

Standards-Based Project WET Activity Pool – Grade 4

Pool Title: Sculpting Landscapes – (California Science Framework - Grade 4, IS3, p: 263)

Landscapes are constantly changing as forces on Earth’s surface sculpt and reshape the rocks. Sometimes these forces act quickly (sudden landslides) while other times they cause more gradual changes. Students will eventually return to the issue of timescales of these processes at a more nuanced level in high school, but fourth-graders begin by simply observing that there are factors that affect the speed at which landscapes change and that there are systematic patterns that cause these differences in rate. In most parts of California, flowing water is the most important process that breaks apart rocks and moves them. Students should directly investigate at least one of these processes in detail. (CSF, p: 264-265)

Standards Pool:

- 4-ESS2-1.** - Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.
- 4-ESS2-2.** - Analyze and interpret data from maps to describe patterns of Earth’s features.
- 4-ESS3-2.** - Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans*

Anchoring Phenomenon: Water carries materials to the sea, as it shapes California landscapes.

Guiding Questions:

- How does soil from inland areas end up in the ocean?
- How does water sculpt landscapes?
- What factors affect how quickly landscapes change?
- How can people minimize the effects of changing landscape on property while still protecting the environment?

California Environmental Principles and Concepts:

Principle III - Natural systems proceed through cycles that humans depend upon, benefit from and can alter.

Principle V - Decisions affecting resources and natural systems are complex and involve many factors.

Performance Expectations <i>Investigative Phenomena</i>	Learning Targets by PE Dimensions	Learning Experience Connections	Common Core & Engineering/ Community Action Connections
<p>4-ESS2-1. Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.</p> <p><i>How does water move in landscapes with and without plants?</i></p>	<p>SEP: Plan and Carry Out Investigations Students use simple models to make observations and produce data as evidence to explain how water erosion can occur on different slopes.</p> <p>DCI: ESS2.E: Biogeology Students can describe the role of plants in influencing the flow of water on sloped or flat landscapes.</p> <p>CCC: Cause and Effect Students can use simple models to observe and describe how water moves and interacts with plants and soil on vegetated and un-vegetated slopes.</p>	<p>‘Just Passing Through’ (Project WET 2.0; p: 163)</p> <ul style="list-style-type: none"> - Students simulate the interaction of soil and water down a vegetated vs. un-vegetated slopes. - Use the activity as a precursor to having students write and/or discuss the pros and cons of soil erosion and the deposition of sediments in the shaping of California. - California activity supplements available on Water Education Foundation website. 	<p>ELA: RI.4.1; RI.4.9; W.4.7; W.4.8</p> <p>MATH: MP.2; MP.4; MP.5; 4.MD.A</p> <ul style="list-style-type: none"> - Students develop and use simple models to study the process of erosion by water. (CSF p: 265)
<p>4-ESS2-2. Analyze and interpret data from maps to describe patterns of Earth’s features.</p> <p><i>Is water shaping the landscape within our community?</i></p>	<p>SEP: Analyze and Interpret Data Students can use simple tools and observations to map the flow of water in an area.</p> <p>DCI: ESS2.B: Plate Tectonics and Large-Scale System Interactions Students can show how run-off from an area connects to water bodies within a watershed.</p> <p>CCC: Patterns Students can identify patterns in data and observations to explain how water flow shapes the land surface of an area.</p>	<p>‘Rainy Day Hike’ (Project WET 2.0; p: 169)</p> <ul style="list-style-type: none"> - Students develop a map of the school grounds or a nearby area to predict where water flow is slowed or increased by slope, objects or other landscape features. (CSF, p: 266) - Students use a map to trace the likely course of runoff from the school grounds into a lake or river. (PWET ‘Seeing Watersheds’ activity) 	<p>ELA: RI.4.1; RI.4.7; RI.4.9; W.4.7; W.4.8</p> <p>MATH: MP.2; MP.4; MP.5; 4.MD.A</p> <ul style="list-style-type: none"> - Students map and measure areas of erosion on their school grounds or community.
<p>4-ESS2-2. Analyze and interpret data from maps to describe patterns of Earth’s features.</p> <p><i>How does water flow in our</i></p>	<p>SEP: Analyze and Interpret Data Students can delineate their watershed on a map and show connections between water flow and their community and ‘Rainy Day Hike’ map area.</p>	<p>‘Seeing Watersheds’ (Project WET 2.0; p: 187)</p> <ul style="list-style-type: none"> - Students use a map to identify their community and delineate their watershed. - Students use a map to trace the likely course of runoff from their ‘Rainy Day 	<p>ELA: RI.4.1; RI.4.7; RI.4.9; W.4.7; W.4.8</p> <p>MATH: MP.4; MP.4; MP.5; 4.MD.2</p>

<p><i>watershed?</i></p> <p><i>Where is water shaping the landscape within our watershed?</i></p>	<p>DCI: Large-Scale System Interactions: Students can use a map to show where water has shaped the landscape of their watershed and how the flow of water connects their watershed to the ocean.</p> <p>CCC: Patterns: Students can use map evidence to explain how runoff from their map area can effect coastal and ocean environments.</p>	<p><i>Hike'</i> map area to a local water body. - Use the activity to engage students in a discussion of water runoff sources in the watershed and effects on coastal and ocean communities downstream.</p>	
<p>4-ESS3-2. - Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans*</p> <p><i>How can we control or eliminate sources of erosion in our community?</i></p>	<p>SEP: Construct Explanations & Design Solutions Students can design an erosion control plan based on evidence tests, measurements and their own research.</p> <p>DCI: ESS3.B: Natural Hazards Students can identify an erosion source in their community and solutions to reduce or eliminate the hazard.</p> <p>DCI: ETS1.B: Design Solutions to Engineering Problems: Students can use simple models to test erosion rates using a variety of factors.</p> <p>CCC: Cause and Effect Students can use simple models to observe and describe how water moves and interacts with plants and soil on vegetated and un-vegetated slopes.</p>	<p>'Just Passing Through' (Project WET 2.0; p: 163) - Have students use their '<i>Rainy Day Hike</i>' maps to identify areas of erosion in their community. - See detailed NGSS correlation on Project WET Portal for additional suggestions for helping students elaborate on and apply the concepts and skills in this activity. - California activity supplements available on Water Education Foundation website.</p>	<p>ELA: RI.4.1; RI.4.9; W.4.7; W.4.8</p> <p>MATH: MP.2; MP.4; MP.5; 4.MD.A</p> <p>- Students design a solution to reduce or eliminate a source of erosion on their school grounds or elsewhere in the community. (<i>CSF, p: 266</i>)</p>