

Newport-Mesa Unified School District
Office of Secondary Curriculum and Instruction
High School Course of Study

Course Title		Geology Field Studies 1AB				Course Code		R0405-R0406			
Transcript Title:	Geology Field Studies 1AB			Grades Levels:	9-12		Board Adoption Date:		May 2014		
Content Area:	Physical (Geo)Sciences			GPA Scale:	4		Date Course Submitted:		May 2014		
Credential Req:	Geosciences		Graduation Subject Areas:		Physical Science		Applied Skills				
UC/CSU “A-G” Area Approvals:				School Site that wrote and submitted the course:				Estancia High School			
Prerequisite(s):	None										
Next course(s):											

COURSE DESCRIPTION *(catalog summary):*

"Field Studies" takes the sciences to the outdoor laboratory, the best place to experience the geological sciences, astronomy, even biology, chemistry, and physics. Students take their classroom learning and apply it to real life situations. They experience earthquake faults, folding, volcanism, glaciation and other factors that alter the crust of the Earth. Students will study processes of change to the Earth, up-close-and-personal, rather than from a book or lab materials box. Processes that provide a window to the past, or an understanding of how the Earth was shaped through all stages of formation and deformation. They also spend evenings during field work, using state-of-the-art telescopes to study astronomy.

Students in the Field Studies class are required to attend any combination of at least two (2) 7-day fieldtrips, or three (3) 4-day fieldtrips, or one (1) 7 and two (2) 4 day-fieldtrips during the year in order to complete a "Laboratory Participation" grade.

Field Studies is essentially the true hands-on experience for science using the laboratory where real scientists go to study!

The course will use the text Geology of the National Parks (Sixth Edition) by Ann G. Harris, Esther Tuttle, and Sherwood D. Tuttle, Kendall/Hunt Publishers. "Geology of the National Parks" is taught at universities across the country. It will be supplemented with other books, and articles, some compiled by the teacher, regarding areas of study that are not part of the national parks, and therefore not covered in the textbook.

GOALS *(expected performance outcomes for students):*

Students will develop an understanding of the processes that were involved in shaping the Earth as we know it today. They will understand Earth shaping factors from the past by observing the same processes going on today (the pillar of Uniformitarianism) as they observe these processes at work in venues like Yosemite, Bryce/Zion, Death Valley, the Grand Canyon, Big Sur (not a national park), and the Owens Valley (not a national park).

Students will understand how to use geoscience data, or physical evidence to predict the results of various ongoing geological processes, and the consequential effects on various Earth systems (Uniformitarianism).

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Students will identify different Earth shaping processes by applying what they learn in the classroom to the things that they observe in the field.

Students will begin to understand the relationship between Earth processes, the subsequent environments, and the living things of the Earth. They will experience, and understand, the correlation between Earth processes and the different biological environments supported by the various geological environments.

Students will also gain valuable experience in Astronomy as they will spend the evenings on fieldtrips using state-of-the-art telescopes to view planets and stars in the nighttime sky. They will learn to use a state-of-the-art CCD camera to control the telescope, and to take pictures of the objects that they observe in the sky. They will then have the ability to prepare reports of their viewing experiences, utilizing state-of-the-art computer software that will allow them to use their own astrophotography, along a vast database of other data and pictures.

Students will be prepared for continuing their education in college by doing fieldwork that is similar to what they will experience in college. They will also be exposed to career opportunities in the diverse fields of Geology, or as a Park Ranger in a state or national park.

CALIFORNIA CONTENT STANDARDS *(how the course aligns with California and/or national curriculum standards):*

The Field Studies Course will support both the California Earth Science Standards, and the following Next Generation Science Standards Disciplinary Core Ideas: HS-ESS1.A, ESS1.B, ESS1.C, ESS2.A, ESS2.B, PS1.C, ESS2.C, ESS3.D. These DCIs support the following Performance Expectations:

- HS-ESS1-1. Develop a model based on evidence to illustrate the life span of the sun and the role of nuclear fusion in the sun's core to release energy in the form of radiation.
- HS-ESS1-2. Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe.
- HS-ESS1-3. Communicate scientific ideas about the way stars, over their life cycle, produce elements.
- HS-ESS1-4. Use mathematical or computational representations to predict the motion of orbiting objects in the solar system.
- HS-ESS1-5. Evaluate evidence of the past and current movements of continental and oceanic crust and the theory of plate tectonics to explain the ages of crustal rocks.
- HS-ESS1-6. Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth's formation and early history.
- HS-ESS2-1. Develop a model to illustrate how Earth's internal and surface processes operate at different spatial and temporal scales to form continental and ocean-floor features.

