SDAIE CLASSES FOR ELLs AT LEVEL 3 and LONG-TERM ENGLISH LEARNERS:

The ELD Standards of reading, writing, listening and speaking describe the linguistic pathway that ELLs take to achieve academic literacy in English. SDAIE content area classes play an important role in developing and strengthening students' progress towards this goal. Students should be encouraged to expand their English skills, even though grammatical and vocabulary approximations will occur during this process.

When content-area information and materials have been made comprehensible through instruction in the SDAIE class, ELLs at each level will progress through the following phases of developing academic literacy in English. The students' degrees of literacy in their primary language will significantly affect the pace that students move through these levels.

ELD Level 3

Upon entering ELD Level 3, students are increasing their control of academic English proficiency about topics that have been explicitly taught to them and some topics that may be new to them. There will be wide gaps in vocabulary. ELLs progressing through this level will:

- participate in group/class projects, discussions and presentations with simple sentences and complex sentences (with increasing accuracy and fluency when given modeling and constructive feedback)
- use content area reading strategies (especially pre-reading, KWL, academic participation cards, anticipation guides, Reciprocal Teaching and Question/Answer Relationships) to analyze concepts from taught texts and other course reading materials. By the end of level 3, ELLs are able to comprehend most texts written at 4th grade level. Students continue to need extensive modeling and direct instruction, especially when encountering figurative language and sentences with numerous clauses.
- respond to Curriculum Embedded Assessment prompts (read to them and clarified for them as needed) orally and with simple and complex sentence structures
- use writing in a variety of ways such as, but not limited to, class note-taking, learning logs, interactive notebooks, response logs, and completing student handouts, homework, and class projects. Students continue to need extensive modeling and direct instruction, especially when writing at differing formality levels for a variety of audiences.
- understand the need for using test-taking strategies (using taught vocabulary) on the required district/state assessments, such as, End of Course Exams (with alternate presentation and response), CST, and CELDT.

Long-Term English Learners

Long-term English learners demonstrate a significant gap between their oral English fluency (high) and their English literacy proficiency (low), even though they have had many years of instruction in English. ELLs progressing through this level will:

- participate in group/class projects, discussions and presentations with sentences that demonstrate conversational English proficiency
- need to be taught how to use content area reading strategies (especially pre-reading, KWL, academic participation cards, anticipation guides, Reciprocal Teaching and Question/Answer Relationships) to analyze concepts from taught texts and other course reading materials. Students need extensive modeling, direct instruction, and oral discussions before, during and after reading.
- respond to Curriculum Embedded Assessment prompts (clarified orally to them as needed). Students need extensive modeling, direct instruction, and oral discussions to move them beyond writing sentences that reflect only conversational English.
- use writing in a variety of ways such as, but not limited to, class note-taking, learning logs, interactive notebooks, response logs, and completing student handouts, homework, and class projects. Students continue to need extensive modeling and direct instruction, especially when writing at differing formality levels for a variety of audiences.
- understand the need for using test-taking strategies on the required district/state assessments, such as, End of Course Exams, CST, and CELDT.

CONTEXT: CONTENT SCOPE AND SEQUENCE

	Physical Sciences	Earth Sciences	Life Sciences
6th	Density (Qualitative) ----- (CA 8) Energy Temperature vs. Heat Heat Transfer	Earth's Layers Plate Tectonics Mountain Building Earthquakes, Faults, and Epicenters Volcanoes California Geology Mechanical & Chemical Weathering Minerals ----- (LB) Rock Cycle (Igneous, Metamorphic, and Sedimentary Rocks) ----- (LB) Sun's Effect on Weather Convections Solar Energy Atmospheric Conditions Natural Resources Stratigraphy: Fossil Locations Rock (CA 7) Geol. Timeline of Earth's History ----(CA 7) Formation of Fossils -----(CA 7) Methods of Dating Earth's History ---(CA 7)	Food Chains / Food Webs Ecosystems Human Impacts on Ecosystems ----- (LB)
			Six Designated Lessons from Project ALERT Health Curriculum
7th			Cell Similarities & Differentiation Function of Cell Structures Energy at the Cellular Level Photosynthesis / Respiration Mitosis Genetics DNA → RNA → Protein ----- (LB) Sexual / Asexual Reproduction Meiosis ----- (LB) DNA, Genes, & Alleles Dominant & Recessive Traits Theory of Evolution Natural Selection Body Systems Taxonomic Keys ----- (LB) Kingdoms & Major Phyla ----- (LB)
8th	Observing and Defining Motion Forces and their Effects Gravity's Large Scale Effects Basic Atomic Theory Periodic Table as a Tool Metals, Non-metals, Inert Gases Electrons beyond the Bohr Model Ions and Isotopes Physical & Chemical Properties Element vs. Compound Properties Chemical Bonding Atoms and Ions Forming Solids Phases and Molecular Motion Chemical Formulas Chemical Equations & Conservation of Matter Exothermic vs. Endothermic Acids, Bases, and pH Density & Buoyancy Sound and Light Energy ----- (CA 7)	Galaxies and Stars Life Cycles of Stars (Nebular Theory, Novas, etc.) Distances in Astronomy Light Sources and Reflectors in the Universe Cosmology (Universe Origin) ----- (LB) Solar System	Simple Machines and the Human Body -----(CA 7) Blood Pressure and Heart Valves---(CA 7) Organic Chem. / Biochem.
			Three Designated Lessons from Project ALERT Health Curriculum
		<p><u>Notes regarding non-aligned content:</u></p> <p>(LB) => Long Beach specific content; not found in CA Science Content Standards</p> <p>(CA 7) => 7th grade content which has been moved to 6th or 8th grade to accommodate reduced science instruction in 7th grade</p> <p>(CA 8) => 8th grade content which should be presented qualitatively in 6th grade to help explain convections and other Earth science related content</p>	

CONTEXT: SKILLS SCOPE AND SEQUENCE

Investigation and Experimentation:

Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:

6th

- 7a. Develop a hypothesis.
- b. Select and use appropriate tools and technology (including calculators, computers, balances, spring scales, microscopes, and binoculars) to perform tests, collect data, and display data.
- c. Construct appropriate graphs from data and develop qualitative statements about the relationships between variables.
- d. Communicate the steps and results from an investigation in written reports and oral presentations.
- e. Recognize whether evidence is consistent with a proposed explanation.
- f. Read a topographic map and a geologic map for evidence provided on the maps and construct and interpret a simple scale map.
- g. Interpret events by sequence and time from natural phenomena (e.g., the relative ages of rocks and intrusions).
- h. Identify changes in natural phenomena over time without manipulating the phenomena (e.g., a tree limb, a grove of trees, a stream, a hillslope).

7th

- 7a. Select and use appropriate tools and technology (including calculators, computers, balances, spring scales, microscopes, and binoculars) to perform tests, collect data, and display data.
- b. Utilize a variety of print and electronic resources (including the World Wide Web) to collect information as evidence as part of a research project.
- c. Communicate the logical connection among hypothesis, science concepts, tests conducted, data collected, and conclusions drawn from the scientific evidence.
- d. Construct scale models, maps and appropriately labeled diagrams to communicate scientific knowledge (e.g., motion of Earth's plates and cell structure).
- e. Communicate the steps and results from an investigation in written reports and verbal presentations.

8th

- 9a. Plan and conduct a scientific investigation to test a hypothesis.
- b. Evaluate the accuracy and reproducibility of data.
- c. Distinguish between variable and controlled parameters in a test.
- d. Recognize the slope of the linear graph as the constant in the relationship $y=kx$ and apply this to interpret graphs constructed from data.
- e. Construct appropriate graphs from data and develop quantitative statements about the relationships between variables.
- f. Apply simple mathematical relationships to determine one quantity given the other two (including $\text{speed} = \text{distance}/\text{time}$, $\text{density} = \text{mass}/\text{volume}$, $\text{force} = \text{pressure} \times \text{area}$, $\text{volume} = \text{area} \times \text{height}$).
- g. Distinguish between linear and non-linear relationships on a graph of data.
- h.

CA CONTENT STANDARDS

Grade 6 Focus On Earth Science:

Plate Tectonics and Earth's Structure

1. Plate tectonics accounts for important features of Earth's surface and major geologic events. As a basis for understanding this concept, students know ...
 - a. the fit of the continents, location of earthquakes, volcanoes, and midocean ridges, and the distribution of fossils, rock types, and ancient climatic zones provide evidence for plate tectonics.
 - b. the solid Earth is layered with cold, brittle lithosphere; hot, convecting mantle; and dense, metallic core.
 - c. lithospheric plates that are the size of continents and oceans move at rates of centimeters per year in response to movements in the mantle.
 - d. earthquakes are sudden motions along breaks in the crust called faults, and volcanoes/fissures are locations where magma reaches the surface.
 - e. major geologic events, such as earthquakes, volcanic eruptions, and mountain building result from plate motions.
 - f. how to explain major features of California geology in terms of plate tectonics (including mountains, faults, volcanoes).
 - g. how to determine the epicenter of an earthquake and that the effects of an earthquake vary with its size, distance from the epicenter, local geology, and the type of construction involved.

Shaping Earth's Surface

2. Topography is reshaped by the weathering of rock and soil and by the transportation and deposition of sediment. As a basis for understanding this concept, students know ...
 - a. water running downhill is the dominant process in shaping the landscape, including California's landscape.
 - b. rivers and streams are dynamic systems that erode and transport sediment, change course, and flood their banks in natural and recurring patterns.
 - c. beaches are dynamic systems in which sand is supplied by rivers and moved along the coast by wave action.
 - d. earthquakes, volcanic eruptions, landslides, and floods change human and wildlife habitats.

Heat (Thermal Energy) (Physical Science)

3. Heat moves in a predictable flow from warmer objects to cooler objects until all the objects are at the same temperature. As a basis for understanding this concept, students know ...
 - a. energy can be carried from one place to another by heat flow, or by waves including water waves, light and sound, or by moving objects.
 - b. when fuel is consumed, most of the energy released becomes heat energy.
 - c. heat flows in solids by conduction (which involves no flow of matter) and in fluids by conduction and also by convection (which involves flow of matter).
 - d. heat energy is also transferred between objects by radiation; radiation can travel through space.

Energy in the Earth System

4. Many phenomena on Earth's surface are affected by the transfer of energy through radiation and convection currents. As a basis for understanding this concept, students know ...
 - a. the sun is the major source of energy for phenomena on the Earth's surface, powering winds, ocean currents, and the water cycle.
 - b. solar energy reaches Earth through radiation, mostly in the form of visible light.
 - c. heat from Earth's interior reaches the surface primarily through convection.
 - d. convection currents distribute heat in the atmosphere and oceans.
 - e. differences in pressure, heat, air movement, and humidity result in changes of weather.

Ecology (Life Science)

5. Organisms in ecosystems exchange energy and nutrients among themselves and with the environment. As a basis for understanding this concept, students know ...
 - a. energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis, and then from organism to organism in food webs.
 - b. over time, matter is transferred from one organism to others in the food web, and between organisms and the physical environment. [LS10]
 - c. populations of organisms can be categorized by the functions they serve in an ecosystem. [LS10]
 - d. different kinds of organisms may play similar ecological roles in similar biomes.
 - e. the number and types of organisms an ecosystem can support depends on the resources available and abiotic factors, such as quantity of light and water, range of temperatures, and soil composition. [LS10]

Resources

6. Sources of energy and materials differ in amounts, distribution, usefulness, and the time required for their formation. As a basis for understanding this concept, students know ...
 - a. the utility of energy sources is determined by factors that are involved in converting these sources to useful forms and the consequences of the conversion process.
 - b. different natural energy and material resources, including air, soil, rocks, minerals, petroleum, fresh water, wildlife, and forests, and classify them as renewable or nonrenewable.
 - c. natural origin of the materials used to make common objects.

Earth and Life History (Earth Science) (CA 7th Grade Standards)

- 7-4. Evidence from rocks allows us to understand the evolution of life on Earth. As the basis for understanding this concept, students know ...
 - a. Earth processes today are similar to those that occurred in the past and slow geologic processes have large cumulative effects over long periods of time.
 - b. the history of life on Earth has been disrupted by major catastrophic events, such as major volcanic eruptions or the impacts of asteroids.
 - c. that the rock cycle includes the formation of new sediment and rocks and that rocks are often found in layers, with the oldest generally on the bottom.
 - d. that evidence from geologic layers and radioactive dating indicates Earth is approximately 4.6 billion years old and that life on this planet has existed for more than 3 billion years.
 - e. fossils provide evidence of how life and environmental conditions have changed
 - f. how movements of the Earth's continental and oceanic plates through time, with associated changes in climate and geographical connections, have affected the past and present distribution of organisms.
 - g. how to explain significant developments and extinctions of plant and animal life on the geologic time scale.

Investigation & Experimentation

7. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will ...
 - a. develop a hypothesis.
 - b. select and use appropriate tools and technology (including calculators, computers, balances, spring scales, microscopes, and binoculars) to perform tests, collect data, and display data.
 - c. construct appropriate graphs from data and develop qualitative statements about the relationships between variables. [LS10]
 - d. communicate the steps and results from an investigation in written reports and verbal presentations.
 - e. recognize whether evidence is consistent with a proposed explanation. [LS10]
 - f. read a topographic map and a geologic map for evidence provided on the maps, and construct and interpret a simple scale map.
 - g. interpret events by sequence and time from natural phenomena (e.g., relative ages of rocks and intrusions).
 - h. identify changes in natural phenomena over time without manipulating the phenomena (e.g., a tree limb, a grove of trees, a stream, a hillslope).

DISTRICT PERFORMANCE STANDARDS:

The Long Beach Unified School District has common assessments and assignments that are required for sixth grade science. The Performance Standard Criteria are shown in the table below. The objective is to have all students achieve at or above the Proficient Level and receive a C or better in the course. Performance level is determined by the average of the assessments or assignments.

Science Performance Standard Criteria

	Not Proficient	Partial Proficient	Proficient	Advanced Proficient
Graded Student Work	Average is a 1 or less than 60%	Average is a 2 or 60% - 69%	Average is a 3 or 70% - 84%	Average is a 4 or 85% - 100%
Standards-Based Classroom Assessments	Less than 60%	60% - 69%	70% - 84%	85% - 100%
Written Response / Lab Report / OES (6 point scale)	1-2	3	4	5-6
Written Response / Lab Report / OES (4 point scale)	1	2	3	4
End-Of-Course Exam	Less than 45%	45% - 59%	60% - 84%	85% - 100%

OUTLINE OF CONTENT AND RECOMMENDED TIME ALLOTMENT:

Time allocations are only suggestions and may be adjusted to suit school site curriculum plans and student needs. Content sequencing is established to align with quarterly district assessments. Adjusting the sequencing can only be done within the established quarters.

