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| **Grade/Course:**  **4th Grade** | **Unit/Lesson Title: *Earth’s Story in Sand and Stone*** |
| **Phenomena:**  **Sand/sandstone; rock formation images; Grand Canyon video/images;** | **Performance Expectations:**  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-ESS1-1. Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.  4-ESS2-2. Analyze and interpret data from maps to describe patterns of Earth’s features.    **4-ESS2-2. Analyze and interpret data from maps to describe patterns of Earth’s features.** |
| **NGSS Practices:**   * Asking questions and defining problems * Developing and using models * Planning and carrying out investigations * Analyzing and interpreting data * Constructing explanations * Engaging in argument from evidence |
| **Disciplinary Core Ideas:**  [**ESS1.C: The History of Planet Earth**](http://www.nap.edu/openbook.php?record_id=13165&page=177)   * [Local, regional, and global patterns of rock formations reveal changes over time due to earth forces, such as earthquakes. The presence and location of certain fossil types indicate the order in which rock layers were formed.](http://www.nap.edu/openbook.php?record_id=13165&page=177)   [**ESS2.A: Earth Materials and Systems**](http://www.nap.edu/openbook.php?record_id=13165&page=179)   * [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.](http://www.nap.edu/openbook.php?record_id=13165&page=179) |
| **DCI Progression:** |
| **Cross-Cutting Concepts:**   * Patterns * Cause and effect: mechanism and explanation | **Lesson Overview:**   * 1. Where does sand come from? Students create a diagram and written explanation while physically exploring sand and sandstone.   2. How do rock structures form? Students view a slideshow of interesting rock formations, then work from still images to create an initial model, or explanation of how they think that structure formed. Students record their questions about these various phenomena as they work.   3. As a class, questions related to the formation of these structures are shared and recorded, as the teacher looks for patterns and differences in questions and offers summaries of what seems to be the class thinking. To compare their thinking to an even larger phenomenon, students next view a video and then slides of the Grand Canyon, and are challenged to think about how the canyon formed, what order things happened in and how long they think it might have taken.   4. Students experiment with stream tables, investigating a series of questions beginning with how a river can be formed, etc. Students then use their collected evidence to show a model for how the canyon may have formed, and why they think that. |