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- HS-ESS2-5. Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.
- HS-ESS3-5. Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems.
- HS-ESS3-6. Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.

EVALUATION *(how the effectiveness of the course will be monitored and assessed):*

Students will be evaluated using various forms of assessment:

- 1. They will keep a "Field Journal" with a record of each fieldtrip.*
- 2. They will write essays upon return from each fieldtrip.*
- 3. They will explore interesting and complex concepts on "Creative Thinking Essay Assessments".*
- 4. Individual and group assignments exploration and research projects.*
- 5. Hands-on laboratories related to processes that they will see exhibited during fieldtrips.*

Group Practicum Tests will reexamine their lab skills, and their understanding of the processes.

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Unit 1	Length of Unit ... (Days / weeks / class sessions) ... Seven (7) Weeks			
	Key Vocabulary	Standards (referenced)	Model Tasks	Tools / Texts
Introduction to Geology-Scenery <i>Developed by Weathering and Erosion on Flat-Lying Rocks-Introduction</i>	physical geology historical geology landforms landscapes geologic agents geologic processes weathering mass wasting entrainment deposition slumping sliding avalanching suspension solution catastrophism uniformitarianism original horizontality relative age absolute age radioactive decay strata layer-cake geology	HS-ESS1.C, ESS2.A, PS1.C	*Approved Textbook from Estancia Geology Course Introduction Notes from PPT and Lecture Chapter Vocabulary and Questions Observing and Measuring Earth Materials and Processes Project: PreLab: Satellite Remote Sensing of Geology PreLab Activity	Text: Geology of the National Parks (Sixth Edition) – Ann G. Harris, Esther Tuttle, Sherwood D. Tuttle *Supplementary Textbook Essentials of Geology Tenth Edition Laboratory Manual in Physical Geology (Ninth Edition) – Richard M. Busch, Dennis Tasa Textbook Lab Manual: Lab 1 (pg. 1-16) Chalcopyrite, Test Tubes, Rack, Bunsen Burner.

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<u>Chapter 2</u> Zion National Park Plate Tectonics: An All- Encompass- ing Explanation, Volcanic Rocks	hanging valleys intermittent tributaries blind arch inset arch slump blocks joints vertical faults cross-bedding angle of repose cut and fill relief spreading centers mid-ocean ridge diverging plate boundaries converging plate boundaries oceanic trench subduction zone batolith transform plate boundary catastrophism uniformitarianism	HS-ESS2.A, ESS2.C	Lab: Breaking down of Chalcopyrite to extract Sulfur, Copper, and Iron Fieldtrip: Zion National Park/Bryce Canyon National Park, Utah (October) Chapter 2 Notes from PPT and Lecture Chapter 2 Questions and Vocabulary Stream Processes, Landscapes, Mass Wastage, and Flood Hazards Lab Project 1. Introduction to Stream Processes and Landscapes 2. Meander Evolution on the Rio Grande 3. Mass Wastage at Niagara Falls 4. Flood Hazard Mapping, Assessment, and Risks	Electrolyte, L.V. Power Supply Field Guides, Field Journals Textbook Lab Manual: Lab 11 (pg. 249-271)
<u>Chapter 3</u> Bryce Canyon National Park Weathering Processes	lithology slope wash limestone limy siltstone shale sandstone	HS-ESS2.A, ESS2.C	Science Current Event Close Read, Critical Thinking and Essay Writing Assignment (subject specific when possible) Fieldtrip: Zion National Park/Bryce	Field Guides, Field Journals