SCIENCE 6

Ecology (Life Science)

5. Organisms in ecosystems exchange energy and nutrients among themselves and with the environment.

Standards and Assessments "Students know..."	Task Analysis "Students are able to ..."	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)																		
<p>... populations of organisms can be categorized by the functions they serve in an ecosystem. (5,c)</p> <p>[LS10]</p> <p>DISTRICT ASSESSMENTS: CR: Food for Thought</p> <p>MODIFIED ASSESSMENTS: (Framework, p. 98) Given a random list of 4 or 5 plants and 8 to 10 consumers (primary, secondary, and tertiary), pairs of students organize the organisms according to food web order and ecological function.</p> <p>Construct an energy pyramid. Outside the pyramid, include 1 or 2 decomposers, and 1 or 2 scavengers. Draw arrows between members of the pyramid to show the predation sequence.</p> <p>Students are assigned roles as producers, consumers, decomposers, etc. Using string or yarn they connect to one another to form a food web and then a food chain.</p>	<ul style="list-style-type: none"> Identify and define an ecosystem as all the living and nonliving things that interact in a given area. Classify organisms as producers or consumers of chemical energy. Classify consumers as either predators, scavengers, or decomposers. Identify consumers that fall under more than one category: <ul style="list-style-type: none"> Omnivores consume both plants and animals. Opportunistic consumers act as both predators and scavengers. 	<p>Focus on ES: Ch 12:1, 13:1</p> <p><i>PH FoES, 19:1</i></p>	<p>KEY VOCABULARY:</p> <table border="0"> <tr> <td>ecosystem</td> <td>scavengers</td> </tr> <tr> <td>producers</td> <td>decomposers</td> </tr> <tr> <td>consumers</td> <td>omnivores</td> </tr> <tr> <td>tertiary</td> <td>opportunistic</td> </tr> <tr> <td>herbivore</td> <td>food chain</td> </tr> <tr> <td>carnivore</td> <td>food web</td> </tr> <tr> <td>predators</td> <td>food pyramid</td> </tr> <tr> <td>abiotic</td> <td>biotic</td> </tr> <tr> <td>photosynthetic</td> <td>microorganisms</td> </tr> </table> <p>GRAPHIC ORGANIZERS:</p> <p>Venn Diagram: consumers vs. producers</p> <p>Flow Map: food webs / food chains</p> <p>Tree Map: Consumers as predators, scavengers, or decomposers</p> <p>SKILLS FOCUS:</p> <p>Recognize whether evidence is consistent with a proposed explanation. (I&E 7.e)</p> <p>LABS / DEMOS:</p> <ul style="list-style-type: none"> (Framework, p. 98) Given a random list of 4 or 5 plants and 8 to 10 consumers (primary, secondary, and tertiary), organize the organisms according to food web order and ecological function. Construct an energy pyramid. Outside the pyramid, include 1 or 2 decomposers, and 1 or 2 scavengers. Draw arrows between members of the pyramid to show the predation sequence. Focus on ES: 12:1, Launch Lab, "How tangled is the life web?" p. 513 Focus on ES: 12:1, Activity (Abiotic/Biotic), p. 517 TE Focus on ES: 12:1, Activity (Soil Observation), p. 521 TE Focus on ES: 12:1, Demo., "Air is Real", p. 522 TE Focus on ES: 12:1, Nat'l Geog., "Visualizing Biotic Factors", p. 525 Focus on ES: 12:1, Data Lab, "Graphing Monthly Abiotic ...", p. 530 Focus on ES: 13:1, Data Lab, "Can you classify animals by diet?" p. 557 Focus on ES: 4-in-1 Lab, "Communities", pp. 87-90 Focus on ES: Ch 13 Transparencies "What's for dinner?" "You are what you eat" "A Vital Job" Teachers Domain: "Producers, Consumers, Decomposers" http://www.teachersdomain.org/resources/tdc02/sci/life/oate/lp_energyweb/index.html Enchanted Learning: "Food Chains and Food Webs" http://www.enchantedlearning.com/subjects/foodchain/ 	ecosystem	scavengers	producers	decomposers	consumers	omnivores	tertiary	opportunistic	herbivore	food chain	carnivore	food web	predators	food pyramid	abiotic	biotic	photosynthetic	microorganisms	<p>4 Days</p>
ecosystem	scavengers																					
producers	decomposers																					
consumers	omnivores																					
tertiary	opportunistic																					
herbivore	food chain																					
carnivore	food web																					
predators	food pyramid																					
abiotic	biotic																					
photosynthetic	microorganisms																					

Ecology (Life Science) (cont'd)

5. Organisms in ecosystems exchange energy and nutrients among themselves and with the environment.

Standards and Assessments "Students know..."	Task Analysis "Students are able to ..."	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
<p>... energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis, and then from organism to organism through food webs. (5,a)</p> <p>... matter is transferred over time from one organism to others in the food web and between organisms and the physical environment. (5,b)</p> <p>[LS10]</p> <p>DISTRICT ASSESSMENTS: CR: Food for Thought</p> <p>MODIFIED ASSESSMENTS: Have groups of students do research and create a diagram showing the flow of energy from the Sun through specific photosynthetic microscopic organisms, to larger organisms, and finally to top predators or humans. Include some symbols to show that most of the chemical energy at each level is lost as heat.</p>	<ul style="list-style-type: none"> Describe producers as plants and photosynthetic microorganisms that do not need to consume other organisms, but store chemical energy from basic molecules and light energy. Diagram food chains and food webs, starting with solar energy. <ul style="list-style-type: none"> Diagram a food chain where plants are consumed by primary consumers (herbivores), which are consumed by secondary consumers (carnivores), which are consumed by tertiary consumers (top-level predators). Diagram a microscopic food chain where photosynthetic bacteria (cyanobacteria) and protists, or single-celled eukaryotic organisms (e.g., dinoflagellates), are consumed by protozoans (heterotrophic protists), which are in turn consumed by larger protozoans and small animals. Explain how energy and matter are passed from one level to the next in a food chain. <ul style="list-style-type: none"> Diagram and explain the carbon cycle. Diagram and explain the nitrogen cycle. Describe ways that matter and energy are exchanged with the physical environment. Depict the hierarchy of consumers and the transfer and loss of energy from herbivores through secondary consumers to the top carnivores in a food web or energy pyramid. 	<p>Focus on ES: Ch 13:1-3</p> <p><i>PH FoES</i>, 19:1</p>	<p>KEY VOCABULARY: photosynthetic microorganisms hierarchy protist water cycle eukaryotic carbon cycle protozoan physical environment nitrogen cycle food web food chain secondary consumer tertiary consumer</p> <p>GRAPHIC ORGANIZERS: Parallel Flow Maps: macroscopic and microscopic food chains Labeled carbon/oxygen and nitrogen cycles showing the flow of energy as well as matter</p> <p>SKILLS FOCUS: Classifying, predicting, modeling Construct appropriate graphs from data and develop qualitative statements about the relationships between variables. (I&E 7.c)</p> <p>LABS / DEMOS:</p> <ul style="list-style-type: none"> Analyze owl pellets Focus on ES: 13:1, Launch Lab, "Can you eat energy?" p. 549 Focus on ES: 13:1, Demo., "How plants obtain CO₂", p. 553 TE Focus on ES: 13:2, Demo., "Food Energy", p. 561 TE Focus on ES: 13:2, Mini Lab, "energy through an ecosystem?" p. 567 Focus on ES: 13:3, Mini Lab, "Is your soil rich in nitrogen?" p. 569 Focus on ES: 13:3, Nat'l Geog., "Visualizing the Carbon Cycle", p. 571 Focus on ES: 13:3, Applying Math, Percent of Nitrogen in soil", p. 573 Focus on ES: 13:3, Lab, "Is it primary, secondary, or tertiary?" pp. 574-575 Focus on ES: 4-in-1 Lab, "Exploring Life in Pond Water", pp. 83-86 Focus on ES: Ch 12 Transparency, "The sun's effect on ecosystems" Focus on ES: Ch 13 Transparency, "Nitrogen Cycle" AIMS Educational Foundation: Field Detectives Iowa St. Univ.: "Food Chains and Food Webs" http://www.cyfernet.org/integrate/iowa/schain.html 	<p>6 Days</p>

Ecology (Life Science) (cont'd)

5. Organisms in ecosystems exchange energy and nutrients among themselves and with the environment.

Standards and Assessments "Students know..."	Task Analysis "Students are able to ..."	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
<p>... different kinds of organisms may play similar ecological roles in similar biomes. (5,d)</p> <p>DISTRICT ASSESSMENTS: CR: <u>Home, Home on the Biome</u></p> <p>MODIFIED ASSESSMENTS: Groups of students prepare a poster comparing and contrasting two similar biomes in different hemispheres.</p>	<ul style="list-style-type: none"> Describe the various biomes and locate them on a map or globe. Research biomes around the world, which have similar climate and availability of water. Define the specific niche of various organisms. Compare organisms in widely separated geographic locations, but similar biomes, that fulfill the same ecological roles. 	<p>Focus on ES: Ch 12:2, 13:2</p> <p><i>PH FoES, 19:3-4, 18:3</i></p>	<p>KEY VOCABULARY: biome role niche</p> <p>GRAPHIC ORGANIZERS: Tree Map: Biomes</p> <p>Venn Diagram: organisms and their ecological roles in two similar biomes</p> <p>SKILLS FOCUS: Inferring, observing, researching</p> <p>Develop a hypothesis. (I&E 7.a)</p> <p>Communicate the steps and results from an investigation in written reports and oral presentations. (I&E 7.d)</p> <p>LABS / DEMOS:</p> <ul style="list-style-type: none"> Focus on ES: 12:2, Activity (Biomes), p. 533 TE Focus on ES: 12:2, Activity (Fox comparison), p. 533 TE Focus on ES: 12:2, Mini Lab, "How many organisms live here?" p. 534 Focus on ES: 12:2, Activity (Museum exhibit), p. 535 TE Focus on ES: 12:2, Demo., "Niches", p. 536 TE Focus on ES: 13:2, Mini Lab, "What do they eat ...?" p. 564 Focus on ES: Ch 12 Transparency, "Biomes" Discovery: "Unique Plants of the Biomes" (activity), http://school.discovery.com/lesson-plans/programs/plantsofthebiomes/ Ariz. St. Univ: "Biomes: Webquest", http://coe.west.asu.edu/students/dmatousek/webquest.htm 	<p>8 Days</p>

Ecology (Life Science) (cont'd)

5. Organisms in ecosystems exchange energy and nutrients among themselves and with the environment.

Standards and Assessments "Students know..."	Task Analysis "Students are able to ..."	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
<p>... the number and types of organisms an ecosystem can support depends on the resources available and on abiotic factors, such as quantities of light and water, a range of temperatures, and soil composition. (5,e)</p> <p>[LS10]</p> <p>DISTRICT ASSESSMENTS: CR: Home, Home on the Biome</p> <p>MODIFIED ASSESSMENTS: Pairs of students create a collage showing the "Goldilocks" effect in ecosystems: where sunlight and water are found in combinations of large amounts, moderate amounts, and scarce amounts. Students explain how plant growth is affected and how the plant growth affects animal populations.</p>	<ul style="list-style-type: none"> • Explain how the richness of plant growth (the base of the energy pyramid) controls the diversity of life in an ecosystem. • Describe how abiotic factors control plant growth. • Compare and contrast temperate and tropical environments to deserts and polar tundra for the number of organisms they support. • Show how the number of edible plants in an ecosystem influences the number of plant eating animals. • Analyze the relationship between the number of predators in a system to the number of prey. 	<p>Focus on ES: Ch 12:1</p> <p><i>PH FoES</i>, 18:1-3, 10:3, 13:2-3, 19:4, 20:3</p>	<p>KEY VOCABULARY: solar radiation water cycle photosynthesis humus predator prey</p> <p>GRAPHIC ORGANIZERS: Flow Map: interaction of biotic and abiotic factors supporting an ecosystem Cycle Map: food chain showing recycling of organic matter</p> <p>SKILLS FOCUS: Observing, classifying, measuring, inferring, constructing data tables</p> <p>Identify changes in natural phenomena over time without manipulating the phenomena. (I&E 7.h)</p> <p>LABS / DEMOS:</p> <ul style="list-style-type: none"> • Focus on ES: 12:1, Demo., "Model Ecosystems", p. 516 TE • Focus on ES: 12:1, Demo., "Ecosystems", p. 521 TE • Focus on ES: 12:1, Demo., "Rain Shadow", p. 527 TE • Focus on ES: 12:1, Demo., "Plant Environments", p. 528 TE • Focus on ES: 12:1, Applying Math, "Changing soil pH", p. 531 • Focus on ES: 12:2, Lab, "Counting Species", pp. 538-539 • Focus on ES: 4-in-1 Lab, "Changes in Predator and Prey ...", pp. 79-82 • Focus on ES: Ch 12 Transparency, "Interactions of Life" • PBS: "The Wolf and the Moose" http://www.pbs.org/edens/denali/mooswolf.htm • ThinkQuest: "Biomes—Living Worlds" http://library.thinkquest.org/C0113340/text/biomes/biomes.tundra.plants.growing_period.html 	<p>5 Days</p>

Ecology (Life Science) (cont'd)

5. Organisms in ecosystems exchange energy and nutrients among themselves and with the environment.

Standards and Assessments "Students know..."	Task Analysis "Students are able to ..."	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
<p>* ... that humans are part of and have a responsibility towards ecosystems. (LBUSD)</p> <p>DISTRICT ASSESSMENTS: OES: MODIFIED ASSESSMENTS: Pairs of students research a local environmental problem and the steps which have been taken to address the problem. Issues may include auto emissions, sewage treatment, landfills, farming technology, water resource use, etc.</p>	<ul style="list-style-type: none"> Recognize that human population is an integral part of an ecosystem. Identify imbalances within a variety of ecosystems. Identify both positive and negative ways in which human populations and natural events can affect ecosystems. List ways in which human populations may be affected by imbalances in their environment. Indicate how the actions of individuals may help to solve environmental problems. 	<p>Focus on ES: Ch 12:1-2</p> <p><i>PH FoES, Ch 20</i></p>	<p>KEY VOCABULARY: imbalance integral</p> <p>GRAPHIC ORGANIZERS: Tree Map: human activities and their ecologically harmful</p> <p>SKILLS FOCUS: Construct appropriate graphs from data and develop qualitative statements about the relationships between variables. (I&E 7.c)</p> <p>LABS / DEMOS:</p> <ul style="list-style-type: none"> Focus on ES: 12:1, Launch Lab, "How tangled is the life web?" p. 513 Focus on ES: 12:1, Content Background, "Real-World Connection (Temp. and Env.)", p. 518 TE Focus on ES: 12:1, Writing in Science (Pollution), p. 522 TE Focus on ES: 12:2, Science & Society, "Recovering Threatened Species", p. 541 Focus on ES: 4-in-1 Lab, "Human Impact on the Env.", pp. 91-94 Focus on ES: 4-in-1 Lab, "A survey of your own environment", pp. 117-118 Focus on ES: 4-in-1 Lab, "A salty situation", pp. 125-128 GEMS: Environmental Detectives Focus on ES: Ch 12 Transparencies, "The Dead Zone" "Is there a great happy swamp?" Nat'l Geog.: "Saved by a shark" http://www.nationalgeographic.com/xp/editions/lessons/07/g68/noaashark.html Discovery: "Water, water everywhere?" http://school.discovery.com/lessonplans/activities/watereverywhere/ 	<p>4 Days</p>

End District Quarter 1 Exam Material

Resources

6. Sources of energy and materials differ in amounts, distribution, usefulness, and the time required for their formation.

Standards and Assessments "Students know..."	Task Analysis "Students are able to ..."	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
<p>... the utility of energy sources is determined by factors that are involved in converting these sources to useful forms and the consequences of the conversion process.</p> <p style="text-align: right;">(6,a)</p> <p>DISTRICT ASSESSMENTS: CR: Fueling Around</p> <p>MODIFIED ASSESSMENTS: Groups of students prepare a visual of their choosing to show the monetary and environmental costs of an energy resource, and the benefits people receive from the energy source.</p>	<ul style="list-style-type: none"> Identify the energy sources which current technologies enable us to use: oil, natural gas, non-fossil fuels (e.g., hydrogen and ethanol), solar, nuclear, wind, and wave. List the uses for energy in society (i.e., heat, light, and transportation). Explain why there are different monetary costs involved in harnessing different forms of energy. Compare the expense and efficiency of various sources of energy for particular uses. Describe the non-monetary, environmental costs of various energy sources. Evaluate the usefulness of energy sources by how easily they can be converted to useful forms of energy, their depletion rate, and their monetary and non-monetary costs. 	<p>Focus on ES: 9:1,2,3 14:2,3</p> <p><i>PH FoES</i>, 11: 4, 12:2, 13:4, 14:2, 17:4, 21:1-4</p>	<p>KEY VOCABULARY: energy source monetary nuclear non-monetary fission environmental conversion consequence cost-effective</p> <p>GRAPHIC ORGANIZERS: Word Web: energy sources Tree Map: energy sources – pros and cons</p> <p>SKILLS FOCUS: Making models, predicting, applying, evaluating</p> <p>Construct appropriate graphs from data and develop qualitative statements about the relationships between variables. (I&E 7.c)</p> <p>LABS / DEMOS:</p> <ul style="list-style-type: none"> Focus on ES: 14:2, Demo, "Oil & Natural Gas Deposits", p. 597 TE Focus on ES: 14:2, Nat'l Geog., "Visualizing Solar Energy", p. 603 Focus on ES: 14:2, Mini-Lab, "... make the sun work for you?", p. 606 Focus on ES: 14:3, Demo, "Hybrid Gas Mileage", p. 609 TE Focus on ES: 14:3, Data Lab, "Do all vehicles ... fuels from oil?", p. 614 Focus on ES: 14:3, Applying Math, "Energy Usage", p. 615 Focus on ES: 14:3, Design your own lab, "Become an Energy Expert", pp. 616-617 Focus on ES: 4-in-1 Lab, "Efficiency of Fossil Fuels", pp. 95-97 Focus on ES: 4-in-1 Lab, "Using Biomass", pp. 99-101 Focus on ES: 4-in-1 Inquiry Activity, "Lemon Power", pp. 105-106 Focus on ES: 4-in-1 Inquiry Activity, "The Effects of Acid Precipitation", pp. 111-112 Focus on ES: Ch 10 Transparency "Oil Disaster" Focus on ES: Ch 14 Transparencies "Earth's Energy" "Energy Usage" "Conserving Resources" PEAK.org: "Energy Challenge Game" www.peakstudents.org/game/ , Dept. of Energy: Energy Facts www.eia.doe.gov/kids/energyfacts/index.html Dept. of Energy: Energy Labels www.eia.doe.gov/kids/classactivities/energyguidelabels_int.pdf NEED.org: Infobooks www.need.org/energyinfobooks.php 	<p>3 Days</p>

Resources (cont'd)

6. Sources of energy and materials differ in amounts, distribution, usefulness, and the time required for their formation.

