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Desired Results

Goals of the Program

Students will...

- Enrich their understanding of a place through inquiry.
- Experience National Parks as places for learning and recreation and develop a personal connection with their local National Parks.
- Gain first-hand experience with the results of plate tectonics and active geologic processes.
- Appreciate the Golden Gate Headlands as the epicenter of plate tectonic theory.

Transfer

- Analyze the geologic processes evidenced in a landscape.
- Engage in an informed discussion of the possible future of a landscape.
- Consider how communities can adapt to global climate change.

Meaning

Essential Question: *How do I recognize geologic change in my environment?*

Enduring Understandings: Students will understand that...

- the physical characteristics of rocks influence landscapes.
- landscapes change due to a variety of natural and human factors, both local and global.
- every landscape contains clues to its past and future.
- past and future climate change is a part of every landscape's story.

Aquisition

Students will know...

- Names and physical characteristics of the primary rocks in the Franciscan Complex.
- Tectonic processes that formed the rocks and landscapes of the Golden Gate Headlands.
- Agents of weathering that formed and changed the rocks and landscapes of the Golden Gate Headlands.
- Agents of weathering that change local landscapes.

Students will be able to...

- Identify the environments of formation of the Franciscan Complex rocks.
- Describe geologic events that occur as a result of plate movements.
- Describe the possible impacts of climate change on a landscape.

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Evidence

Students will show their learning by...

- Completing the post-visit geology and climate change reflection provided at the end of the field program.

...and by doing one of the following:

- Identifying at least two examples of geologic change on their field map.
- Using evidence to identify a pebble from Rodeo Beach.
- Using evidence to answer their own question during one of the geologic investigation discussions.

CA Next Generation Science Standards

MSESS2-1: Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.

MS-ESSS2-2: Construct a scientific explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.

MS-ESS2-3: Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.

MSESS3-5: Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.

Source:

http://www.cde.ca.gov/pd/ca/sc/ngssstandards.asp

CA Common Core Standards

LACC.68.RH.3.7: Integrate visual information (e.g., in charts, graphs, photographs, videos, or maps) with other information in print and digital texts.

LACC.68.RH.3.8: Distinguish among fact, opinion, and reasoned judgment in a text.

Source:

www.cde.ca.gov/be/st/ss/documents/finalelaccssstandards.pdf

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Learning Plan

Summary of Key Learning Events and Instruction

- Before NPS pre-trip presentation: Teacher shows 8 minute ROTM video to introduce trip purpose and over-arching concepts (http://www.nps.gov/goga/forteachers/secondary-02.htm).
- Beach Ball Earth: During pre-trip classroom presentation NPS staff assess students' prior knowledge of plate tectonics and class dynamics (http://www.nps.gov/goga/forteachers/upload/Beach%20Ball%20Earth%20WEB2.pdf).
- Edible Geology: During pre-trip presentation NPS staff facilitate an opportunity for students to apply their expertise with common candy to learning the physical characteristics of the rocks of the Franciscan Complex, consider the tectonic environments of these rocks, and generate questions about local geology (http://www.nps.gov/goga/forteachers/upload/Edible-geology-lesson-WEB-11-2011pdf.pdf).
- Pre-trip preparation: Teacher helps students collaborate to write investigation questions (factual and critical thinking questions) (http://www.nps.gov/goga/forteachers/rocks-on-the-move-teachers-corner.htm).
- Pre-trip presentation: Teacher conducts 20 minute Magic Window activity, in order to familiarize students with this teaching tool, and to introduce observation of geologic changes in landscapes (http://www.nps.gov/goga/forteachers/upload/Magic%20Windows%20-%20GGB%20Poster%20WEB1-3.pdf).
- Cookie Tectonics: During field trip NPS staff facilitate student participation in tactile, interactive modeling of formation of Franciscan Complex landscapes (http://www.nps.gov/goga/forteachers/cookie-tectonics.htm).
- Geologic Investigations: During field trip teacher and NPS staff guide student observations of examples of geologic change and facilitate student investigations of questions about changing landscapes OR students identify beach pebbles in order to reconstruct the tectonic environment of formation of Rodeo beach sediments and consider the impacts of climate change on Rodeo Beach.
- Field trip and post trip: NPS staff facilitate student discussion as they share field observations to complete their geologic investigation maps (journal) OR to correctly place their beach pebbles on a subduction zone diagram.
- Post trip: Students complete the post visit reflection assignment provided by NPS staff at the end of the field program.
- Teacher returns the post visit reflections via NPS postage-paid envelope.