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	fragmentation decomposition granular disintegration frost wedging frost heaving spheroidal weathering exfoliation oxidation Fe_2O_3 $Fe_2O_3 \cdot nH_2$ MnO_2 hydration carbonation $CaCO_3$ solution weathering hoodoo conglomerate		<i>Canyon National Park, Utah (October)</i> <i>Chapter 3 Notes from PPT and Lecture</i> <i>Chapter 3 Questions and Vocabulary</i> <i>Minerals and Rocks Identification Lab Project-</i> 1. <i>Minerals ID Lab</i> 2. <i>Rock-Forming Processes and the Rock Cycle Lab</i> 3. <i>Igneous Rocks ID and Volcanic Hazards Lab</i> 4. <i>Sedimentary Rocks ID Lab</i> 5. <i>Metamorphic Rocks ID Lab</i> <i>Science Current Event Close Read, Critical Thinking and Essay Writing Assignment (subject specific when possible)</i> Textbook Lab Manual: Labs 3,4,5,6,7 (pg.89-174) Igneous, Sedimentary, Metamorphic Rock Sets, Tools
Differentiation	Support -- for students who are struggling	Content: Reading assignments will be modified as necessary. Process: Extended time, partner and group work, modified assignments.	

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	with the content	Product: See “Model Tasks” – many products include elements of student choice and personalization such as topic, lab design, and presentation. Students can study similar topics at varying degrees of depth and complexity. Projects will be modified to students’ needs.		
	Extension – for high achieving students.	Process: Extension activities, investigation, independent research, modified assignments Product: See “Model Tasks” – many products inherently contain elements for building depth for high achieving students, including more rigorous experimental design elements and greater detail and mastery of content for projects.		
Evaluation	Formative Assessments (ongoing & mid-lesson): Checking for understanding; hypothesis prior to beginning experiments; review of laboratory processes during labs, worksheets.			
	Summative Assessments (unit final evaluation): Field Journal evaluations; laboratory reports; formal presentations for peers, teacher, and community.			

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Unit 2	Length of Unit ... (Days / weeks / class sessions) ... Seven (7) Weeks			
	Key Vocabulary	Standards (referenced)	Model Tasks	Tools / Texts
<u>Chapter 1</u> Grand Canyon National Park, Arizona - “And the Geologic History of the Colorado Plateaus” How Does a River System Form? Igneous and Metamorphic Rocks Geologic Structures Sedimentary Environments	base level gradient headward erosion stream capture rock cycle igneous rocks intrusive intrusion extrusive pluton dike sill sedimentary rocks clastic non-clastic metamorphic rocks unconformity angular unconformity fold anticline syncline isocline isoclinal fold monocline monoclinial fold fault displacement normal fault	HS-ESS2.A, HS-ESS2.C	Fieldtrip: Grand Canyon National Park/ Antelope Canyon, AZ/ Canyonlands National Park/Arches National Park, Utah (November) Chapter 1 Notes from PPT and Lecture Chapter 1 Questions and Vocabulary Lab: Stream Table Lab: Explore Stream, and River Formation Processes Lab Science Current Event Close Read, Critical Thinking and Essay Writing Assignment (subject specific when possible)	Field Guides, Field Journals Textbook Stream Table and Accessories

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Chapter 5 Canyonlands National Park, Utah Upheaval Dome, needles, arches, and grabens	hanging wall footwall reverse fault thrust fault strike-slip fault block-fault structure sedimentary environments brecciated karst sinkholes eolian desert varnish sandstone canyon mesa butte fin arches spires salt dome plastic needles pillars grabens incised meanders deflation tanks charcos evaporates closed basin deposition precipitate orogeny	HS-ESS2.A, HS-ESS2.C	Fieldtrip: Grand Canyon National Park/ Antelope Canyon, AZ/ Canyonlands National Park/Arches National Park, Utah (November) Chapter 5 Notes from PPT and Lecture Chapter 5 Questions and Vocabulary Lab: Geologic Structures, Maps, and Block Diagrams Lab 1. Introduction to Structural Geology 2. Geologic Mapping in Wyoming 3. Geologi Mapping in Colorado 4. Cardboard Model Anaysis and Interpretation 5. Block Diagram Analysis and Interpretation	Field Guides, Field Journals Textbook Lab Manual: Lab 10 (pg. 227-248)