Standards and Assessments "Students know..."	Task Analysis "Students are able to ..."	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
<p>... different natural energy and material resources, including air, soil, rocks, minerals, petroleum, fresh water, wildlife, and forests, and know how to classify them as renewable or nonrenewable. (6,b)</p> <p>DISTRICT ASSESSMENTS: CR: Fueling Around CR: Oils Well that Ends Well</p> <p>MODIFIED ASSESSMENTS: Students identify pictures of energy resources as either renewable or nonrenewable.</p> <p>In groups, students present ideas about how some nonrenewable resources can be conserved or made partially renewable through recycling efforts.</p>	<ul style="list-style-type: none"> List material and energy resources. Categorize resources as renewable or nonrenewable based on the time and process needed to create the resource. Compare and contrast present and expected future uses of renewable and nonrenewable resources. 	<p>Focus on ES: Ch 3:2,3 9:1, 10:4, 14:1,2,3</p> <p><i>Focus on ES, 4:2, 5:2,3&5, 7:3, 9:1, 11:1-3, 14:2, and 20:1-3</i></p>	<p>KEY VOCABULARY: renewable hydroelectric nonrenewable geothermal finite biomass extraction (mining) fusion processing (smelting) geologic cycle</p> <p>GRAPHIC ORGANIZERS: T Chart: renewable and nonrenewable resources</p> <p>SKILLS FOCUS: Inferring, observing classifying, making models</p> <p>Develop a hypothesis. (I&E 7.a)</p> <p>LABS / DEMOS:</p> <ul style="list-style-type: none"> Focus on ES: 14:1, Data Lab, "How old is that tree?", p. 590 Focus on ES: 14:1, Demo, "Wasting Water", p. 593 TE Focus on ES: 4-in-1 Inquiry Activity, "A Survey of your own Environment", pp. 117-118 Focus on ES: Ch 14 Transparencies "Water Power" "Earth's Energy and Mineral Resources" PEAK.org: Renewable vs. Nonrenewable www.peakstudents.org/energy_tips_renewable.asp 	3 Days
<p>... natural origin of the materials used to make common objects. (6,c)</p> <p>DISTRICT ASSESSMENTS: CR: Oils Well that Ends Well</p> <p>MODIFIED ASSESSMENTS: In pairs, students analyze various food and material items. They then create a visual of their choice to show the final item and its original material sources.</p>	<ul style="list-style-type: none"> Make a list of common objects in the classroom or at home. Analyze these items and determine the materials used to manufacture it. For example, a pencil contains wood, paints, metal, a rubber or plastic eraser, and a "lead" made from a mixture of clay and graphite. Research the natural origins of each material, for instance, plastics and synthetic materials that are derived from oil. Classify the materials as renewable or nonrenewable. 	<p>Focus on ES: Ch 2:2, 3:3 and 14:1,2,3</p> <p><i>PH FoES, 4:3, 20:4, and 21:1</i></p>	<p>KEY VOCABULARY: natural goods synthetic</p> <p>GRAPHIC ORGANIZERS: Tree Map: Samples of common items broken into their material components and the sources or those materials.</p> <p>SKILLS FOCUS: Observing, inferring</p> <p>Communicate the steps and results from an investigation in written reports and oral presentations. (I&E 7.d)</p> <p>LABS / DEMOS:</p> <ul style="list-style-type: none"> Focus on ES: Ch 14, Launch Lab, "Where did that come from?", p. 585 Focus on ES: 14:3, Mini-Lab, "Is it made from plants or plastic?", p. 608 Focus on ES: Ch 14 Transparency, "For a Big Payoff" Mineral Information Institute: Common Minerals and their Uses www.mii.org/commonminerals.html#Al Geol. Soc. of America: What Earth Materials are in My Subaru? www.geosociety.org/educate/LessonPlans/Earth_Materials_in_Subaru.pdf Geol. Soc. of America: Toothpaste with a Twist www.geosociety.org/educate/LessonPlans/ToothpasteTwist.pdf 	4 Days

Heat (Thermal Energy) (Physical Science)

3. Heat moves in a predictable flow from warmer objects to cooler objects until all the objects are at the same temperature.

Standards and Assessments "Students know..."	Task Analysis "Students are able to ..."	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
<p>... energy can be carried from one place to another by heat flow or by waves, including water, light, and sound, or by moving objects. (3,a)</p> <p>DISTRICT ASSESSMENTS: CR: A Burning Question</p> <p>MODIFIED ASSESSMENTS: In small groups, students create a molecular role-play to model the difference between the concepts of temperature and heat flow.</p> <p>In pairs, students create illustrations of ways to both enhance and dampen the effects of light, sound, and heat energy in a room. For each idea, they should explain how it affects the waves carrying the energy.</p> <p>Students use features advertised to enhance car safety and show how they reduce (or prevent) the energy of a crash getting to the passengers.</p>	<ul style="list-style-type: none"> • Read thermometers. • Distinguish between heat and temperature. • Explain that transfer of energy from object to object is the result of difference in temperature. • Demonstrate heat flow. • Demonstrate how waves are able to carry energy from place to place without net movement of matter. <ul style="list-style-type: none"> ○ waves of water ○ sound waves – vibrating objects cause other objects to vibrate, such as eardrums ○ light waves (electromagnetic waves), for instance, from the sun to the Earth • Show that moving objects also carry energy. 	<p>Focus on ES: 3:1,2,3</p> <p><i>PH FoES, 1:2, 2:2, 12:1, and 15:1-2</i></p>	<p>KEY VOCABULARY: temperature caloric thermal energy infrared heat kinetic energy electromagnetic waves potential energy heat flow</p> <p>GRAPHIC ORGANIZERS: Triple Venn Diagram: heat vs. temperature vs. thermal energy Tree Map: heat transfer Venn Diagram: Celsius and Fahrenheit temperature scales.</p> <p>SKILLS FOCUS: Select and use appropriate tools and technology to perform tests, collect data, and display data. (I&E 7.b)</p> <p>Recognize whether evidence is consistent with a proposed explanation. (I&E 7.e)</p> <p>LABS / DEMOS:</p> <ul style="list-style-type: none"> • Compare the feel of room temperature wood or plastic to metal. The metal "seems" colder because it conducts heat energy better (heat leaves your hand quicker). • Tuning forks: listening to the sound, vibrating in water • Focus on ES: Ch 3 Launch Lab, "How cold is it?", p. 121 • Focus on ES: 3:1, Nat'l Geog., "Visualizing Kinetic Energy", p. 125 • Focus on ES: 3:1, Demo, "Differences in Kinetic Energy", p. 126 TE • Focus on ES: 3:1, Mini-Lab, "How deep is the crater?", p. 127 • Focus on ES: 3:2, Use Models, p. 132 TE • Focus on ES: 3:2, Applying Math, "Thermal Expansion", p. 138 • Focus on ES: 3:3, Demo, "Particle Movement", p. 139 TE • Focus on ES: 3:3, Data Lab, "How are temperature scales related?", p. 144 • Focus on ES: Ch 3 Transparencies "They've Got Potential" "Nuclear Reactor" "Cosmic Impact" "How a Refrigerator Works" "Full of Hot Air" "Forced Air System" • Caltech: "Heat vs. Temp", coolcosmos.ipac.caltech.edu/cosmic_classroom/light_lessons/thermal/differ.html • Discover.com: Sound Waves school.discovery.com/lessonplans/programs/soundwaves/ • AskERIC: "Understanding Waves" www.reachoutmichigan.org/funexperiments/quick/eric/waves.html 	<p>2 Days</p>

Heat (Thermal Energy) (Physical Science) (cont'd)

3. Heat moves in a predictable flow from warmer objects to cooler objects until all the objects are at the same temperature.

Standards and Assessments "Students know..."	Task Analysis "Students are able to ..."	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
<p>... that when fuel is consumed, most of the energy released becomes heat energy. (3,b)</p> <p>DISTRICT ASSESSMENTS: CR: A Burning Question</p> <p>MODIFIED ASSESSMENTS: Groups of students role-play fuel molecules (i.e., 8 students to form an eight carbon octane molecule in gasoline, or 6 students to represent a six carbon sugar in food) and show how breaking bonds releases the energy that creates heat, and perhaps light, and is used for work to move things or generate electricity.</p>	<ul style="list-style-type: none"> Demonstrate how fuel provides energy. Explain that fuel is a form of stored energy that is released to provide heat, light, electricity, or motion. Show by experiment that the energy released when fuel burns comes from the chemical bonds. Describe how burning fuel is used to do work and how much of that work tends to be transformed into heat. 	<p>Focus on ES, Ch 3:2</p> <p><i>PH FoES, 21:1-4</i></p>	<p>KEY VOCABULARY: fuel consumed waste products friction bonds work transformed</p> <p>GRAPHIC ORGANIZERS: Flow Map: what happens when stored chemical energy is released</p> <p>SKILLS FOCUS: Observation</p> <p>Develop a hypothesis. (I&E 7.a)</p> <p>LABS / DEMOS:</p> <ul style="list-style-type: none"> Strike a large kitchen match as a demonstration. Light a candle as an analogy to the way a car's fuel combines with oxygen to produce heat and light as byproducts. (Framework, p. 93) Rub hands together to produce frictional heat to show work. Focus on ES: 3:2, Demo, "Energy Transformations", p. 135 TE Focus on ES: 3:2, Mini-Lab, "Heating by Friction", p. 136 Focus on ES: 4-in-1 LAB, "Using Biomass", pp. 99-107 PBS: "Peanut Calorimetry Lab", www.pbs.org/safarchive/4_class/45_pguides/pguide_502/4552_truth.html#act2 	<p>1 Day</p>

Density and Buoyancy (Grade 8 CA Standard)

8. All objects experience a buoyant force when immersed in a fluid.

Standards and Assessments "Students know..."	Task Analysis "Students are able to ..."	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
<p>... density is mass per unit volume. (8,a)</p> <p>DISTRICT ASSESSMENTS: PT: <u>Density Rocks!</u></p> <p>MODIFIED ASSESSMENTS: Fill a large beaker (1 L or larger) with dry rice. Before class, push a ping-pong ball down into the rice. In class, place a large steel ball bearing on top and shake. In pairs, have students explain why the ball bearing sinks and the ping-pong ball pops up and give an analogy from their experience.</p> <p>Using diagrams, have students predict and explain which will float higher: a ship in warm water, or the same ship in cold water. Also predict whether a warm piece of wood or a cold piece of wood will float higher in the same temperature water. Students need to make the connection that by heating, a given amount of matter will spread out and become less dense.</p>	<p>QUALITATIVE ONLY</p> <ul style="list-style-type: none"> Explain that density is the amount of matter (mass) in a given volume. Show that density of an object can change with temperature. Define fluids as matter with molecules that are free to move, such as liquids and gases. Make justified predictions about whether objects or substances will float or sink in a given fluid. <p>Do not take time to make measurements and calculate densities. This will be done in 8th grade.</p>	<p>Focus on ES, 2:2, 3:4</p> <p><i>PH FoES, 3:3</i></p>	<p>KEY VOCABULARY: mass density volume fluid</p> <p>GRAPHIC ORGANIZERS: Circle Map: density Use two different colors to indicate pre- and post-instruction ideas.</p> <p>Tree Map: density</p> <p>SKILLS FOCUS: Observing, predicting</p> <p>Recognize whether evidence is consistent with a proposed explanation. (I&E 7.e)</p> <p>LABS / DEMOS:</p> <ul style="list-style-type: none"> Focus on ES: 2:2, Demo., "Density", p. 91 TE Focus on ES: 4:3, Science Concepts, "What is density?" p. 187 TE Focus on ES: 10:2, Mini Lab, "Different densities?" p. 433 Focus on PS: Launch Lab, "Can you push ... under water?" p. 127 Focus on PS: 3:1, Use Models (Density), p. 132 TE Focus on PS: 3:2, Activity (Pressure and Buoyancy), p. 141 TE Focus on PS: 3:3, Demo., "Differences in Densities", p. 151 TE Focus on PS: 4-in-1 Lab: "Floating in Fresh & Ocean Water", pp. 21-22 Focus on PS: 4-in-1 Lab: "The Case of the Sabotaged ...", pp. 109-112 Focus on PS: Mini Lab, "Do cold things float?" p. 155 Focus on PS: 10:2, Mini Lab, "Different Densities", p. 433 Focus on PS: Ch 3 Transparencies, "Up or Down?" "Density Table" "Buoyancy" Demonstration: Place an unopened can of coke and diet coke in an aquarium with water to observe density. Demonstration: give a variety of objects to students to make predictions about density and then place in a beaker of water to observe. Demonstration: place grapes in salt water and fresh water to observe density (ex. Dead Sea vs. swimming pool) GEMS: Discovering Density Virtual Chembook (Density demonstrations) http://www.elmhurst.edu/~chm/vchembook/124Adensityliq.html Nat'l Geog. (virtual lab), http://www.nationalgeographic.com/xp/editions/lessons/14/g68/trythisoil.html 	4 Days

Heat (Thermal Energy) (Physical Science) (cont'd)

3. Heat moves in a predictable flow from warmer objects to cooler objects until all the objects are at the same temperature.

Standards and Assessments "Students know..."	Task Analysis "Students are able to ..."	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
<p>... heat flows in solids by conduction (which involves no flow of matter) and in fluids by conduction and convection (which involves flow of matter). (3,c)</p> <p>DISTRICT ASSESSMENTS: CR: A Burning Question</p> <p>MODIFIED ASSESSMENTS: Groups of students report on real life examples of convection and conduction.</p> <p>Pairs of students explain how these processes relate to the Earth's interior using a visual or demonstration of their choice.</p>	<ul style="list-style-type: none"> • Demonstrate conduction and convection as methods of transferring heat. • Explain the difference between conduction and convection. 	<p>Focus on ES, Ch 2:3, 3:4 and 9:2</p> <p><i>PH FoES, 1:2, 15:2</i></p>	<p>KEY VOCABULARY: conduction atoms convection molecules kinetic molecular theory</p> <p>GRAPHIC ORGANIZERS: Venn Diagram: conduction and convection</p> <p>SKILLS FOCUS: Observation</p> <p>Develop a hypothesis. (I&E 7.a)</p> <p>LABS / DEMOS:</p> <ul style="list-style-type: none"> • Demonstrate conduction using a metal rod with a paper handle. (Framework, p. 93) • Demonstrate convection using a heat resistant beaker, water, shredded paper, and a heat source. (Framework, p. 94) • Focus on ES: 3:4, Mini-Lab, "Is metal a good conductor?", p. 146 • Focus on ES: 3:4, Mini-Lab, "... convection current", p. 148 • Focus on ES: 3:4, Demo, "Convection in the air", p. 149 TE • Focus on ES: 3:4, Lab, "Create a Thermos", pp. 152-153 • Focus on ES: 4-in-1 Forensics, "Fact or Fraud?", pp. 137-140 • Focus on ES: 4-in-1, Probeware, "Thermal Conductivity", pp. 167-169 • Exploratorium: "Convection Current" www.exploratorium.edu/snacks/convection_currents.html • Cal Tech: "How does heat travel?" http://coolcosmos.ipac.caltech.edu/cosmic_classroom/light_lessons/thermal/transfer.html • Cal Tech: "Measuring Temperature" http://coolcosmos.ipac.caltech.edu/cosmic_classroom/light_lessons/thermal/measure.html 	<p style="text-align: center;">2 Days</p>

Heat (Thermal Energy) (Physical Science) (cont'd)

3. Heat moves in a predictable flow from warmer objects to cooler objects until all the objects are at the same temperature.

