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 | Learning Targets by PE Dimensions | Learning Experience Connections | Common Core & Engineering/ |
|--------------------------------|---|---|--|
| Investigative Phenomena | | | Community Action Connections |
| 4-ESS2-1. Make observations | SEP: Plan and Carry Out Investigations | 'Just Passing Through' (Project WET 2.0; | ELA: RI.4.1; RI.4.9; W.4.7; W.4.8 |
| and/or measurements to | Students use simple models to make | p: 163) | |
| provide evidence of the | observations and produce data as evidence | - Students simulate the interaction of soil | MATH: MP.2; MP.4; MP.5; 4.MD.A |
| effects of weathering or the | to explain how water erosion can occur on | and water down a vegetated vs. un- | |
| rate of erosion by water, ice, | different slopes. | vegetated slopes. | - Students develop and use simple |
| wind, or vegetation. | | Use the activity as a precursor to having | models to study the process of |
| | DCI: ESS2.E: Biogeology | students write and/or discuss the pros and | erosion by water. (CSF p: 265) |
| How does water move | Students can describe the role of plants in | cons of soil erosion and the deposition of | |
| in landscapes with and | influencing the flow of water on sloped or | sediments in the shaping of California. | |
| without plants? | flat landscapes. | - California activity supplements available | |
| | | on Water Education Foundation website. | |
| | 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. | | |
| 4-ESS2-2. Analyze and | SEP: Analyze and Interpret Data | 'Rainy Day Hike' (Project WET 2.0; p: 169) | ELA: RI.4.1; RI.4.7; RI.4.9; W.4.7; |
| interpret data from maps to | Students can use simple tools and | Students develop a map of the school | W.4.8 |
| describe patterns of Earth's | observations to map the flow of water in an | grounds or a nearby area to predict where | |
| features. | area. | water flow is slowed or increased by | MATH: MP.2; MP.4; MP.5; 4.MD.A |
| | | slope, objects or other landscape features. | |
| Is water shaping the | DCI: ESS2.B: Plate Tectonics and Large- | (CSF, p: 266) | - Students map and measure areas |
| landscape within our | Scale System Interactions | - Students use a map to trace the likely | of erosion on their school grounds |
| community? | Students can show how run-off from an | course of runoff from the school grounds | or community. |
| | area connects to water bodies within a | into a lake or river. (PWET 'Seeing | |
| | watershed. | Watersheds' activity) | |
| | | | |
| | CCC: Patterns | | |
| | Students can identify patterns in data and | | |
| | observations to explain how water flow | | |
| | shapes the land surface of an area. | | |
| 4-ESS2-2. Analyze and | SEP: Analyze and Interpret Data Students | 'Seeing Watersheds' (Project WET 2.0; p: | ELA: RI.4.1; RI.4.7; RI.4.9; W.4.7; |
| interpret data from maps to | can delineate their watershed on a map | | W.4.8 |
| describe patterns of Earth's | and snow connections between water flow | - Students use a map to identify their | |
| Teatures. | and their community and <i>'Rainy Day Hike'</i> | community and delineate their watershed. | MATH: MP.4; MP.4; MP.5; 4.MD.2 |
| | map area. | - Students use a map to trace the likely | |
| How does water flow in our | | course of runoff from their 'Rainy Day | |

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