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Chapter 6 Arches National Park, Utah Arches and Natural Bridges, How Bridges Form, Balanced Rocks Antelope Canyon, AZ-Slot Canyons	orogenesis natural bridge watercourse natural arch physical weathering chemical weathering exfoliation fins balanced rock sandblasting abrasion gypsum quicksand chalcedony conchoidal fracture siltstone siliceous concretions	HS-ESS2.A, HS-ESS2.C	6. <i>Appalachian Mountains Geologic Map</i> 7. <i>Geologic Map of Colorado National Monument</i> <i>Science Current Event Close Read, Critical Thinking and Essay Writing Assignment (subject specific when possible)</i> Fieldtrip: <i>Grand Canyon National Park/ Antelope Canyon, AZ/ Canyonlands National Park/Arches National Park, Utah (November)</i> <i>Chapter 6 Notes from PPT and Lecture</i> <i>Chapter 6 Questions and Vocabulary</i> Lab: <i>Topographic Maps, Aerial Photographs, and Orthoimages Lab Project</i> <i>Introduction to Topographic Maps</i> <i>Topographic Profile Construction</i> <i>Map CA Geology with a Topo Map and Orthoimage</i> <i>Map AZ Geology with a Topo Map and Orthoimage</i> <i>Obtain and Analyze a Topo Map or Orthoimage</i> <i>Aerial Photographs</i>	Field Guides, Field Journals Textbook Lab Manual: Lab Nine (pg. 195-226)

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		HS-ESS2.A, HS-ESS2.C	Science Current Event Close Read, Critical Thinking and Essay Writing Assignment (subject specific when possible)	
Differentiation	Support -- for students who are struggling with the content	Content: Reading assignments will be modified as necessary. Process: Extended time, partner and group work, modified assignments. Product: See “Model Tasks” – many products include elements of student choice and personalization such as topic, lab design, and presentation. Students can study similar topics at varying degrees of depth and complexity. Projects will be modified to students’ needs.		
	Extension – for high achieving students.	Process: Extension activities, investigation, independent research, modified assignments Product: See “Model Tasks” – many products inherently contain elements for building depth for high achieving students, including more rigorous experimental design elements and greater detail and mastery of content for projects.		
Evaluation	Formative Assessments (ongoing & mid-lesson): Checking for understanding; hypothesis prior to beginning experiments; review of laboratory processes during labs, worksheets.			
	Summative Assessments (unit final evaluation): Field Journal evaluations; laboratory reports; formal presentations for peers, teacher, and community.			

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Unit 3	Length of Unit ... (Days / weeks / class sessions) ... Four (4) Weeks			
	Key Vocabulary	Standards (referenced)	Model Tasks	Tools / Texts
<u>Chapter 12</u> Great Sand Dunes National Park and Preserve South Central Colorado Tallest Sand Dunes in NorthAmerica	<i>active dune field dry lake area sand sheet sand dune deflation surface creep saltation suspension windward face leeward face slip face transverse dune barchans dune reversing dune star dune sand surging flows antidunes braided stream capillary action</i>	<i>HS-ESS2.A, HS-ESS2.C</i>	Fieldtrip: Pisgah Crater, Kelso Dunes, Rainbow Basin, Inspiration Canyon Petroglyphs (This trip is a California State Park trip-not a National Park) Chapter 12 Notes from PPT and Lecture Chapter 12 Questions and Vocabulary Lab: Dry Landforms, Hazards, and Risks Lab Project 1. Death Valley, California 2. Sand Dunes of Nebraska and the Arabian Peninsula 3. Dryland Lakes of Utah Science Current Event Close Read, Critical Thinking and Essay Writing Assignment (subject specific when possible)	Field Guides, Field Journals Lab Manual: Lab Fourteen (pg.317-332)
<u>Chapter 7</u> Mesa Verde National Park Southwest Colorado The Natural World	<i>silt loess Cuesta pediment stream capture</i>		Fieldtrip: This chapter will focus more on the living environments and cultures of ancient American Indians. Field Studies takes the opportunity to visit "Indian	Field Guides, Field Journals