Standards and Assessments "Students know..."	Task Analysis "Students are able to ..."	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
<p>... heat energy is also transferred between objects by radiation (radiation can travel through space). (3,d)</p> <p>DISTRICT ASSESSMENTS: CR: A Burning Question</p> <p>MODIFIED ASSESSMENTS: Students create a Triple Venn Diagram of conduction, convection, and radiation to sum up the three types of heat transfer.</p> <p>Pairs of students design and/or build a solar oven.</p>	<ul style="list-style-type: none"> • Demonstrate radiation as a method of transferring heat. • Explain how energy is transferred from the Sun to the Earth by radiation. 	<p>Focus on ES: Ch 3:1,2,4 & 9:1,2,3</p> <p><i>PH FoES</i>, 1:2, 15:2</p>	<p>KEY VOCABULARY: radiation conductor emission insulator absorption</p> <p>GRAPHIC ORGANIZERS: Tree Map: conduction, convection, and radiation (Include types of energy carried by each.)</p> <p>SKILLS FOCUS: Develop a hypothesis (I&E 7.a) Communicate the steps and results from an investigation in written reports and verbal presentations. (I&E 7.d)</p> <p>LABS / DEMOS:</p> <ul style="list-style-type: none"> • Focus on ES: 9:1, Demo, "Radiant Heat", p. 385 TE • Focus on ES: 4-in-1 LAB, "Observing Radiation", pp. 13-15 • Focus on ES: 4-in-1 LAB, "Venus - The Greenhouse Effect", pp. 17-20 • Focus on ES: 4-in-1 Inquiry Activity, "The Greenhouse Effect on Venus", pp. 113-114 • Focus on ES: Ch 3 Transparencies "The Sun's Radiant Energies" "Conduction, Convection, Radiation" • Focus on ES: Ch 9 Transparency "Energy Transfer" • Science Rocks! (Meredith Middle School): "Heat Transfer Demo Lab" http://www.mmscrusaders.com/newscirocks/wethrweb/heat2.htm 	<p>1 Day</p>

Energy in the Earth System

4. Many phenomena on the Earth's surface are affected by the transfer of energy through radiation and convection currents.

Standards and Assessments "Students know..."	Task Analysis "Students are able to ..."	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
<p>... the sun is the major source of energy for phenomena on Earth's surface, it powers winds, ocean currents, and the water cycle. (4,a)</p> <p>DISTRICT ASSESSMENTS: PT: <u>Seasons Have Reasons</u></p> <p>MODIFIED ASSESSMENTS: After observations of how the angle of light hitting the Earth's surface changes at different latitudes (p. 538 activity), have groups of students write paragraphs or create collages of pictures showing how the angle of light affects daily life at different latitudes. Try a combination paragraph/collage if using heterogeneous student groups, or separate the assignments if using homogeneous groups.</p> <p>In pairs, draw a diagram of photosynthesis with labels and explanations of each step of the process.</p> <p>In pairs, students put arrows and labels on a diagram of the water cycle, and then explain their diagram to the class.</p>	<ul style="list-style-type: none"> Use evidence to show that solar radiation penetrates the atmosphere to heat the air, oceans, and land. Draw diagrams showing how sunlight strikes the ground at different angles depending on the season and latitude and explain what effects this has. Describe how the Sun makes life possible on Earth. Explain that photosynthesis converts solar energy to stored energy. Illustrate the H₂O cycle with labels. Explain how solar energy drives the H₂O cycle. 	<p>Focus on ES: Ch. 9:1, 9:3, 10:2, 11:1, 12:1</p> <p><i>PH FoES, Ch 9:3, 12:4, 15:1,3, 17:1</i></p>	<p>KEY VOCABULARY: solar radiation photosynthesis latitude water cycle</p> <p>GRAPHIC ORGANIZERS: Flow Chart: photosynthesis from solar energy to plants as a food source Flow Chart: water cycle Tree Map: the Sun (energy source) to winds, ocean currents, and the water cycle</p> <p>SKILLS FOCUS: Recognize whether evidence is consistent with a proposed explanation. (I&E 7.e)</p> <p>LABS / DEMOS:</p> <ul style="list-style-type: none"> Focus on ES: 9:1, Demo., "Radiant Heat", p. 385 TE Focus on ES: 9:1, Demo., "Intensity", p. 386 TE Focus on ES: 11:1, Launch Lab, "How does water move ...?" p. 465 Focus on ES: 11:1, Demo., "Molecular Movement", p. 469 TE Focus on ES: 11:1, Activity (Cloud Formation), p. 471 TE Focus on ES: 11:1, Nat'l Geog., "Visualizing the Water Cycle", p. 473 Focus on ES: 11:2, Demo., (Tilt of Earth & seasons), p. 479 TE Focus on ES: 12:1, Demo., "Rain Shadow", pg. 527 TE Focus on ES: 4-in-1 Lab, "Photosynth. and sunlight", pp. 67-70 Focus on ES: 4-in-1 Lab, "Carbon Dioxide and Earth Temps", pp. 75-78 Focus on ES: 4-in-1 Lab, "A Trip Around the World", pp. 115-116 Focus on ES: Ch 9 Transparencies, "Energy for Life" "The Water Cycle" Focus on ES: Ch 11 Transparency, "A Lovely Planet" NASA: "Seasons & Angle of sunlight" http://www-spf.gsf.nasa.gov/stargaze/Sseason.htm NOAA: Water Cycle activity http://www.srh.noaa.gov/srh/jetstream/atmos/ll_sweatin.htm 	<p>5 Days</p>

Energy in the Earth System (cont'd)

4. Many phenomena on the Earth's surface are affected by the transfer of energy through radiation and convection currents.

Standards and Assessments "Students know..."	Task Analysis "Students are able to ..."	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
<p>... solar energy reaches Earth through radiation, mostly in the form of visible light. (4,b)</p> <p>DISTRICT ASSESSMENTS: CR: <i>Why is the Sky Blue?</i></p> <p>MODIFIED ASSESSMENTS: In pairs, draw two examples of solar radiation on construction paper, including explanations. Have the pairs explain their examples to the class before displaying them.</p> <p>In small groups, make up a mnemonic to help memorize all of the colors in visible spectrum in order. Then have students quiz one another.</p> <p>In pairs, draw and label the electromagnetic spectrum. Include explanations of three types of radiation, their effects, and how atmospheric constituents absorb them.</p> <p>In pairs, write an explanation with illustrations to show why the sky is blue and the Sun is yellow.</p>	<ul style="list-style-type: none"> Describe solar radiation and demonstrate its energy through observation and experimentation. Explain and interpret a diagram of the electromagnetic spectrum. Distinguish long and short wave radiation and how they are absorbed to different amounts by atmospheric constituents. Explain that the sky appears blue and the Sun yellow because the atmosphere scatters blue light more than yellow. Describe visible light, infrared light, ultraviolet light and their effects. 	<p>Focus on ES: Ch. 9:1</p> <p><i>PH FoES:</i> 15:1</p>	<p>KEY VOCABULARY: infrared transparent ultraviolet opaque visible scatter spectrum absorb electromagnetic atmospheric constituents</p> <p>GRAPHIC ORGANIZERS: Circle Map: radiation</p> <p>Triple Venn Diagram: visible light, infrared radiation, ultraviolet radiation</p> <p>Circle Map: "Why is the sky blue?" using two different colors to show before and after instruction ideas. Be sure to cross out ideas that turned out to be fallacies after instruction.</p> <p>SKILLS FOCUS: Observing</p> <p>Develop a hypothesis. (I&E 7.a)</p> <p>LABS / DEMOS:</p> <ul style="list-style-type: none"> Focus on ES: 9:1, Mini Lab, "Why is the sky blue?" p. 391 Focus on ES: 9, Lab, "Water and Sand Temperatures", pp. 410-411 Focus on ES: Ch 3 Transparencies, "The Sun's Radiant Energies" "Conduction, Convection and Radiation" Focus on ES: Ch 9 Transparencies "Heat Transfer" "Energy Transfer" SMRC / LBAOP: "Watershed" Out-of-the-Box Science Kit for checkout NASA: "Why is the sky blue?" http://spaceplace.nasa.gov/en/kids/misrsky/misr_sky.shtml Exploratorium: "Blue Sky" http://www.exploratorium.edu/snacks/blue_sky.html 	<p>2 Days</p>

Energy in the Earth System (cont'd)

4. Many phenomena on the Earth's surface are affected by the transfer of energy through radiation and convection currents.

Standards and Assessments "Students know..."	Task Analysis "Students are able to ..."	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
<p>... heat from Earth's interior reaches the surface primarily through convection. (4,c)</p> <p>DISTRICT ASSESSMENTS: PT: California Breeze</p> <p>MODIFIED ASSESSMENTS: Create sets of cards(one for each group of four students) labeled, Core, Mantle, Crust, Convection Currents, Volcanoes, Hot Springs, Geysers, and Conduction. Have each student select two of the cards for a round robin activity on, "How heat is transferred from Earth's core to the atmosphere?" Each group looks at their cards and organizes a sequence for responding. Individuals explain the heat transfer method that is mentioned on their card as it relates to the question.</p>	<ul style="list-style-type: none"> Describe evidences of convection currents within the mantle. Explain how this process carries heat from the Earth's core to the crust. Explain that heat reaching the atmosphere in this way is very small compared to solar heating. 	<p>Focus on ES: Ch. 2:3, 4:3</p> <p>PH FoES: 1:2, 3:1-2</p>	<p>KEY VOCABULARY: mantle (of Earth) thermal gradients plate tectonics convection currents</p> <p>GRAPHIC ORGANIZERS: Cause/Effect: mantle convection</p> <p>SKILLS FOCUS: Inferring, predicting, observing</p> <p>Communicate the steps and results from an investigation in written reports and verbal presentations. (I&E 7.d)</p> <p>LABS / DEMOS:</p> <ul style="list-style-type: none"> Focus on ES: 4:3, Mini Lab, "How can you observe convection ...?" p. 194 Focus on ES: 4-in-1 Lab, "How do continental plates move?" pp. 25-28 Steve Spangler Sci.: "Colorful convection currents" http://www.stevespanglerscience.com/experiment/00000031 UCAR: "Atmospheric Processes — Convection" http://www.ucar.edu/learn/1_1_2_7t.htm 	<p>1 Day</p>

Energy in the Earth System (cont'd)

4. Many phenomena on the Earth's surface are affected by the transfer of energy through radiation and convection currents.

Standards and Assessments "Students know..."	Task Analysis "Students are able to ..."	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
<p>... convection currents distribute heat in the atmosphere and oceans. (4,d)</p> <p>DISTRICT ASSESSMENTS: PT: <u>California Breeze</u></p> <p>MODIFIED ASSESSMENTS: Using weather web sites, have groups of students research average temperatures in Fargo, North Dakota and Paris, France. (Paris is actually a little farther north than Fargo.) Also, have other student groups compare ocean temperatures of the Pacific off of San Diego to the Atlantic off of Charleston, South Carolina. By looking at maps of global wind and ocean currents, have students explain why the differences exist.</p>	<ul style="list-style-type: none"> Diagram the convection currents for air over a coastline caused by unequal heating over land and ocean. Explain how this unequal heating causes both wind and ocean currents. Explain how wind and air currents are deflected by the geography of the land and the rotation of the Earth. Cite evidence proving that these currents carry heat energy from place to place (i.e., coastal cool temperatures, the Gulf Stream warming western Europe.) 	<p>Focus on ES: Ch. 9:2-3, 10:2, 10:4, 11:3-4</p> <p>PH FoES: 12:4, 15:2-3, 17:1</p>	<p>KEY VOCABULARY: current deflect distribute Coriolis Effect topography convection current</p> <p>GRAPHIC ORGANIZERS: Diagram of day and night air currents over coastlines</p> <p>Flow Map: Solar energy to convection currents to air currents to ocean currents</p> <p>SKILLS FOCUS: Read a topographic map and a geologic map for evidence provided on the maps and construct and interpret a simple scale map. (I&E 7.f)</p> <p>LABS / DEMOS:</p> <ul style="list-style-type: none"> Investigate atmospheric convection currents using smoke chimney or fog chamber. (Framework p. 96) Observe water droplets (condensing steam) as they exit a boiling teakettle. (Framework p. 96) Investigate convection currents in liquid. (Framework p. 96) Focus on ES: 9:1, Launch Lab, "Does temperature affect air density?" p. 379 Focus on ES: 9:2, Mini Lab, "How do clouds form from convection currents?" pp. 395 Focus on ES: 9:3, Dem., "Convection Currents", p. 403 TE Focus on ES: 9:3, Nat'l Geog., "Visualizing Global Winds", p. 407 Focus on ES: 9:3, Data Lab, "Is it windy here?" p. 408 Focus on ES: 10:1, Launch Lab, "Will hot water sink?" p. 421 Focus on ES: 10:2, Mini Lab, "Different Densities?" p. 433 Focus on ES: 10:2, Activity (Coriolis Effect), p. 432 TE Focus on ES: 10:4, Demo., (California Current), p. 448 TE Focus on ES: 10:4, Data Lab, "How many whales ...?" p. 450 Focus on ES: 11:3, Mini Lab, "How does latitude affect the angle of sunlight?" p. 485 Focus on ES: 11:4, Demo., "Differential Heating", p. 493 TE Focus on ES: Ch 9 Transparency, "Coriolis Effect" GEMS: Ocean Currents NOAA: National Oceanic & Atmospheric Administration http://www.noaa.gov/ 	<p>2 Days</p>

Energy in the Earth System (cont'd)

4. Many phenomena on the Earth's surface are affected by the transfer of energy through radiation and convection currents.

