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| **Lesson Title : Minimizing Erosion** | **Unit #:**  **1** | **Lesson #:**  **2** | **Activity #:**  **3** |
| **Activity Title: Erosion methods and problems** |

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| **Estimated Lesson Duration:** | **5-6 days (50-minute periods)** |
| **Estimated Activity Duration:** | **1 day (50-minutes periods)** |

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| **Setting:** | **Classroom** |

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| **Activity Objectives:** |

1. Students will be able to describe several methods by which erosion takes place.
2. Students will be able to recall and describe various problems that are caused by various forms of erosion.

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| **Activity Guiding Questions:** |

1. Which forces are involved in erosion?
2. Which substances are displaced during erosion?
3. What problems are created when these substances are removed from their original sites?
4. What problems are created when these substances are deposited at their new sites?

| **Next Generation Science Standards (NGSS)** | |
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| **Science and Engineering Practices (Check all that apply)** | **Crosscutting Concepts (Check all that apply)** |
| ☐ Asking questions (for science) and defining problems (for engineering) | ☒ Patterns |
| ☐ Developing and using models | ☒ Cause and effect |
| ☐ Planning and carrying out investigations | ☐ Scale, proportion, and quantity |
| ☐ Analyzing and interpreting data | ☐ Systems and system models |
| ☐ Using mathematics and computational thinking | ☒ Energy and matter: Flows, cycles, and conservation |
| ☐ Constructing explanations (for science) and designing solutions (for engineering) | ☐ Structure and function. |
| ☐ Engaging in argument from evidence | ☒ Stability and change. |
| ☒ Obtaining, evaluating, and communicating information |  |

| **Ohio’s Learning Standards for Science (OLS)** |
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| **Expectations for Learning - Cognitive Demands (Check all that apply)** |
| ☐ Designing Technological/Engineering Solutions Using Science concepts **(T)** |
| ☒ Demonstrating Science Knowledge **(D)** |
| ☒ Interpreting and Communicating Science Concepts **(C)** |
| ☒ Recalling Accurate Science **(R)** |

| **Ohio’s Learning Standards for Math (OLS) and/or**  **Common Core State Standards -- Mathematics (CCSS)** | |
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| **Standards for Mathematical Practice (Check all that apply)** | |
| ☐ Make sense of problems and persevere in solving them | ☐ Useappropriate tools strategically |
| ☐ Reason abstractly and quantitatively | ☐ Attendto precision |
| ☐ Construct viable arguments and critique the reasoning of others | ☐ Look for and make use of structure |
| ☐ Model with mathematics | ☐ Look for and express regularity in repeated reasoning |

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| **Unit Academic Standards (NGSS, OLS and/or CCSS):** |

**OLS: ESS:** A combination of constructive and destructive geologic processes formed Earth’s

surface.

**PS:** Forces have magnitude and direction.

**NGSS**: - Demonstrating science knowledge

- Interpreting and communicating science concepts

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| **Materials**: (Link Handouts, Power Points, Resources, Websites, Supplies) |

1. PowerPoint presentation with notes and images of erosion
2. Textbook pages related to erosion methods and problems

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| **Teacher Advance Preparation:** |

1. Run the PowerPoint slides to check that all function well and contain no errors.
2. Locate textbook pages related to the topic and generate questions to use in discussion.

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| **Activity Procedures:** |

1. Show PowerPoint slides to the class; students should be taking notes or otherwise be attaining this information, according to their best learning style. These PowerPoint slides will present new vocabulary terms related to weathering and erosion and will provide examples with pictures. They will also provide a chance for discussion of any misconceptions at this point (my students often confuse the topics of weathering, erosion, and deposition).
2. Textbook pages with erosion information will be assigned as independent reading assignment, coupled with a worksheet to be filled out (homework assignment) to be discussed and/or collected the following day.

**Formative Assessments:** Link the items in the Activities that will be used as formative assessments.

1. On the following day, the homework can be collected for a daily grade or checked for completion and discussed in class.

**Summative Assessments:** These are optional; there may be summative assessments at the end of a set of Activities or only at the end of the entire Unit.

None at this point in the unit.

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| **Differentiation:** |

All of the assignments in this activity can be modified in length and/or complexity according to individual student requirements. In some cases, the assignments might be read aloud, completed in a pullout small group, or allowed extended time for completion.

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| **Reflection:**  Since this lesson mainly involved direct instruction methods for the slide presentation, that portion of the lesson was fairly straightforward. I forgot to add pictures to my slides to illustrate some of the types of weathering and erosion that were discussed; pictures would have been very helpful here, and I plan to fix that problem for next time.  The worksheet that students worked on involved more information about mass movement, water erosion, and deposition. Since it follows the layout of the textbooks that my school purchased, the actual worksheet may be of minimal use to teachers at other schools. I used this activity in my classes because I wanted students to have that information for the instructional unit that I teach about Earth’s changing surface, but it probably could have been left out of this project. In retrospect, the information contained in the worksheet would probably have been better attained by my students if they had completed the worksheet after this project. |