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of the Mesa Verde Anasazi	porosity permeable		<i>Petroglyphs” on two of our trips (the Hwy. 6 petroglyphs on our Hwy. 395 trip (Bishop and Mammoth), and the Inspiration Canyon Petroglyphs at Black Mountain while on our Pisgah Crater/Rainbow Basin/ Kelso Dunes/ Inspiration Canyon trip (Barstow area). We do so to help students appreciate the history and culture of other people.</i> <i>Chapter 7 Notes from PPT and Lecture</i>		
Differentiation	Support -- for students who are struggling with the content	Content: Reading assignments will be modified as necessary. Process: Extended time, partner and group work, modified assignments. Product: See “Model Tasks” – many products include elements of student choice and personalization such as topic, lab design, and presentation. Students can study similar topics at varying degrees of depth and complexity. Projects will be modified to students’ needs.			
	Extension – for high achieving students.	Process: Extension activities, investigation, independent research, modified assignments Product: See “Model Tasks” – many products inherently contain elements for building depth for high achieving students, including more rigorous experimental design elements and greater detail and mastery of content for projects.			
Evaluation	Formative Assessments (<i>ongoing & mid-lesson</i>): Checking for understanding; hypothesis prior to beginning experiments; review of laboratory processes during labs, worksheets.				

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	Summative Assessments (<i>unit final evaluation</i>): Field Journal evaluations; laboratory reports; formal presentations for peers, teacher, and community.		

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Unit 4	Length of Unit ... (Days / weeks / class sessions) ... Two (2) Weeks			
	Key Vocabulary	Standards (referenced)	Model Tasks	Tools / Texts
Caves and Reefs <i>Limestones and Dolomites, The Role of Groundwater</i> Chapter 16 Carlsbad Caverns National Park, New Mexico <i>Origin of the Cave, Bedrock and Geologic Structure, Cavern Features, Sediments in the Cavern</i>	soft rocks caves caverns reefs carbonate rocks deformation metamorphism plutonism interbedded laterally gradational ground water zone of aeration vadose zone saturated zone phreatic zone water table travertine speleothem alluvial fill solutional erosion basinal limestone karst topography solutional fissures	HS-ESS2.C	<i>There is currently no fieldtrip planned for this chapter or subject matter. Should Mitchell Caverns (the only limestone caverns in California) reopen then that will be added as part of an existing fieldtrip.</i> <i>Chapter 16 Notes from PPT and Lecture</i> <i>Chapter 16 Questions and Vocabulary</i> Lab: <i>Groundwater Processes, Resources, and Risks</i> <i>Karst Processes and Topography</i> <i>Floridian Limestone Aquifer</i> <i>Land Subsidence from Groundwater Withdrawal</i> Lab: <i>Karst Topography aerial and Orthoimages</i>	Textbook Lab Manual: Lab Twelve (pg. 273-292) Mirror Stereoscopes, Aerial images

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	pits sinkholes spongework collapse blocks cave popcorn cave pearls rimstone endellite montmorillonite		Science Current Event Close Read, Critical Thinking and Essay Writing Assignment (subject specific when possible)		
Differentiation	Support -- for students who are struggling with the content	Content: Reading assignments will be modified as necessary. Process: Extended time, partner and group work, modified assignments. Product: See “Model Tasks” – many products include elements of student choice and personalization such as topic, lab design, and presentation. Students can study similar topics at varying degrees of depth and complexity. Projects will be modified to students’ needs.			
	Extension – for high achieving students.	Process: Extension activities, investigation, independent research, modified assignments Product: See “Model Tasks” – many products inherently contain elements for building depth for high achieving students, including more rigorous experimental design elements and greater detail and mastery of content for projects.			
Evaluation	Formative Assessments (ongoing & mid-lesson): Checking for understanding; hypothesis prior to beginning experiments; review of laboratory processes during labs, worksheets.				
	Summative Assessments (unit final evaluation): Field Journal evaluations; laboratory reports; formal presentations for peers, teacher, and community.				