Standards and Assessments "Students know..."	Task Analysis "Students are able to ..."	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
<p>... differences in pressure, heat, air movement, and humidity result in changes of weather. (4,e)</p> <p>DISTRICT ASSESSMENTS: CR: <u>What's Up with the Weather?</u></p> <p>MODIFIED ASSESSMENTS: Given various combinations of temperature and humidity, pairs of students find pictures of places to match the conditions.</p> <p>Groups of students identify the different types of air masses and describe the types of fronts formed when they interact.</p> <p>Students research the causes and effects of Santa Ana winds and/or El Niño.</p>	<ul style="list-style-type: none"> Compare and contrast weather (short term) and climate (long term). Describe weather experienced with various combinations of temperature and humidity. Explain that precipitation occurs when moist air is cooled below its condensation temperature (dew point). Show how pressure differences effect winds and the movement of weather fronts. * <i>Interpret and create weather maps using weather data symbols.</i> Describe how local winds and eddies spin off of larger currents. 	<p>Focus on ES: Ch. 9:3, 11:1-4</p> <p>PH FoES: 14:3-4, 15:3-4, 16:1-2,4</p>	<p>KEY VOCABULARY: humidity precipitation weather condensation climate dew weather front eddies</p> <p>GRAPHIC ORGANIZERS: Venn Diagram: weather vs. climate Word Web: weather map terms and symbols</p> <p>SKILLS FOCUS: Observing, inferring, predicting, measuring, designing an experiment, communicating Select and use appropriate tools and technology to perform tests, collect data, and display data. (I&E 7.b)</p> <p>LABS / DEMOS:</p> <ul style="list-style-type: none"> Focus on ES: 11:1, Data Lab, "When will dew form?" p. 470 Focus on ES: 11:2, Mini Lab, "How do you interp. a satellite image?" p. 477 Focus on ES: 11:3, Applying Math, "Finding Precipitation Avg's", p. 489 Focus on ES: 11:4, Demo., "Santa Ana wind model", p. 495 TE Focus on ES: 11:4, Mini Lab, "How do Santa Ana winds move?" p. 497 Focus on ES: 11:4, Lab, "Use the Internet: How diverse is the natural landscape of California?" pp. 498-499 Focus on ES: 4-in-1 Lab, "Air volume and pressure", pp. 59-60 Focus on ES: 4-in-1 Lab, "Temperature of the Air", pp. 61-62 Focus on ES: 4-in-1 Lab, "How do the oceans affect climate?" pp. 63-66 Focus on ES: 4-in-1 Lab, "Effect of temperature on cloud formation", pp. 71-74 Focus on ES: 4-in1 Lab, "Fact or Fraud", pp. 137-140 Focus on ES: Reference Handbook, "Weather Map Symbols", p. 677 Focus on ES: Ch 9 Transparency, "Blowing in the Wind" Focus on ES: Ch 10 Transparency, "Ocean Air Currents" Focus on ES: Ch 11 Transparencies, "Weather Map" "Whither wanders the weather" "North American Air Currents" "Cloud Walking" "Climate Classification System" "Where are we?" USGS: "Hurricane and Extreme Storm Impact Studies", http://coastal.er.usgs.gov/hurricanes/ NOAA: "National Climatic Data Center" (information), http://www.ncdc.noaa.gov/oa/ncdc.html Poway Schools: "El Nino or El No-No: Webquest", http://www.powayschools.com/projects/elnino/ 	<p>7 Days</p>

Plate Tectonics and Earth's Structure (cont'd)

1. Plate tectonics accounts for important features of Earth's surface and major geologic events.

Standards and Assessments "Students know..."	Task Analysis "Students are able to ..."	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)										
<p>... the solid Earth is layered with cold, brittle lithosphere; hot, convecting mantle; and dense, metallic core. (1,b)</p> <p>DISTRICT ASSESSMENTS: CR: A Moving Experience</p> <p>MODIFIED ASSESSMENTS: In pairs, students make an appropriately scaled, labeled poster or collage of Earth's interior.</p>	<ul style="list-style-type: none"> Describe the Earth's interior structure: <ul style="list-style-type: none"> cold, brittle lithosphere "plastic" upper mantle region called the asthenosphere hot, convecting mantle dense, metallic core. Create an appropriately scaled, cross-section diagram of the Earth with temperature, density, composition, and physical state labeled for each layer. Explain that scientists have learned about the Earth's structure by studying how earthquake waves move reflect inside the Earth. 	<p>Focus on ES, Ch 2:3, 4:3, and 5:2</p> <p><i>PH FoES, Ch 1:1,2</i></p>	<p>KEY VOCABULARY:</p> <table border="0"> <tr> <td>crust</td> <td>asthenosphere</td> </tr> <tr> <td>mantle</td> <td>convection currents</td> </tr> <tr> <td>core</td> <td>density</td> </tr> <tr> <td>lithosphere</td> <td>heat flow</td> </tr> <tr> <td>geologist</td> <td>composition</td> </tr> </table> <p>GRAPHIC ORGANIZERS: Tree Map: Earth's interior KWL Chart: What do you know about the Earth?</p> <p>SKILLS FOCUS: Drawing to scale</p> <p>Communicate the steps and results from an investigation in written reports and oral presentations. (I&E 7.d)</p> <p>Recognize whether evidence is consistent with a proposed explanation. (I&E 7.e)</p> <p>LABS / DEMOS:</p> <ul style="list-style-type: none"> Focus on ES: Ch 2, Helping You Prepare, Demo., p. 74D TE Focus on ES: 2:3, Demo., "Structures", p.103 Focus on ES: 2:3, Mini-Lab, "How can you describe ...?", p.103 Focus on ES: 2:3, Science Concepts, "Activity", p.104 TE Focus on ES: 2:3, Design Your Own Lab, "Model and Invent: Earth's Layers", p.110-111 Focus on ES: 4:3, Demo., "Rigid Crust & Molten Mantle", p.187 TE Focus on ES: 4:3, Applying Math, "Percentage of Minerals and Rocks in the Lithosphere", p.195 Focus on ES: Ch 3 Transparencies, "Mountain of Ash" "Seismic Wave Speeds" UC San Diego: "Earth Like a Puzzle", http://sio.ucsd.edu/voyager/earth_puzzle/look_beneath.html Purdue Univ.: "Journey to the Center of the Earth", web.ics.purdue.edu/~braille/edumod/journey/journey.htm USGS: "The Interior of the Earth", pubs.usgs.gov/gip/interior/ 	crust	asthenosphere	mantle	convection currents	core	density	lithosphere	heat flow	geologist	composition	<p>4 Days</p>
crust	asthenosphere													
mantle	convection currents													
core	density													
lithosphere	heat flow													
geologist	composition													

Plate Tectonics and Earth's Structure (cont'd)

1. Plate tectonics accounts for important features of Earth's surface and major geologic events.

Standards and Assessments "Students know..."	Task Analysis "Students are able to ..."	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
<p>... lithospheric plates that are the size of continents and oceans move at rates of centimeters per year in response to movements in the mantle. (1,c)</p> <p>DISTRICT ASSESSMENTS: CR: A Moving Experience</p> <p>MODIFIED ASSESSMENTS: Given a cross-section diagram of the Earth's crust from North America, across the mid-Atlantic ridge, to Europe, have students draw arrows in the magma showing how convection currents must be moving to cause the (divergent) plate movement above.</p> <p>Do the same for a convergent boundary.</p>	<ul style="list-style-type: none"> Explain that the Earth's lithosphere is broken up into oceanic and continental plates. Describe how hot rising magma and relatively cooler sinking magma in the Earth create convection currents that push the tectonic plates. Explain that the tectonic plates move at about the same speed that fingernails grow. 	<p>Focus on ES: 4:3, 5:1</p> <p><i>PH FoES, Ch 1:5</i></p>	<p>KEY VOCABULARY: lithospheric plates convection oceanic plate density continental plate tectonic plates basal granite</p> <p>GRAPHIC ORGANIZERS: Venn Diagram: continental and oceanic plates</p> <p>SKILLS FOCUS: Applying prior knowledge Develop a hypothesis. (I&E 7.a) Select and use appropriate tools and technology to perform tests, collect data, and display data. (I&E 7.b)</p> <p>LABS / DEMOS:</p> <ul style="list-style-type: none"> Focus on ES: Ch 4, Design Your Own Lab: "Use the Internet: Inferring Plate Tectonic Activity", p.196-197 Focus on ES: 5:1, Applying Math, "Speed of Lithospheric Plates", p.222 Focus on ES: 5:1, Additional Activity, p.222 TE Focus on ES: 4-in-1 LAB, "How do Continental Plates move?", p.25-27 Focus on ES: 4-in-1Lab, "Rena's Folly", pp.133-136 Focus on ES: Ch 4 Transparency, "Plates of the Lithosphere" HartRAO: Intro to Plate Tectonics www.hartrao.ac.za/geodesy/tectonics.html 	<p>2 Days</p>

Plate Tectonics and Earth's Structure (cont'd)

1. Plate tectonics accounts for important features of Earth's surface and major geologic events.

Standards and Assessments "Students know..."	Task Analysis "Students are able to ..."	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
<p>... the fit of the continents, location of earthquakes, volcanoes, and midocean ridges, and the distribution of fossils, rock types, and ancient climatic zones provide evidence for plate tectonics. (1,a)</p> <p>DISTRICT ASSESSMENTS: CR: A Moving Experience</p> <p>MODIFIED ASSESSMENTS: In pairs, using a physical map of regions on Earth (showing ocean floor topography when appropriate), students label areas of continental drift showing the direction of movement and listing evidence to look for which would prove continental drift. (These could include plant/animal fossils, landforms, magnetic alignment of rocks, age of rocks, and shapes of landmasses.)</p>	<ul style="list-style-type: none"> Describe the theory of continental drift and give evidence from landforms, fossils and climates. Describe how the existence of midocean ridges provides further evidence for plate tectonics. Cite general evidence that when plates move, landforms are generated along plate boundaries. 	<p>Focus on ES, Ch 4:1, 2, 5:2, 10:1, 4</p> <p><i>PH FoES, Ch 1:3,4 & Ch 2</i></p>	<p>KEY VOCABULARY: Pangaea plate tectonics continental drift volcano climate sea floor spreading fossil faults mid-ocean ridge earthquakes geothermal topography</p> <p>GRAPHIC ORGANIZERS: Tree Map: Evidences of Plate Tectonics</p> <p>SKILLS FOCUS: Observing, giving evidence</p> <p>Develop a hypothesis. (I&E 7.a)</p> <p>Interpret events by sequence and time from natural phenomena. (I&E 7.g)</p> <p>LABS / DEMOS:</p> <ul style="list-style-type: none"> Focus on ES: Ch 2 Launch Lab, "How can you model landscapes?", p. 75 Focus on ES: Ch 4 Launch Lab, "Can you put it back together?", p. 163 Focus on ES: 4:1, Demo., "Breakup of Pangaea", p. 167 Focus on ES: 4:1, Practice Skills, "Reconstruct", p. 168 Focus on ES: 4:1. Demo., "Similar Organisms found ...", p. 169 Focus on ES: 4:1, Mini-Lab, "Drifting Continents", p. 172 Focus on ES: 4:2, Nat'l Geog., "Vis'ing Mid-Ocean Ridges", p. 177 Focus on ES: 4:2, Demo., "Identify", p. 178 Focus on ES: 4:2, Practice Skills, "Model the Seafloor", p. 179 Focus on ES: 4:2, Demo., "Drilling for Samples", p. 180 Focus on ES: 4:2, Data Lab, "How fast does seafloor spread?", p. 182 Focus on ES: 10:1, Demo., "Model Echo Sounding", p. 426 Focus on ES: 10:1, Data Lab, "How ... read a bathymetric map?", p. 428 Focus on ES: 10:4, Lab, "Mapping the Ocean Floor", pp. 454-455 Focus on ES: 4-in-1 Lab, "Charting the Ocean Floor", pp. 5-7 Focus on ES: 4-in-1 Lab, "Concretions", pp. 9-10 Focus on ES: 4-in-1 Lab, "Paleogeographic Mapping", pp. 29-32 Focus on ES: 4-in-1 Lab, "Earth's Plates", p. 33-37 Focus on ES: 4:1, Transparency "A Cold Dig" Focus on ES: Ch 4 Transparencies, "Continental Drift and Fossils" "Let Go of Pressure" "Ocean Basin" Moorland School: "Plate tectonics", www.moorlandschool.co.uk/earth/tectonic.htm USGS: "Historical Perspective" http://pubs.usgs.gov/gip/dynamic/historical.html NASA: "Evidence Supporting Continental Drift" http://kids.earth.nasa.gov/archive/pangaea/evidence.html 	<p>8 Days</p>

Plate Tectonics and Earth's Structure (cont'd)

1. Plate tectonics accounts for important features of Earth's surface and major geologic events.

Standards and Assessments "Students know..."	Task Analysis "Students are able to ..."	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)																
<p>... earthquakes are sudden motions along breaks in the crust called faults, and volcanoes / fissures are locations where magma reaches the surface. (1,d)</p> <p>DISTRICT ASSESSMENTS: CR: A Moving Experience CR: California on the Move</p> <p>MODIFIED ASSESSMENTS: Stay & Stray Activity: In pairs, students create a poster of one of the different types of volcanoes and types of faults. Student (experts) then take turns teaching each other the key facts.</p>	<ul style="list-style-type: none"> Describe the type of faults. Explain why faults form. Explain the different ways that magma can reach the Earth's surface. Describe types of volcanoes and how they form. 	<p>Focus on ES: 5:1, 6:1 and 7:1,2,3</p> <p><i>PH FoES, Ch 2:1 & 3:2,3</i></p>	<p>KEY VOCABULARY:</p> <table border="0"> <tr> <td>fault</td> <td>ring of fire</td> </tr> <tr> <td>earthquake</td> <td>crater</td> </tr> <tr> <td>stress</td> <td>magma chamber</td> </tr> <tr> <td>fissures</td> <td>cone</td> </tr> <tr> <td>volcano</td> <td>shield</td> </tr> <tr> <td>magma</td> <td>composite</td> </tr> <tr> <td>lava</td> <td>eruption</td> </tr> <tr> <td>seismic</td> <td>molten</td> </tr> </table> <p>GRAPHIC ORGANIZERS: Table: listing Type of Fault, Example, and Cause Multiflow Diagram: Earthquakes</p> <p>SKILLS FOCUS: Observation</p> <p>Recognize whether evidence is consistent with a proposed explanation. (I&E 7.e)</p> <p>LABS / DEMOS:</p> <ul style="list-style-type: none"> Focus on ES: Ch 5 Launch Lab, "How do objects deform?", p. 207 Focus on ES: 5:1, Demo., "Rock Stretch", p. 211 Focus on ES: 5:1, Demo, "Normal and Reverse Faults", p. 213 Focus on ES: 5:1, Mini-Lab, "How can you model movement of a fault?", p. 214 Focus on ES: Ch 6 Launch Lab, "Rocks Stretch", p. 243 Focus on ES: 6:1, Demo, "Model Elastic Strain", p. 247 Focus on ES: Ch 7 Launch Lab, "How did these rocks form?", p. 291 Focus on ES: 7:1, Demo, "Model Magma Movement", p. 295 Focus on ES: 7:1, Mini-Lab, "How do volcanoes form?", p. 300 Focus on ES: 7:2, Demo, "Model", p. 303 Focus on ES: 7:2, National Geographic, "Visualizing Lava", p. 306 Focus on ES: 7:2, Data Lab, "Model structures of volcanoes", p. 312 Focus on ES: 4-in-1 LAB, "Earthquakes", pp. 45-47 Focus on ES: 4-in-1 LAB, "Volcanic Eruptions", pp. 49-52 Focus on ES: 4-in-1 LAB, "Volcanic Preservation", pp. 53-54 IRIS: fault motion animations http://www.iris.edu/gifs/animations/faults.htm NASA Space Grant: "Volcano World", http://volcano.und.edu/ 	fault	ring of fire	earthquake	crater	stress	magma chamber	fissures	cone	volcano	shield	magma	composite	lava	eruption	seismic	molten	<p>4 Days</p>
fault	ring of fire																			
earthquake	crater																			
stress	magma chamber																			
fissures	cone																			
volcano	shield																			
magma	composite																			
lava	eruption																			
seismic	molten																			

Plate Tectonics and Earth's Structure (cont'd)

1. Plate tectonics accounts for important features of Earth's surface and major geologic events.

Standards and Assessments "Students know..."	Task Analysis "Students are able to ..."	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
<p>... major geologic events, such as earthquakes, volcanic eruptions, and mountain building result from plate motions. (1,e)</p> <p>DISTRICT ASSESSMENTS: CR: A Moving Experience</p> <p>MODIFIED ASSESSMENTS: Identify Pacific Plate boundaries by plotting locations of earthquakes and volcanoes on a world map using iris.edu. Have students note the pattern outlining the Ring of Fire. Explain the causes and surface effects of these.</p>	<ul style="list-style-type: none"> Explain how the theory of plate tectonics accounts for the formation, movement, colliding, and subduction of earth's plates. Describe how various plate movements explain earthquakes, volcanic eruptions, and mountain-building. Plot the locations of major earthquakes and volcanic eruptions for the last 10 to 100 years on a large map using the internet or various library resources. Describe that tectonic events form a "ring" that outlines the Pacific plate and that there is a Hawaiian "hot spot". List landforms likely to be associated with plate boundaries (i.e., mountain ranges, ocean trenches, and volcanic island arcs). 	<p>Focus on ES: Ch 2:1, 5:1,2 6:1 7:1, 3 10:4</p> <p>PH FoES: Ch 1:5, 2, 3:1, and 13:1</p>	<p>KEY VOCABULARY: convergent boundary volcano subduction island arc ring of fire hot spot collision trench</p> <p>GRAPHIC ORGANIZERS: Flow Map: Plate movements to faults to earthquakes, volcanoes, and landforms</p> <p>SKILLS FOCUS: Mapping, interpreting</p> <p>Recognize whether evidence is consistent with a proposed explanation. (I&E 7.e)</p> <p>LABS / DEMOS:</p> <ul style="list-style-type: none"> Focus on ES: 2:1, Demo, "Model landforms", p. 79 Focus on ES: 2:1, Data Lab, "How do mountains vary in shape?", p. 85 Focus on ES: 5:1, National Geographic, "Visualizing Rift Valleys", p. 217 Focus on ES: 5:1, Demo, "Density", p. 219 Focus on ES: 5:2, Data Lab, "How do landforms define plate boundaries?", p. 227 Focus on ES: 5:2, Design your own Lab, "Earthquake Depths and Plate Boundaries", pp. 228-229 Focus on ES: 6:1, Mini-Lab, "Modeling earthquakes and Plate tectonics", p. 250 Focus on ES: 7:3, Applying Math, "Finding Range", p. 319 Focus on ES: 7:3, LAB, "Use the Internet: The Ring of Fire", p. 320-321 Focus on ES: 4-in-1 LAB, "Earth's Plates - PART C", p. 33-37 Focus on ES: Ch 1 Transparencies, "Valley of Ten Thousand Smokes" "Volcanic Mountain Structure" Focus on ES: Ch 5 Transparencies, "Plate Movement" "Faults" Focus on ES: Ch 7 Transparencies, "River Ablaze" "Volcanoes and Hot Spots" "Volcanoes" Focus on ES: Ch 10 Transparencies, "Water, Water, Everywhere" "The Ocean Floor" "California Coast" IRIS: "Seismic Monitor", http://www.iris.edu/seismon/ USGS: "Plate Motions", http://pubs.usgs.gov/gip/dynamic/understanding.html 	<p>3 Days</p>

