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| **Grades 1-3**  **Sand Sculptures** | | | |
| **Curricular Connection** | **SCIENCE**  **Standard 1: Processes of Science**  D. Technology  1. Design and make things with simple tools and a variety of materials.  **Standard 2: Earth Science**  **1.** Describe and compare properties of a variety of Earth materials.  a. Classify a collection of rocks based on the properties that distinguish one type from another.  b. Collect soil from different locations and compare the properties of the samples.   * + Color   + Texture   + Reaction to water   + Remains of living things   c. Use examples of observations from places around the school and neighborhood to describe ways Earth materials can change.   * + Changes caused by humans and other animals   + Changes caused by water, wind, etc.   **MATH**  **Standard 3: Measurement**  B. Measurement Tools  **1.** Measure in customary units  a. Measure length of objects and pictures of objects to the nearest inch using a ruler  **Standard 2: Geometry**  B. Solid Geometric Figures  **1.** Recognize and use the attributes of solid geometric figures  a. Identify and compare cubes, spheres, cylinders, pyramids, cones, and rectangular prisms | | |
| **Background** | In grades 1 and 3 students investigate with Earth materials during the Earth/Space Science unit. In grade 1 they investigate with sand as an Earth material using the FOSS kit Pebbles, Sand, and Silt. In grade 3 they study the properties of Earth materials such as rocks and minerals. In grade 2 the students do not investigate with Earth materials but they do investigate with balance using the FOSS kit Balance and Motion. Grade 2 students can draw connections between what they learned about sand and apply it to what they learned about balance. Grade 3 students can draw connections between what they learned about Earth materials and balance. Grade 1 students have not been exposed to ideas about balance. | | |
| **Materials/**  **Resources** | **Teacher Materials** | | **Student Materials** |
| * Cornstarch Matrix (premade and stored in plastic container) * Sand (approximately 7 pounds) * Glue * Paper plates * 1 cup of sand per pair of students * Metal spoon * Newspaper (or some other material to cover and protect desks) * Chart paper and markers * Rubric for building (chart paper) * Camera (to record sculptures) * Power Point Program * Super Sand Castle Saturday (Mathstart Level 2 (Steck-Vaughn) * Pictures of sand sculptures | | * Notebook * Ruler * Pencil * 1 cup of sand per pair * Paper plate * Scoop of cornstarch matrix * Magnifying glass/hand lenses * Computers for students to complete Power Point |
| **Safety** | * Discuss the importance of keeping away from your eyes. For example, don’t blow the sand, or rub your eyes while handling the sand. | | |
| **Focus Question(s)** | How sand can be used as building material? | | |
| **Vocabulary** | engineer | | |
| stability (stable) | | |
| base | | |
| height | | |
| dimensions | | |
| forms- cylinder, square, pyramid | | |
| sand | | |
| Earth materials | | |
| sculpture | | |
| properties | | |
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| **5 E Model** | **Time Frame** | **Activity** | |
| **Engage** | 10 -15 minutes | Begin by displaying various pictures of sand castles/sculptures. Ask if they have ever built a sand castle or sculpture before. Allow students to turn and talk about their experiences. Then read Super Sand Castle Saturday (Mathstart Level 2 (Steck-Vaughn). Tell the students that today they will be using sand as a building material. Present the focus question. Explain that they will need to design a sculpture, build it, measure its dimensions, and then create a power point slide to describe the stability of the building. | |
| **Explore** | 10 minutes | Tell students before we begin building we need to take a closer look at the sand. As we explore the sand, we will list words in our science notebook that describe the properties of sand. Hand out the sand, plates, hand lenses, and cover desks in newspaper. Allow students an adequate time to explore and record properties. After students have spent some time exploring, call together to share properties. Record on chart paper. | |
| **Explain** | 5 minutes | After recording the properties, restate the focus question: How can sand be used as a building material?  Allow students to make suggestions. If it is not suggested, you will want to introduce the idea of adding a sticky compound. At this time you will present the cornstarch matrix.  Tell students that they use what they know about the properties of sand to help them to create a sand sculpture. | |
| **Explore** | 30-45 minutes | Students will then build their sand sculpture. After building the sculpture, students will measure the dimensions. Then a picture will be taken to be used in the power point slide. Students will then work as partners to describe the dimensions and forms used in the sculpture. The students will also address the focus question in their power point slide. | |
| **Extend** | 10 minutes | After the sculptures have dried, a fan and water could be used to demonstrate the effects of wind and rain on buildings. This would allow students to visually assess the effects of erosion on sand sculptures.  Students could research building/sculptures that have been created using sand. Ancient Egypt used sand as key building resource. | |
| **Evaluate** | 20 minutes | The power point slides will be presented to the class and also evaluated for the following items:   * Height and width included * At least two forms(shapes) included * Answer to focus question addressing whether sand is good or poor building material. | |

Cornstarch Matrix Recipe:

Here are some suggestions from Leigh Agler, FOSS Developer, on making the perfect cornstarch matrix.  
  
I’ve always cooked the matrix on medium heat with great success. [Older editions of the national edition of the teacher guide may still say "low" heat.] Here's what I do, and it shouldn't take more than 5–10 minutes.

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| * Mix equal parts cornstarch and water (about 3.5 cups water per box). * Stir like crazy until it is smooth and very liquidy. * Heat on MEDIUM heat, stirring CONSTANTLY. * About 5 minutes into it, the spoon will glob up with cooked mixture and the bottom of the pot will begin to glob up. * Scrape the spoon and mush the thick mixture from the spoon on the side of the pot. * Continue stirring until about 1/2 of the pot is like thick mashed potatoes. * Remove the pot from the heat and stir like crazy (by this time your arm is coming off, so requisition a friend) until the entire pot of mixture is smooth. * Pour and scrape into a plastic storage container and cool. The next day, it will be like Crisco. That's OK. |