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Unit 5	Length of Unit ... (Days / weeks / class sessions) ... Five (5) Weeks			
	Key Vocabulary	Standards (referenced)	Model Tasks	Tools / Texts
Landscapes Shaped by Continental or Alpine Glaciation <i>The Theory of Glacial Ages, Types of Glaciers, How Glaciers Form and Move, The Work of Glaciers, Glacial Advances and Retreats, Carbon-14 Dating, Another Ice Age?</i>				
Chapter 28 Yosemite National Park, California <i>Bedrock Geology, Mesozoic Batholiths, Cenozoic Volcanic Activity, Joint Systems, Effects of</i>	<i>erratics striations continental glaciers valley glacier alpine glacier cirque glacier piedmont glacier firn glacier zone of</i>	<i>HS-ESS2.A, HS-ESS2-3, ESS2.C</i>	Fieldtrip: Yosemite National Park <i>Chapter 28 Notes from PPT and Lecture</i> <i>Chapter 28 Questions and Vocabulary</i> Lab: Glacial Processes, Landforms, and	Field Guides, Field Journals Lab Manual:

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<i>Glacial Erosion</i>	<i>accumulation zone of wastage firn line rigid zone plastic flow zone plucked quarried abrasion rock flour moraines ground moraine glacial outwash glacial drift batholith nested equigranular porphyritic fractional crystallization joints sheet jointing exfoliation exfoliation domes roches moutonnées nunataks hanging valley</i>	<i>Indicators of Climate Change Lab</i> <i>Mountain Glaciers and Glacial Landforms</i> <i>Continental Glaciation of North America</i> <i>Glacier National Park Investigation</i> <i>Nisqually Glacier Response to Climate Change</i> <i>Thawing Permafrost in Alaska</i> Close Reading and Writing: “Glaciers in Hawaii? The Shifting AMOC	Lab 13 (pg. 293-316)
Differentiation	Support -- for students who are struggling with the content	Content: Reading assignments will be modified as necessary. Process: Extended time, partner and group work, modified assignments. Product: See “Model Tasks” – many products include elements of student choice and personalization such as topic, lab design, and presentation. Students can study similar topics at varying degrees of depth and complexity. Projects will be modified to students’ needs.	

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		Process: Extension activities, investigation, independent research, modified assignments Product: See “Model Tasks” – many products inherently contain elements for building depth for high achieving students, including more rigorous experimental design elements and greater detail and mastery of content for projects.		
	Extension – for high achieving students.			
Evaluation	Formative Assessments (<i>ongoing & mid-lesson</i>): Checking for understanding; hypothesis prior to beginning experiments; review of laboratory processes during labs, worksheets.			
	Summative Assessments (<i>unit final evaluation</i>): Field Journal evaluations; laboratory reports; formal presentations for peers, teacher, and community.			

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Unit 6	Length of Unit ... (Days / weeks / class sessions) ... Eight (8) Weeks			
	Key Vocabulary	Standards (referenced)	Model Tasks	Tools / Texts
Non-National Park: Big Sur, CA Point Reyes, CA Coastline Processes and Landforms	continental drift convergent boundary Curie Point deep-ocean trench divergent boundary fossil magnetism fracture zone hot spot lithosphere magnetic reversal magnetic time scale magnetometer mantle plume normal polarity oceanic-ridge system paleomagnetism Pangaea partial melting plate plate tectonics reverse polarity ridge push rift seafloor spreading slab pull slab suction subduction zone	HS-ESS2.A, HS-ESS2.C	Fieldtrip: Hwy. 1-Big Sur – Geology, Marine Science, History Chapter 13 “Essentials of Geology”: Shorelines (Coastal Processes) Lab: Crustal Evolution Education Project – 1. What Happens When Continents Collide? 2. Continents and Ocean Basins: Floaters and Sinkers 3. Tropics in Antarctica? Science Current Event Close Read, Critical Thinking and Essay Writing Assignment (subject specific when possible)	Field Guides, Field Journals Supplementary Textbook Essentials of Geology Tenth Edition CEEP Modules