Plate Tectonics and Earth's Structure (cont'd)

1. Plate tectonics accounts for important features of Earth's surface and major geologic events.

Standards and Assessments "Students know..."	Task Analysis "Students are able to ..."	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
<p>... how to explain major features of California geology in terms of plate tectonics (including mountains, faults, volcanoes). (1,f)</p> <p>DISTRICT ASSESSMENTS: CR: <u>A Moving Experience</u></p> <p>MODIFIED ASSESSMENTS: In pairs, students create a poster showing different California geologic structures.</p> <p>In small groups, students create a flip book or poster of what California will look like in the future given the current information on plate movements. Include predictions about landforms either growing larger or eroding to become smaller.</p>	<ul style="list-style-type: none"> Explain how interaction between the North American continental plate and Pacific oceanic plate have lead to the development of the California's mountain ranges (coastal and Sierra Nevada) and large valleys (Central Valley, Los Angeles Basin, and Ventura basin). Create a geological timeline to show how long tectonic forces have been shaping the lithosphere into the current geography and predict the far future look of California. 	<p>Focus on ES: 2:1, 5:2 7:1,2, 8:3, 10:4</p> <p><i>PH FoES, Ch 2:1, 3:3</i></p>	<p>KEY VOCABULARY: San Andreas Fault valley continental plate basin oceanic plate deformation</p> <p>GRAPHIC ORGANIZERS: Circle Map: mountain building and mountain eroding forces</p> <p>SKILLS FOCUS: research, read maps</p> <p>Recognize whether evidence is consistent with a proposed explanation. (I&E 7.e)</p> <p>LABS / DEMOS / VISUALS:</p> <ul style="list-style-type: none"> Focus on ES: 7:2, Figure 10, p. 307 Focus on ES: Ch 5 Transparencies "The World of Earthquakes" "Fault Movement" Focus on ES: Ch 7 Transparency, "Ancient Volcanic Rock" North Bay Science Project: "Landforms of California", http://nbsp.sonoma.edu/resources/teachers_materials/earth_03/CAlandforms_files/frame.htm World Atlas.com: California Map http://worldatlas.com/webimage/countrys/namerica/usstates/igcolor/cacolor.htm 	<p style="text-align: center;">2 Days</p>

Plate Tectonics and Earth's Structure (cont'd)

1. Plate tectonics accounts for important features of Earth's surface and major geologic events.

Standards and Assessments "Students know..."	Task Analysis "Students are able to ..."	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
<p>... how to determine the epicenter of an earthquake and that the effects of an earthquake vary with its size, distance from the epicenter, local geology, and the type of construction involved.</p> <p style="text-align: right;">(1,g)</p> <p>DISTRICT ASSESSMENTS: CR: <u>A Moving Experience</u> CR: <u>California on the Move</u></p> <p>MODIFIED ASSESSMENTS: Given P and S wave data for three seismic stations, students are able to triangulate the location of a hypothetical earthquake epicenter.</p> <p>Pairs of students make an illustrated earthquake safety kit checklist.</p> <p>In small groups, students will answer a series of "What if?" earthquake situation questions on index cards. Students rotate the cards until they have answered all the questions.</p> <p>Given a square of jello, 10 toothpicks, and 10 mini-marshmallows, pairs of students create earthquake-proof structures. Compare these to building code regulations.</p>	<ul style="list-style-type: none"> Describe how the energy waves of an earthquake travel through Earth. Identify and describe the different P and S seismic waves. Model seismic waves through the use of a spring. Calculate the velocities of P- and S-waves using a spring. Compare Richter and Mercalli scales used to measure earthquake intensity. Determine the epicenter of an earthquake through using the method of triangulation. Locate major California geologic features including Mount Lassen, San Andreas Fault, Sierra Nevada Mountains, Death Valley, Baja Peninsula, San Francisco Peninsula on a map. Plot on a map the location of their school and nearby active faults. Using the internet research records of earthquake activity, ground motion and fracturing near the school. Describe construction methods that improve the ability of buildings to withstand the effects of earthquakes. 	<p>Focus on ES, Ch 6:2,3,4</p> <p><u>PH FoES</u>, Ch 2:2,3</p>	<p>KEY VOCABULARY: epicenter magnitude focus amplitude seismography intensity primary wave (P wave) secondary wave (S wave) vibration triangulation velocity rupture Richter scale liquefaction Mercalli scale brittle compression flexible tension shearing</p> <p>GRAPHIC ORGANIZERS: T Chart: Earthquake Safety – Safe vs. Unsafe</p> <p>SKILLS FOCUS: Calculate, measure</p> <p>Construct appropriate graphs from data and develop qualitative statements about the relationships between variables. (I&E 7.c)</p> <p>Interpret events by sequence and time from natural phenomena. (I&E 7.g)</p> <p>LABS / DEMOS / VISUALS:</p> <ul style="list-style-type: none"> Focus on ES: 6:2, Mini-Lab, "Modeling P and S waves", p. 256 Focus on ES: 6:2, Applying Math, "Speeds of seismic waves", p. 259 Focus on ES: 6:3, Demo, "Seismograph", p. 263 Focus on ES: 6:3, Data Lab, "... earthquake's epicenter?", pp. 268-269 Focus on ES: 6:4, Nat'l Geog., "Visualizing Tsunamis", p. 273 Focus on ES: 6:4, Demo, "Model structures", p. 275 Focus on ES: 6:4, Demo, "Earthquake safety", p. 277 Focus on ES: 6:4, Data Lab, "... areas at risk for earthquakes?", p. 279 Focus on ES: 6:4, Design your own lab, "Preparing for an earthquake", pp. 280-281 Focus on ES: 4-in 1 Lab, "Using the modified Mercalli scale to locate an epicenter", p. 39-43 Focus on ES: 4-in 1 Proeware, "Measuring Earthquakes", pp. 159-161 Focus on ES: Ch 6 Transparencies "Earthquake Activity" "Earthquake Intensity" "Surface Waves" "Seismic Waves" "A Beautiful Detector" "Earthquakes" USGS: Latest Quake Info http://quake.wr.usgs.gov/recent/index.html USGS: "Earthquakes" http://earthquake.usgs.gov/ 	<p>6 Days</p>

Plate Tectonics and Earth's Structure (cont'd)

1. Plate tectonics accounts for important features of Earth's surface and major geologic events.

Standards and Assessments "Students know..."	Task Analysis "Students are able to ..."	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
<p>* ... how to identify individual rocks and minerals, and describe the processes involved in their formation. (LBUSD)</p> <p>District Assessments: OES:</p>	<ul style="list-style-type: none"> • Diagram the rock cycle showing the connections between igneous, metamorphic, and sedimentary rocks. • Show how heat, pressure, and weathering processes make transitions between rock types occur. • Use observations guided by identification keys to identify specific examples of igneous, metamorphic, and sedimentary rocks. • Use observations guided by identification keys to identify specific examples of minerals. • Choose one or two minerals and discuss their formation, abundances, and uses. 	<p>Focus on ES: Ch 2:2 4:3</p> <p>PH FoES: 4:1-3, and 5:1-6</p>	<p>KEY VOCABULARY: igneous abundance metamorphic mineral sedimentary identification key lithify lithification</p> <p>SKILLS FOCUS: Classifying, observing, inferring, making models</p> <p>Interpret events by sequence and time from natural phenomena (e.g., the relative ages of rocks and intrusions). (I&E 7.g)</p> <p>LABS / DEMOS:</p> <ul style="list-style-type: none"> • Focus on ES: 2:2, Demo, "Mineral Hardness", p. 89 TE • Focus on ES: 2:2, Mini-Lab, "Mineral ID by Property", p. 93 • Focus on ES: 2:2, Activities, pp. 88, 89, 90, 92, 95, and 96 • Focus on ES: 2:2, Demo, "Model Sediment", p. 99 TE • Focus on ES: 4:3, Additional Activity, "Grow Rock Crystals", p. 195 • Focus on ES: 4-in-1 Lab, "Identifying Metamorphic Rocks", p. 11-12 • Focus on ES: Reference Handbook, Rocks, p. 474, Minerals, pp. 675-676 • Focus on ES: Ch 2 Transparencies "Sorting it Out" "Mineral Hardness" • Mineralogical Society of America: www.minsocam.org/MSA/k12/k_12.html • Rocks for Kids.com: "Uses of Rocks and Minerals", www.rocksforkids.com/RFK/uses.html#common 	<p>5 Days</p>

End District Quarter 3 Exam Material

Shaping Earth's Surface

2. Topography is reshaped by the weathering of rock and soil and by the transportation and deposition of sediment.

Standards and Assessments "Students know..."	Task Analysis "Students are able to ..."	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
<p>... water running downhill is the dominant process in shaping the landscape, including California's landscape. (2,a)</p> <p>DISTRICT ASSESSMENTS: CR: <i>Wasting Away</i></p> <p>MODIFIED ASSESSMENTS: Pairs of students design a way to separate small, medium, and large soil particles using wind or water.</p> <p>Students match appropriate key vocabulary words to cards showing erosion landforms.</p> <p>Students perform GEMS: "River Cutters" assessment after about six guided trials. After observing their stream table, students record the types of erosion and landscape formations over time.</p>	<ul style="list-style-type: none"> • Explain the concepts of weathering, erosion and deposition and relate them to landscape formations. • Model transportation and deposition of sediment. • Demonstrate that different sizes of sediments settle at different rates. • Describe the effects of moving water. • Describe the effects and cite examples of wind and glacial erosion. • Interpret topographic maps for evidence of erosion. 	<p>Focus on ES, Ch 1:1-2 2:1, 8:1-3</p> <p><i>PH FoES, Ch 7:1,</i> <i>8:1-4 10:1</i></p>	<p>KEY VOCABULARY: chemical weathering mechanical weathering erosion deposition glaciers sediment settling landscape topography mass wasting</p> <p>GRAPHIC ORGANIZERS: Tree Map: wind, water, and glacier erosion</p> <p>SKILLS FOCUS: Read a topographic map and a geologic map for evidence provided on the maps and construct and interpret a simple scale map. (I&E 7.f)</p> <p>LABS / DEMOS:</p> <ul style="list-style-type: none"> • Focus on ES: 1:1, Launch Lab, "How might you map ..." p. 45 • Focus on ES: 1:1, Demo. (Lat. and Long.), p. 51 TE • Focus on ES: 1:2, Nat'l Geog., Visualizing Topography, p. 57 • Focus on ES: 1:2, Data Lab, "How does a landscape change over time?" p. 62 • Focus on ES: 1:2, Lab, "Mapping a Race Route", pp. 64-65 • Focus on ES: Reference Handbook, "Topographic Map Symbols", p. 673 • Focus on ES: 8:1, Launch Lab, "Set in Stone?", p. 331 • Focus on ES: 8:1, Activity (Weathering), p. 336 TE • Focus on ES: 8:1, Mini Lab, "Water and Weathering", p. 338 • Focus on ES: 8:1, Demo., "Soil Formation", p. 338 TE • Focus on ES: 8:2, Demo., "Beach Deposition", p. 349 TE • Focus on ES: 8:3, Demo., "Glacier Deposition", p. 355 TE • Focus on ES: 8:3, Mini Lab, "Will it slump, or will it creep?" p. 362 • Focus on ES: 8:3, Lab, "Stream Sediment", pp. 364-365 • Demonstration: Place varying sizes/types of sediment in a jar, shake the jar, and observe rate of settling. • Focus on ES: 4-in-1 Lab, "Determining Latitude", pp. 1-4 • Focus on ES: 4-in-1 Lab, "Charting the Ocean Floor", pp. 5-8 • Focus on ES: 4-in-1 Lab, "Mass Movements", pp. 55-56 • Focus on ES: 4-in-1 Lab, "Modeling a Glacier", pp. 57-58 • Focus on ES: Ch 1 Transparencies, "Latitude and Longitude" "Map Reading" • Focus on ES: Ch 8 Transparencies, "Going, Going..." "Types of Weathering" "Avalanche" • Geology Online: "Weathering and Erosion" http://geologyonline.museum.state.il.us/tools/lessons/6.3/lesson.html • USGS: "Glacial Striations" http://education.usgs.gov/schoolyard/glacialstriations.html • USGS: "27 ideas for teaching with Topographic Maps" http://education.usgs.gov/common/lessons/teaching_with_topographic_maps.html 	<p>6 Days</p>

Shaping Earth's Surface (cont'd)

2. Topography is reshaped by the weathering of rock and soil and by the transportation and deposition of sediment.

Standards and Assessments "Students know..."	Task Analysis "Students are able to ..."	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
<p>... rivers and streams are dynamic systems that erode, transport sediment, change course, and flood their banks in natural and recurring patterns. (2,b)</p> <p>DISTRICT ASSESSMENTS: CR: <i>Wasting Away</i></p> <p>MODIFIED ASSESSMENTS: Pairs of students respond to the "Inquiry Challenge" in <i>Focus on ES</i>, p. 245</p> <p>In small groups, students plan ways to control floods (sand bags, dams, river diversion, etc.).</p>	<ul style="list-style-type: none"> Explain how water erosion is the primary factor responsible for shaping Earth's land surface. Describe some of the land features formed by water erosion. Explain how sediment enters rivers and streams. List the factors that effect water's ability to erode and carry sediment. Explain why a river may change its course over time. Describe conditions that cause floods and describe how floods can be controlled. 	<p>Focus on ES, Ch. 2:1, 8:2-3</p> <p><i>PH FoES</i>, Ch 8:1,2, 3 Ch 16: 3</p>	<p>KEY VOCABULARY: energy oxbow lake volume sediment flow bedrock flood slope stream bank valley</p> <p>GRAPHIC ORGANIZERS: Flow Map: river changes over time and the reasons for the changes Tree Map: three ways streams carry sediment</p> <p>SKILLS FOCUS: Communicate the steps and results from an investigation in written reports and oral presentations. (I&E 7.d)</p> <p>LABS / DEMOS:</p> <ul style="list-style-type: none"> GEMS: River Cutters Focus on ES: 8:2, Demo., "Levees", p. 347 TE Focus on ES: 8:2, Activity (Hurricane Katrina), p. 348 TE Focus on ES: 4-in-1 Lab, "Where is the money?" pp. 121-124 Focus on ES: 4-in-1 Lab, "What happened to the wild stream?" pp. 129-132 Focus on ES: Ch 8 Transparencies, "Take the Long Way Home" "Mississippi River Watershed" Nat'I Geog. (virtual lab), "Rain: Friend or Foe?", http://www.nationalgeographic.com/xp/editions/lessons/07/g68/rain.html Nat'I Geog. (activity), "Delving into the Grand Canyon" http://www.nationalgeographic.com/xp/editions/lessons/07/g68/canyon68.html 	<p>4 Days</p>

Shaping Earth's Surface (cont'd)

