



# UNIT FRAMEWORK

| NAME           | GRADE | SUBJECT |
|----------------|-------|---------|
| Matt McDermott | 4 - 5 | Geology |

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| <b>UNIT</b> | Sediment Mitigation on the Toutle River |
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| ESSENTIAL QUESTION(S)/OUTCOME(S)   |
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| <ul style="list-style-type: none"> <li>-How do you design a system for mitigating sediment on the Toutle River?</li> <li>-How did the 1980 eruption of Mt. St. Helens effect the Toutle River Valley?</li> </ul> |

| TARGETS  |
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| <ul style="list-style-type: none"> <li>-Students will work in partnerships to design a sediment mitigation engineering project for the Toutle River.</li> <li>-Students will effectively manage their budget for this project, efficiently 'purchasing' the materials needed to engineer their project.</li> <li>-Students will explain, in writing, how their project will work.</li> </ul> |

| STANDARDS / TOPICS / SKILLS  |   |
|--|---|
| <p><b>SCIENCE</b></p> <ul style="list-style-type: none"> <li>-Construct an argument with evidence, data, and/or a model. (4-LS1-1)</li> <li>-Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around. (4-ESS2-1)</li> </ul> | <p><b>TECHNOLOGY</b></p> <ul style="list-style-type: none"> <li>-Over time, people's needs and wants change, as do their demands for new and improved technologies. (4-ESS3-1)</li> </ul> |

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| <p><b>ENGINEERING</b><br/> -A variety of hazards result from natural processes (e.g., earthquakes, tsunamis, volcanic eruptions). Humans cannot eliminate the hazards but can take steps to reduce their impacts. (4-ESS3-2)</p> | <p><b>MATH</b><br/> Students need to work within a budget to secure materials and build their project</p> |
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| VOCABULARY   | MATERIALS / RESOURCES / TEXTS  |
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| <p>Sediment, mitigate, erosion, eruption, river valley, hummocks</p> | <p>-Engineering project from the Mt. St. Helens Institute<br/> -Foss science kit, grade 4, "Soil, rocks and landforms"</p> |

| ACTIVITIES  |
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| <ul style="list-style-type: none"> <li>-Students learn about <u>soil, rocks and landforms</u> through a series of studies in the FOSS 4th grade science kit of the same name.</li> <li>-Students build and observe a stream table model to help them better understand what happens to a river valley under both normal flow and flood-level flow conditions.</li> <li>-Students visit Mt. St. Helens and hike the Hummocks trail, along the Toutle River.</li> <li>-Students visit the Mt. St. Helens, Johnston Ridge Observatory to hear from rangers about the 1980 blast and how it affected the Toutle River Valley.</li> <li>-Students read about the 1980 blast and the effects on the Toutle River Valley.</li> <li>-Students work in partnerships to design a sediment mitigation project for the Toutle River Valley.</li> <li>-Students receive feedback on their design from peers and have a chance to revise their design.</li> </ul> |

**COMMUNITY PARTNERS (industries, businesses, agencies, colleges, universities)**

Alan Lester, Dept. of Geology, University of Colorado, Boulder  
Rangers of the Mt. St. Helens National Monument



# STEM ATTRIBUTES

| STEM ATTRIBUTES  | EVIDENCE / EXAMPLES   |
|--|---|
| Integrates Science, Technology, Engineering, and Math.   | Sediment Mitigation Design Project  |
| Develops communication and literacy skills.  | Students explained in writing how their design would work   |
| Provides authentic, real-world experiences through contextual learning (may include active citizenship). | Students designed a solution to a real problem after visiting the problem area to better understand the issue |

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| Forms partnerships with business, industry, agencies, and nonprofits (may occur outside the school).   | Gathering information from professor of geology as well as rangers at Mt. St. Helens. Working with Mt. St. Helens Institute to find an engineering project.   |
| Provides career awareness through postsecondary and career relevant connections.   | Talking with professor of geology   |
| Fosters problem-solving, critical thinking, and argumentation skills through inquiry and design.   | Sediment mitigation project   |
| Includes effective instructional strategies that develop collaboration and teamwork.   | Sediment mitigation project was well explained and scaffolded, including a slideshow that explained the problem and potential solutions in great detail. All students were able to effectively work in partnerships to design a sediment mitigation project.  |
| Uses equitable instructional practices that are inclusive to all students regardless of gender, disability, ethnicity, race, language, socioeconomic status, gender identity and sexual orientation. | Sediment mitigation project was well explained and scaffolded, including a slideshow that explained the problem and potential solutions in great detail. All students were able to effectively work in partnerships to design a sediment mitigation project. I did not notice any barriers to accessing this unit and project for any students. |
| Uses standards-based performance/proficiency assessments.  | Assessments from the FOSS units that are based on standards.  |