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Non-National Park: San Andreas Fault, CA Earthquakes and Plate Tectonics	suspect terranes transform fault boundary aftershock asthenosphere body wave core crust earthquake elastic rebound epicenter fault fault creep focus foreshock inner core intensity liquefaction lithosphere lower mantle magnitude mantle Modified Mercalli Intensity Scale moment magnitude outer core primary (P) wave Richter magnitude Richter scale secondary (S) wave seismic sea wave seismogram seismograph	HS-ESS2.A, HS-ESS2.C	Fieldtrip: San Andreas Fault/Cajon Pass Fieldtrip – one (1) day Hwy. 395 – four (4) days Chapter 14 Notes/Geology Textbook from PPT and Lecture Chapter 14 Questions and Vocabulary Lab: Earthquake Hazards and Human Risks Lab 1. Simulate Earthquake Hazards and Risks 2. How Seismic Waves Travel Through Earth 3. Locate the Epicenter of an Earthquake 4. San Andreas Fault Analysis at Wallace Creek 5. New Madrid Blind Fault Zone Science Current Event Close Read, Critical Thinking and Essay Writing Assignment (subject specific when possible) Field Guides, Field Journals Textbook Lab Manual: Lab 16 (pg. 349-363)

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California Volcanism	seismology surface wave discordant eruption column fissure fissure eruption flood basalt fumerole hot spot intraplate volcanism laccolith lahar lava tube mantle plume massive nuée ardente pahoehoe flow parasitic cone pillow lava pipe pluton pyroclastic flow pyroclastic material scoria cone shield volcano sill stratovolcano tabular vent viscosity volcanic neck volcano	HS-ESS2.A, HS-ESS2.C	Fieldtrip: Pisgah Crater/Rainbow Basin/Inspiration Canyon Petroglyphs Trip, Death Valley Trip, Hwy. 395 Trip Chapter 4 Notes from PPT and Lecture Chapter 4 Questions and Vocabulary Lab: Crustal Evolution Education Project – 1. Volcanoes: Where and Why?, 2. The Eruption of Mount St. Helens Lab: Crustal Evolution Education Project – 1. Earthquakes and Plate Boundaries Science Current Event Close Read, Critical Thinking and Essay Writing Assignment (subject specific when possible)	Field Guides, Field Journals

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	volatiles				
Differentiation	Support -- for students who are struggling with the content	Content: Reading assignments will be modified as necessary. Process: Extended time, partner and group work, modified assignments. Product: See “Model Tasks” – many products include elements of student choice and personalization such as topic, lab design, and presentation. Students can study similar topics at varying degrees of depth and complexity. Projects will be modified to students’ needs.			
	Extension – for high achieving students.	Process: Extension activities, investigation, independent research, modified assignments Product: See “Model Tasks” – many products inherently contain elements for building depth for high achieving students, including more rigorous experimental design elements and greater detail and mastery of content for projects.			
Evaluation	Formative Assessments (ongoing & mid-lesson): Checking for understanding; hypothesis prior to beginning experiments; review of laboratory processes during labs, worksheets.				
	Summative Assessments (unit final evaluation): Field Journal evaluations; laboratory reports; formal presentations for peers, teacher, and community.				

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Unit 7	Length of Unit ... (Days / weeks / class sessions) ... Three (3) Weeks			
	Key Vocabulary	Standards (referenced)	Model Tasks	Tools / Texts
<i>The Final Unit will allow us to explore future trips that may possibly be added to our itinerary.</i>			<i>Joshua Tree National Park, Sequoia and Kings Canyon National Parks, Point Reyes, and others.</i>	
Differentiation	Support -- for students who are struggling with the content	Content: Reading assignments will be modified as necessary. Process: Extended time, partner and group work, modified assignments. Product: See “Model Tasks” – many products include elements of student choice and personalization such as topic, lab design, and presentation. Students can study similar topics at varying degrees of depth and complexity. Projects will be modified to students’ needs.		
	Extension – for high achieving students.	Process: Extension activities, investigation, independent research, modified assignments Product: See “Model Tasks” – many products inherently contain elements for building depth for high achieving students, including more rigorous experimental design elements and greater detail and mastery of content for projects.		
Evaluation	Formative Assessments (<i>ongoing & mid-lesson</i>): Checking for understanding; hypothesis prior to beginning experiments; review of laboratory processes during labs, worksheets.			

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	Summative Assessments (<i>unit final evaluation</i>): Field Journal evaluations; laboratory reports; formal presentations for peers, teacher, and community.		

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