2. Topography is reshaped by the weathering of rock and soil and by the transportation and deposition of sediment.

Standards and Assessments "Students know..."	Task Analysis "Students are able to ..."	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
<p>... earthquakes, volcanic eruptions, landslides, and floods change human and wildlife habitats. (2,d)</p> <p>DISTRICT ASSESSMENTS: CR: <i>Wasting Away</i></p> <p>MODIFIED ASSESSMENTS: Small groups of students determine how to plan in advance for potential a natural disaster in a given situation.</p> <p>Small groups of students determine how to deal with the after effects of a natural disaster in a given situation.</p>	<ul style="list-style-type: none"> • Explain how natural events pose hazards to human and wildlife habitats. • Describe ways individuals and societies address potential disasters through building codes, land use planning, and wildlife protection measures. • Give examples of how benefits can result from catastrophic events, such as formation of new habitats, fertile land, exposure of fresh mineral deposits. 	<p>Focus on ES, Ch. 6:4, 7:3, 8:2</p> <p>PH FoES, Ch 8:1, 2:3, 3:2, 10:1, 16:3</p>	<p>KEY VOCABULARY: tsunamis exposure landslides building code habitats catastrophic probability</p> <p>GRAPHIC ORGANIZERS: Venn Diagram: positive and negative effects of natural disasters on the land</p> <p>SKILLS FOCUS: Research, hypothesize</p> <p>Recognize whether evidence is consistent with a proposed explanation. (I&E 7.e)</p> <p>LABS / DEMOS:</p> <ul style="list-style-type: none"> • Focus on ES: 8:3, Applying Math, "Erosion Rates", p. 363 • Focus on ES: 7:3, Mini-Lab, "How does lava affect habitats?" p. 318 • Focus on ES: 6:4, Nat'l Geog., "Visualizing Tsunamis", p. 273 • Focus on ES: 6:4, Demo., "Model Structures", p. 275 TE • Focus on ES: 4-in-1 Lab, "Volcanic Eruptions", pp. 49-52 • Focus on ES: 6:4, Lab, "Use the Internet: Preparing for an Earthquake", pp. 280-281 • Webquest: "Natural Disasters" http://www.webquest.org/questgarden/lessons/30451-060715085118/process.htm • USGS: "Landslide Hazards Program" http://landslides.usgs.gov/ 	<p>2 Days</p>

Shaping Earth's Surface (cont'd)

2. Topography is reshaped by the weathering of rock and soil and by the transportation and deposition of sediment.

Standards and Assessments "Students know..."	Task Analysis "Students are able to ..."	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
<p>... beaches are dynamic systems in which sand is supplied by rivers and moved along the coast by the action of waves. (2,c)</p> <p>DISTRICT ASSESSMENTS: CR: <u>Wasting Away</u></p> <p>MODIFIED ASSESSMENTS: Students identify components of sand from a given sample.</p> <p>In pairs, students describe coastal landforms and identify the forces that shaped them from pictures.</p>	<ul style="list-style-type: none"> Explain that because all rivers end up at the ocean, sediments are deposited onto the beach and the ocean. Describe how ocean waves shape beaches, coasts and landforms. Observe differences in the composition of a variety of sand samples. Identify constituents such as quartz, feldspar, shell fragments and magnetite. 	<p>Focus on ES, Ch. 2:1, 8:2-3, 10:3</p> <p><u>PH FoES, Ch 8:5</u></p>	<p>KEY VOCABULARY: energy sediment erosion beach deposition long shore drift oblique angle parallel</p> <p>GRAPHIC ORGANIZERS: Multiflow Map: beach erosion</p> <p>SKILLS FOCUS: Calculate, model</p> <p>Develop a hypothesis. (I&E 7.a)</p> <p>Select and use appropriate tools and technology (including calculators) to perform tests, collect data, and display data. (I&E 7.b)</p> <p>LABS / DEMOS:</p> <ul style="list-style-type: none"> Focus on ES: 2:1, Demonstration, "Erosion and Deposition", p. 83 TE Focus on ES: 8:2, Data Lab, "Sorting it out", p. 354 Focus on ES: 4-in-1 Lab, "Making waves", pp. 109-110 Focus on ES: 10:3, Demonstration, "Sediment", p. 438 TE Focus on ES: 10:3, Demo., "Sample Size", p. 442 TE Focus on ES: 10:3, Mini Lab, "Isn't all sand the same?" p. 443 Focus on ES: 10:3, Applying Math, "Sediment Deposition Rates", p. 445 Focus on ES: 8:3, Use Models (Beach Erosion), p. 360 TE Focus on ES: 10:3, Activity (Longshore Drift), p. 440 TE Focus on ES: Ch 8 Transparency, "Water erosion & deposition" Focus on ES: Ch 10 Transparency, "Ebb and Flow" USC: Wave Erosion Lab, http://www.usc.edu/org/cosee-west/quikscience/WaveErosionLab(JAMS_05).pdf Surfrider: "California Beach Erosion" (teacher reference), http://www.surfrider.org/stateofthebeach2003/6-state/beach_erosion.asp?state=CA 	<p>2 Days</p>

Earth and Life History (Earth Science) (Grade 7 CA Standard)

4. Evidence from rocks allows us to understand the evolution of life on Earth. As the basis for understanding this concept.

Standards and Assessments "Students know..."	Task Analysis "Students are able to ..."	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
<p>... Earth processes today are similar to those that occurred in the past and slow geologic processes have large cumulative effects over long periods of time. (7-4,a)</p> <p>DISTRICT ASSESSMENTS: CR: <u>Lights Out</u> CR: <u>Sands of Time</u></p> <p>MODIFIED ASSESSMENTS: Students create color-coded posters showing different layers of rocks. Given 10 sample fossils, students glue them into the appropriate layers and use this poster to explain the law of superposition.</p> <p>(Refer to standard 1 to review continental drift and plate tectonics.)</p>	<ul style="list-style-type: none"> Define the principle of uniformitarianism. (<i>According to this principle, the laws of nature do not change over time. Therefore, the same processes that shaped the earth in the past are still at work today</i>). Define the principle of superposition. (<i>The principle of superposition states that younger rock layers are formed on top of older rock layers. This principle is the basis for most relative age dating of fossils</i>). Describe continental drift and give evidence for it (model the process). Explain the theory of plate tectonics. Describe the relationship between the fossil records and geologic history. 	<p>Focus on LS, Ch 7:1</p> <p><i>PH FoLS, Ch. 6:1, 2, 5</i> <i>PH FoES, Ch 1:3, 5</i></p>	<p>KEY VOCABULARY: continental drift Pangaea uniformitarianism plate tectonics superposition fossil record sedimentary rock</p> <p>GRAPHIC ORGANIZERS: Flow Map: geologic time scale with examples of organisms</p> <p>SKILLS FOCUS: Inferring, organizing</p> <p>Communicate the logical connection among hypothesis, science concepts, tests conducted, data collected, and conclusions drawn from the scientific evidence. (I&E 7.c)</p> <p>LABS / DEMOS:</p> <ul style="list-style-type: none"> Use hand motions to simulate plate movement. Focus on LS: 7:1, Launch Lab, "What is Earth's surface like?" p. 281 Focus on LS: 7:1, Activity (Layering and Superposition), p. 290 TE Focus on LS: 7:1, Mini Lab, "How does Earth change ...?", p. 292 Focus on LS: 4-in-1 Lab: "Principle of Superposition", pp. 37-39 Focus on ES: Ch 1 Transparency, "Geologic Mapping" Focus on LS: Ch 7 Transparencies, "Older than the Hills" "Rock Cycle" GEMS: Life Through Time The Paleontology Portal: http://www.paleoportal.org/ USGS: Educational Resources for Paleontology, http://geology.er.usgs.gov/paleo/eduinfo.shtml Glencoe: "The Fossils of Antarctica" http://www.glencoe.com/sites/common_assets/science/webquests/fossils.html#task 	<p>2 Days</p>

Earth and Life History (Earth Science) (Grade 7 CA Standard) (cont'd)

4. Evidence from rocks allows us to understand the evolution of life on Earth. As the basis for understanding this concept.

Standards and Assessments "Students know..."	Task Analysis "Students are able to ..."	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
<p>... the history of life on Earth has been disrupted by major catastrophic events, such as major volcanic eruptions or the impacts of asteroids. (7-4,b)</p> <p>DISTRICT ASSESSMENTS: CR: Lights Out</p> <p>MODIFIED ASSESSMENTS: In groups, students discuss and create a plan for what we might do if there were a major, catastrophic event such as a meteor or major volcanic eruption. They should address the question, "How would life change?"</p>	<ul style="list-style-type: none"> Discuss that though rare, catastrophic events have had a significant effect on the shaping of Earth's surface and on the evolutionary development of life. Describe the immediate effects of catastrophic events such as a large meteor impact or major volcanic eruption (both of which cause the injection of large amounts of fine-grained particle matter into the atmosphere, which may cause immediate regional and global consequences for climate and short and long-term changes in habitat). 	<p>Focus on LS, Ch 8:1-3</p> <p><i>PH FoLS, Ch 6:5</i></p>	<p>KEY VOCABULARY: catastrophe meteor volcano consequence effect atmosphere climate habitat catastrophic</p> <p>GRAPHIC ORGANIZERS: Venn Diagram: effects of volcanic eruptions and asteroid impacts</p> <p>SKILLS FOCUS: Comparing, contrasting, observing</p> <p>Utilize a variety of print and electronic resources (including the World Wide Web) to collect information as evidence as part of a research project. (I&E 7.b)</p> <p>LABS / DEMOS:</p> <ul style="list-style-type: none"> Allow students to observe and describe volcanic ash, focusing on its fine particulate nature. Focus on LS: 8:1, Demo., " Permian Extinction", p. 319 TE Focus on LS: 8:1, Use Models (Asteroid Impact), p. 322 TE Focus on LS: 8:1, Data Lab, "Which organisms return first ...?", p. 324 Focus on LS: Ch 8 Transparency, "Bad for Pompeii, Good for Archaeology" McDougal Littell: animation of an asteroid impact ... Cretaceous Period www.classzone.com/books/earth_science/terc/navigation/home.cfm Enter keycode ES3006 Enchanted Learning: "Geologic Time Scale" http://www.enchantedlearning.com/subjects/Geologictime.html PBS: "What killed the dinosaurs?" http://www.pbs.org/wgbh/evolution/extinction/dinosaurs/index.html 	<p>2 Days</p>

Earth and Life History (Earth Science) (Grade 7 CA Standard) (cont'd)

4. Evidence from rocks allows us to understand the evolution of life on Earth. As the basis for understanding this concept.

Standards and Assessments "Students know..."	Task Analysis "Students are able to ..."	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
<p>... the rock cycle includes the formation of new sediment and rocks and that rocks are often found in layers, with the oldest generally on the bottom. (7-4,c)</p> <p>[Note: This standard extends the introduction of superposition in standard 7-4a and reviews erosion and deposition concepts from standards 2a-d.]</p> <p>DISTRICT ASSESSMENTS: CR: Lights Out CR: Sands of Time</p> <p>MODIFIED ASSESSMENTS: Teacher creates fossil columns by pouring four different colors of plaster into cups with a different "fossil" in each layer (i.e., peanut, paper clip, eggshell, chicken bone). Students act as paleontologists by excavating the fossils, drawing a diagram of where each fossil was discovered, and drawing conclusions about what events took place and in what sequence.</p>	<ul style="list-style-type: none"> Define sediment as a combination of organic and inorganic materials (rock and mineral fragments, various dissolved ions, and biological debris). Diagram how sediment is transported and deposited to form new sedimentary rock. Describe the formation of sediment as due to physical processes (abrasion and freezing and thawing cycles) and chemical processes (acid rain and oxygen which results in the formation of new types of minerals). Determine the relative ages of rock layers using the principle of superposition (include cross-cutting and inclusions). Describe how the biological portion of accumulated sediment may be fossilized and preserved to provide a partial record of organisms from the source area. 	<p>Focus on LS: Ch. 6:1, 7:1</p> <p><i>Focus on LS:</i> 6.1, 2</p>	<p>KEY VOCABULARY: sediment organic inorganic minerals ions debris abrasion relative age superposition acid rain erosion lithification / lithify</p> <p>GRAPHIC ORGANIZERS: Flow Map: sediment to sedimentary rock</p> <p>Venn Diagram: comparing sediment samples (sand, silt, clay, garden soil)</p> <p>SKILLS FOCUS: Comparing, contrasting</p> <p>Communicate the logical connection among hypothesis, science concepts, tests conducted, data collected, and conclusions drawn from the scientific evidence. (I&E 7.c)</p> <p>LABS / DEMOS:</p> <ul style="list-style-type: none"> Focus on LS: 7:1, Activity (Clast Shape), p. 286 TE Focus on LS: 7:1, Activity (Sediment Sorting), p. 287 TE Focus on LS: 7:1, Demonstration, "Sediment Sorting", p. 289 TE Focus on LS: 7:2, Lab, "Erosion Stoppers", pp. 302-303 USGS: "Rock Stories" http://education.usgs.gov/schoolyard/RockActivity.html Sci. Net Links: "How Sedimentary Rocks are formed" http://www.sciencenetlinks.com/lessons.cfm?Grade=6-8&BenchmarkID=4&DocID=174 	<p>1 Day</p>

Earth and Life History (Earth Science) (Grade 7 CA Standard) (cont'd)

4. Evidence from rocks allows us to understand the evolution of life on Earth. As the basis for understanding this concept.

Standards and Assessments "Students know..."	Task Analysis "Students are able to ..."	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
<p>... that evidence from geologic layers and radioactive dating indicate Earth is approximately 4.6 billion years old and that life on this planet has existed for more than 3 billion years. (7-4,d)</p> <p>DISTRICT ASSESSMENTS: CR: <u>Lights Out</u> CR: <u>Sands of Time</u></p> <p>MODIFIED ASSESSMENTS: Groups of students create an illustrated time line showing major events and epochs in Earth's history. These should include citations of specific absolute and relative dating evidence.</p>	<ul style="list-style-type: none"> Compare and contrast relative and absolute dating methods. Define absolute dating as putting a numerical estimate on the age of a particular rock sample. Model the rate of radioactive decay using the concept of half-life. Describe the process by which scientists utilize radioactive decay to determine absolute age. Describe how scientists infer the age of the Earth by using moon rocks and meteorites (due to plate tectonics and erosion very little of Earth's original material is available for dating). 	<p>Focus on LS: Ch 7:2</p> <p><i>PH FoLS:</i> Ch 6:3</p>	<p>KEY VOCABULARY: absolute dating infer estimation relative dating radioactive decay half-life igneous rock atoms</p> <p>GRAPHIC ORGANIZERS: Venn Diagram: relative and absolute dating methods</p> <p>SKILLS FOCUS: Calculating, interpreting data, making models</p> <p>Communicate the logical connection among hypothesis, science concepts, tests conducted, data collected, and conclusions drawn from the scientific evidence. (I&E 7.c)</p> <p>LABS / DEMOS:</p> <ul style="list-style-type: none"> Focus on LS: 4-in-1 Lab, "Radioactive Decay—a simulation", pp. 41-44 Focus on LS: 7:2, Demo., "Understanding Half-Life", p. 297 TE Focus on LS: 7:2, Data Lab, "How long until it's all gone?" p. 300 Focus on LS: 8:2, Mini Lab, "What makes the best fossils?" p. 327 Focus on LS: Ch 7 Transparencies, "It's Sedimentary" "Igneous, Metamorphic and Sedimentary Rock Formation" Exploratorium: "Radioactive decay model" http://www.exploratorium.edu/snacks/radioactive_decay.html Ariz. St. Univ.: "A Fossil in Time" http://coe.west.asu.edu/students/clord/webquest/index.html Geol. Soc. of America: "Geologic Cross-Section and Column" www.geosociety.org/educate/LessonPlans/geologic_xsection.pdf USGS: "Geologic Age" interactive2.usgs.gov/learningweb/teachers/geoage.htm UC Museum of Paleo.: "Who's on First? A Relative Dating Activity" www.ucmp.berkeley.edu/fosrec/BarBar.html 	<p>2 Days</p>

Earth and Life History (Earth Science) (Grade 7 CA Standard) (cont'd)

4. Evidence from rocks allows us to understand the evolution of life on Earth. As the basis for understanding this concept.

Standards and Assessments "Students know..."	Task Analysis "Students are able to ..."	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
<p>... fossils provide evidence of how life and environmental conditions have changed. (7-4,e)</p> <p>DISTRICT ASSESSMENTS: CR: Lights Out CR: Sands of Time</p> <p>MODIFIED ASSESSMENTS: Pairs of students compare fossils of ancient organisms to similar modern organisms using a Venn diagram. Then, they report to the class on their hypothesis about how differences in environmental conditions might account for the differences in organisms.</p>	<ul style="list-style-type: none"> Describe how fossils provide evidence of the environments and types of life that existed in the past (environmental changes are reflected by the classes of organisms that evolved during the period of environmental change). Describe how geologists use the principle of uniformitarianism to exam fossil evidence, noting changes in organism types over time (ancient animals that exhibit the same shell shape and thickness of modern clams probably lived in the same type of environment). 	<p>Focus on LS: 6:1, and 8:1,2,3</p> <p><i>PH FoLS: 6:1,2,4,5</i></p>	<p>KEY VOCABULARY: index fossils environment uniformitarianism</p> <p>GRAPHIC ORGANIZERS: T Chart: environmental conditions today and 100 million years ago</p> <p>SKILLS FOCUS: Comparing, contrasting, inferring</p> <p>Communicate the logical connection among hypothesis, science concepts, tests conducted, data collected, and conclusions drawn from the scientific evidence. (I&E 7.c)</p> <p>LABS / DEMOS:</p> <ul style="list-style-type: none"> Focus on ES: 4-in-1 LAB, "Index Fossils", pp. 21-23 Focus on LS: 6:1, Mini Lab, "How do Fossils Form?", p. 249 Focus on LS: 6:1, Demo, "Share Fossils", p. 245 TE Focus on LS: 6:1, Demo, "Fossilized or Not?", p. 247 TE Focus on LS: 6:1, Demo, "Env'l Info. from Fossils", p. 249 TE Focus on LS:8:2, Mini Lab, "What makes the best fossils?", p. 327 Focus on LS:8:3, Mini Lab, "What happened here?", p. 340 McDougal Littell: "Observe how fossils can form" www.classzone.com/books/earth_science/terc/navigation/home.cfm Enter keycode ES2901 	<p>2 Days</p>
<p>... how movements of the Earth's continental and oceanic plates through time, with associated changes in climate and geographical connections, have affected the past and present distribution of organisms. (7-4,f)</p> <p>DISTRICT ASSESSMENTS: CR: Lights Out CR: Sands of Time</p> <p>MODIFIED ASSESSMENTS: In groups, have students research and present examples of unique animal or plant species found on isolated islands.</p> <p>Given pictures of fossils and a world map, students find the locations of the fossils and show how areas now separated were probably connected in the past.</p>	<ul style="list-style-type: none"> Explain how the isolation of species due to geographic separation leads to genetic changes in the separated populations over time. (i.e. Darwin's observation of the finches of the Galapagos Islands). Demonstrate the principle of plate tectonics using evidence from the fossil record of dinosaurs. 	<p>Focus on LS, 6:3, 5:1</p> <p><i>PH FoLS, 5:1</i></p>	<p>KEY VOCABULARY: isolation species finches genetic plate tectonics population</p> <p>GRAPHIC ORGANIZERS: Venn Diagram: island vs. mainland</p> <p>SKILLS FOCUS: Interpreting data, classifying</p> <p>Communicate the steps and results from an investigation in written reports and verbal presentations. (I&E 7.e)</p> <p>LABS / DEMOS:</p> <ul style="list-style-type: none"> Focus on LS: 4-in-1 LAB, "Bird Beaks and Physical Adaptations", pp. 25-28 Focus on LS: 4-in-1 LAB, "Survival in Extreme Climates", pp. 91-92 Univ. of Florida: Origin of the species www.clas.ufl.edu/users/rhatch/NSF-PLANS/4-1_ORIGIN.htm Educator's Reference Desk: Animal Adaptations: Focus on Bird Beaks http://www.eduref.org/cgi-bin/print_lessons.cgi/Virtual/Lessons/Science/Animals/ANM0116.html 	<p>2 Days</p>

Earth and Life History (Earth Science) (Grade 7 CA Standard) (cont'd)

4. Evidence from rocks allows us to understand the evolution of life on Earth. As the basis for understanding this concept.

Standards and Assessments "Students know..."	Task Analysis "Students are able to ..."	Adopted Textbook Correlation(s)	Connections	Appx Time (per 180 days)
<p>... how to explain significant developments and extinctions of plant and animal life on the geologic time scale. (7-4,g)</p> <p>DISTRICT ASSESSMENTS: CR: <u>Lights Out</u></p> <p>MODIFIED ASSESSMENTS: Create a class geologic timeline using the scale 1 mm = 1 million years. Students are given pictures of organisms with a time period and glue the pictures to the correct location in time.</p>	<ul style="list-style-type: none"> List the gradual changes that life has undergone during the history of Earth (i.e. organisms adapt to slowly changing environments, evolution of new species, and extinction of species). Provide examples of organisms that support the principle of uniformitarianism (i.e. photosynthetic cyanobacteria, a.k.a. blue-green algae). Prove whether the principle of uniformitarianism is consistent over the history of the Earth by researching evidence, such as: <ul style="list-style-type: none"> Early Earth was very different from today as little oxygen was present in the atmosphere. There was no ozone layer in the early stratosphere. Earliest life was anaerobic. Earth's history has been punctuated by catastrophic events such as mass extinctions and the Cambrian explosion. 	<p>Focus on LS, 8:1,2,3</p> <p><i>PH FoLS, Ch 6:4,5</i></p>	<p>KEY VOCABULARY: environment organisms anaerobic ozone layer photosynthetic cyanobacteria (blue-green algae)</p> <p>GRAPHIC ORGANIZERS: Time Line: Students' life history</p> <p>SKILLS FOCUS: Interpreting data, making models Construct scale models appropriately labeled diagrams to communicate scientific knowledge (I&E 7.d)</p> <p>LABS / DEMOS:</p> <ul style="list-style-type: none"> Focus on LS: 4-in-1-Lab, "Modeling Geographic Isolation", pp. 49-50 Focus on LS: 6:3, Nat'l Geog.: "Vis'ing Geographic Isolation", p. 258 Focus on LS: 4-in-1 Lab, "Looking at the Geologic Timescale", pp. 45-48 Focus on LS: 8:3, Demo., "Geologic Timescale", p. 337 TE Focus on LS: 8:3, Lab, "...CA ... Over Geologic Time", pp. 342-343 USGS: "Our changing continent " http://pubs.usgs.gov/gip/continents 	<p>5 Days</p>

Health education from Project ALERT lessons 1-6 are optional. Materials and training are available through the Health Curriculum Office (Ext 2967).

APPLICATION OF COURSE CONTENT: *Career Connections*

Related Major Skills & Characteristics – objective observation, careful measurement, curiosity, problem solving, organizational skills, numerical reasoning, ability to analyze & interpret data, critical thinking, reading comprehension, concise and accurate communication skills, computer literacy, logical thinking, team skills, testing skills, practical safety awareness, evidence evaluating

Related Careers – Students who continue in the sciences can prepare for the following careers:

Aeronautical Engineer (<i>Rocket Scientist</i>)	Chemical Engineer	Mining Geologist	Physiologist
Agricultural Ecologist	Electrical Engineer	National Park Ranger	Professor
Analytical Chemist	Energy	Neurobiologist	Quality Control Specialist
Aquatic Microbial Ecologist	Fire Fighter	Nuclear Physicist	Radiologist
Astronomer	Geologist	Nurse	Refrigeration Technician
Automotive Engineer	Geneticist	Paleontologist	Science Fiction Writer
Biochemist	Immunologist	Pathologist	Seismologist
Biologist	Marine Biologist	Pediatrician	Teacher
Biotechnologist	Materials Scientist	Petroleum Geologist	Technical Editor
Botanist	Medical Researcher	Pharmacist	Veterinarian
Cell Biologist	Meteorologist	Physician	Virologist
	Microbiologist	Physicist	Wildlife Ecologist

METHODS:

Lesson Design & Delivery: Teachers will incorporate these components of lesson design during direct instruction and inquiry activities. The order of components is flexible, depending on the teacher’s vision for the individual lesson. For instance, the objective and purpose, while present in the teacher’s lesson plan, are not made known to the students at the beginning of an inquiry lesson.

<p>Essential Elements of Effective Instruction Model for Lesson Design Using Task Analysis</p>	<p>Anticipatory Set Objective Standard Reference Purpose Input Modeling Check for Understanding Guided Practice Closure Independent Practice</p>
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Some components may occur once in a lesson, but others will recur many times. Checking for understanding occurs continually; input, modeling, guided practice and closure may occur several times. There may even be more than one anticipatory set when more than one content piece is introduced.

Active Participation: Teachers will incorporate the principles of active participation and specific strategies to ensure consistent, simultaneous involvement of the minds of all learners in the classroom. Teachers should include both covert and overt active participation strategies, incorporating cooperative learning structures and brain research. Some of the possible active participation strategies include:

COVERT	OVERT (Oral)	OVERT (Written)	OVERT (Gestures)
<ul style="list-style-type: none"> • Recall • Imagine • Observe • Consider 	<ul style="list-style-type: none"> • Pair/Share • Idea Wave • Choral Response • Give One, Get One • Socratic Seminar • Cooperative Discussion Groups (i.e. Talking Chips, Gambit Chips) 	<ul style="list-style-type: none"> • Restate in Journals / Notes • Response Boards • Graphic Organizers • Folded Paper • Ticket Out of Class 	<ul style="list-style-type: none"> • Hand Signals • Model with Manipulatives • Stand up/ Sit down • Point to Examples

Baldrige Quality Tools: Students can become more positively involved in their education through goal setting, self-assessment, and data tracking and analysis by making use of the following strategies:

BALDRIDGE TOOL	PURPOSES
Affinity Diagram	– finding consensus, organizing complex information
Flowchart	– describing a process, planning a project, identifying problem steps in a process
Force Field Diagram	– identifying obstacles, finding causes and solutions to problems
Issues / Ideas Bin	– handling individual questions/requests without stopping a group activity, providing anonymous input, obtaining diverse input in specific areas.
Data Folder	– tracking goals and actual results
Plus / Delta	– tracking improvement efforts, identifying opportunities for change, finding out what's working and what's not working in a process, procedure, activity, etc.
Class Data Graphs	– displaying trends for goal setting

Learning styles and learning challenges of your students may be addressed by implementing combinations of the following:

Reading Strategies in Science

- Learning Logs
- Pre-teaching
- Vocabulary
- Pre-reading
- Text Structures
- Trail Markers
- Reciprocal Teaching
- Functional Text

SDAIE Strategies for English Learners

- Tapping/Building Prior Knowledge (Graphic Organizers, Schema)
- Grouping Strategies
- Multiple Intelligences
- Adapt the Text
- Interactive Learning (Manipulatives, Visuals)
- Acquisition Levels
- Language Sensitivity
- Lower the Affective Filter (including Processing Time)
- Home/School Connection (including Cultural Aspects)

Differentiation for Advanced Learners

- Curriculum Compacting
- Tiered Assignments
- Flexible Grouping
- Acceleration
- Depth and Complexity
- Independent Study

Significant, Proven Science Strategies for ALL Science Students

- | | | |
|---|---|---|
| <input type="checkbox"/> Hands-On Labs | <input type="checkbox"/> Short/Long-term projects | <input type="checkbox"/> Current Events |
| <input type="checkbox"/> Inquiry Activities | <input type="checkbox"/> Essential Questions | <input type="checkbox"/> Peer Teaching |
| <input type="checkbox"/> Written/Oral Presentations | <input type="checkbox"/> Summarization | <input type="checkbox"/> Guest Speakers |

Please note that these strategies often overlap and should not be limited to specifically defined courses or student populations.

MATERIALS:

Basic Textbook and Supplementary Materials: Focus on Earth Science,
Glencoe © 2007

eguidance.com web site for exploring careers

safety equipment: goggles, latex gloves, fire extinguisher

glassware: flasks, beakers, test tubes, etc.

measuring devices: triple beam balance, rulers, volumetric containers

chemical reagents

microscopes, microviewers, hand lenses, dissection equipment

appropriate technology

- ❖ Many items are available through Science/Math Resource Center (SMRC).

RESOURCES:*Documents*

- ❑ Science Framework: <http://www.cde.ca.gov/re/pn/fd/documents/scienceframework.pdf>
[or find it posted in sections at the LBUSD Science Office website]
- ❑ CST / NCLB Test Blueprints: <http://www.cde.ca.gov/ta/tg/sr/blueprints.asp>
- ❑ CST Reference Sheets: <http://www.cde.ca.gov/ta/tg/sr/cstsciref.asp>
- ❑ CST Released Test Questions <http://www.cde.ca.gov/ta/tg/sr/css05rtq.asp>
- ❑ National Science Standards: <http://www.nap.edu/readingroom/books/nses/html/>
- ❑ Science Safety Handbook for CA Public Schools (1999)
can be ordered from the CDE at <http://www.cde.ca.gov/re/pn/rc/>
- ❑ LBUSD Approved Chemicals List, Chemical Hygiene Plan, and Science Fair Resources:
http://www.lbusd.k12.ca.us/Main_Offices/Curriculum/Areas/Science/teacher_resources.cfm

District Offices

- ❑ Science Curriculum Office (562) 997-8000 (ext. 2963)
 - K-12 science standards, curriculum, professional development, science fair
- ❑ Science / Math Resource Center (SMRC) (562) 997-8000 (ext. 2964)
 - hands-on materials, consumable material orders, alternative standards-based curriculum packets
- ❑ Instructional Materials Workshop (IMW) (562) 997-8000 (ext. 2965)
 - standards-based instructional materials
 - content integrated instructional materials
 - monthly theme-based literacy supplements for science
 - wood shop / lumber room
 - copying, enlarging, and laminating
- ❑ Office of Multimedia Services (OMS) (562) 997-8000 (ext. 7145)
 - videos for check out to fit the curriculum (see your librarian for current catalogs)
 - district TV channels programming
- ❑ PALMS Office Program Assistance for Language Minority Students (562) 997-8000 (ext. 8031)
 - technical assistance and professional development for English Language Development (ELD) and Specially Designed Academic Instruction In English (SDAIE)
 - assistance in the implementation and maintenance of programs addressing the needs of English Language Learners (ELLs)
- ❑ Health Curriculum Office (562) 997-8000 (ext. 2967)
 - curriculum and training for mandated health content

EVALUATION: Student achievement in this course will be measured using multiple assessment tools. Assessments will be used for diagnosing student understanding before instruction, monitoring student learning during instruction, and evaluating student understanding after instruction.

SUGGESTED EVALUATION TOOLS:

Source	Diagnose	Monitor	Evaluate
District Developed Assessments	Grade Level Pretest	Open-Ended Science Performance Task	End of Course Exam Open Ended Science
Glencoe Science: Focus on Earth Science	Reading Essentials: Before You Read Launch Labs New Vocabulary	Reading Check questions Science Notebook, "Summarize It" Lesson Review: Summarize, Using Vocabulary, Understanding Main Ideas, Applying Science Reading Essentials: Think it Over, Reading Check, Picture This Applying Math Foldables Active Folders Mini Lab and Lab Standards Review	Standards Assessment Performance Assessment Sci Activities for Adv. Learners Chapter & Unit Tests Rubric Scored Projects, Labs, and Writings
Teacher Developed Assessments	Accessing Prior Knowledge Activities Pre-quiz Pre-Test Vocab. Knowledge Rating	Warm-Up Quiz Proving Behavior Lab	Open-ended Prompts Chapter / Unit Test Practicum Semester Final Exam

SUGGESTED GRADE WEIGHTING:
(with some possible examples)

- | | |
|---|--------------------------|
| 1. Assessment | ~30% |
| <ul style="list-style-type: none"> o objective tests including comprehensive finals o performance tasks (rubric scored) o open-ended questions (rubric scored) o portfolios o student self-evaluations | |
| 2. Homework | not more than 10% |
| <ul style="list-style-type: none"> o discovery assignments o assignments reinforcing class lesson o essays o organization o research | |
| 3. Labs | ~20% |
| <ul style="list-style-type: none"> o lab reports o active participation | |
| 4. Projects | ~20% |
| <ul style="list-style-type: none"> o science fair projects o research-based reports and projects | |
| 5. Classwork | ~20% |
| <ul style="list-style-type: none"> o note taking skills o organization skills o oral presentations o individual and group projects and assessments | |

STANDARD GRADING SCALE:		
Advanced Proficient	A	90 – 100%
	B	80 – 89%
Proficient	C	70 – 79%
Partial Proficient	D	60 – 69%
Not Proficient	F	0 – 59%

Submitted by: Eric Brundin (K. Feeley, D. Van Divort)
 School: Science Office
 Date: 5/8/08
 Revised Board Date: 10/4/11