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Demo: Structures

Pre-Visit Activities
Grades K-2



Revised 11/07

Standards of Learning

The following Standards of Learning are addressed in the Structures Program:

Science 2.1- The student will conduct investigations in which (a) observation is differentiated from personal interpretations, and conclusions are drawn based on observations; (b) observations are repeated to ensure accuracy; (c) two or more attributes are used to classify items; (h) simple physical models are constructed.

Social Studies 2.1- The student will explain how the contributions of ancient China and Egypt have influenced the present world in terms of architecture, inventions, the calendar, and written language.

Social Studies 2.3- The student will identify and compare changes in community life over time in terms of buildings, jobs, transportation, and population.

Activities

These activities are intended for use before your visit to the Virginia Air and Space Center. It is beneficial for the students to have some prior knowledge about the content area covered in the program. All of the activities can be tailored to your specific classroom needs, and procedures listed are suggestions for teaching.

Activity 1: Un-Puzzle Geometry in Architecture

Materials: Pictures of various assortments of ancient and modern structures such as: pyramids, Eiffel tower, Colosseum (Coliseum) in Rome, the Great Wall of China, the St. Louis Arch, etc. You will also need to check the website below for other materials needed.

For this activity you will first need to go to the website listed and follow the instructions for the activity: http://www.creativekidsathome.com/activities/activity_3.html. If you don't have meat trays available use card stock or poster board.

Once your students have had a chance to construct using the shapes, ask them to identify the shapes. You may also want to add additional shapes like: rectangle, cone, hexagon, oval, sphere, and pyramid. Discuss with your students what defines these shapes. How are they different? How are they alike? Then ask them to think of different structures that are made up of those different shapes. Using the pictures you have available, hold them up and ask your students to identify the geometrical shapes in the structural make up of each one. Were the pyramids made by one huge prism standing up? No, pyramids were built one square block at a time. Elaborate this idea by identifying a different structure for each of the shapes you are using. How do these shapes help in the structure of the building? When architects were designing these structures, how important were the shapes they used?

Extension: Depending on how far along your students are in their math lessons, you can tie this activity in with area and perimeter. Have your students trace the different shapes onto graphing paper. Then have them find and calculate the area and perimeter of each shape used.

Activity 2: How Many Dimensions

Materials: For this activity each student will need paper, a pencil, and a ruler. You may also want to have some colored wooden blocks and shapes handy as well.

To begin this activity you will need to go to the American Museum of Natural History's website listed below and conduct the Understanding Dimensions activity with your students. http://ology.amnh.org/einstein/stufftodo/threed_dimension.html

Once your students have a better understanding of the different dimensions, have them see how many shapes around your classroom they can identify by dimension. Ask them first to identify one dimensional shapes. Then move on to two dimensional shapes and so on. Discuss with them the importance of identifying dimensions when it comes to architecture. Would an architect want to build a one dimensional structure? Why are three dimensional shapes important?

Extension: You can also do a variation of this activity outside on the playground. First, have your students see how many geometrical shapes they can identify on the playground equipment. Then have them see how many geometrical dimensions they can identify on the equipment.

Activity 3: Mapping out Structures in Geography

Materials: For this activity you will need a large world map or globe, drawing paper, markers, crayons, and pencils.

For this activity you may want to refer to the pictures used in the first activity as reference for the students. Ask your students “Where were the pyramids built?” They were built in Egypt. Where is Egypt? Show the class where Egypt is located on the world map. Go through all the pictures and see if you and your students can identify all the geographical locations of the structures. The Eiffel tower in France, the Roman Colosseum (Coliseum), and so on. Before the architects built these structures do you think they took the geographical location into consideration? Do you think they took the culture or religion of the people into consideration? Discuss these aspects with your students. Just like locating these structures on a map, architects had to map out their designs for each structure on paper. Today we call those blue prints. A blue print is a layout of the structure and its dimensions on paper. Architects design blue prints in order to get their thoughts out as well as give builders instructions and plans for the construction. Explain to your class that they are going to become architects. Have them create their very own blue prints for their dream house. Have them use regular drawing paper, or graphing paper if you want them to draw to scale. Once they have completed their blueprints, have each student share their design with the rest of the class.

Extension: Depending on the time available, have the students build their design ideas. Have them construct their “idea” into a three dimensional structure.

RESOURCES

Websites

<http://www.archkitecture.org/>

<http://www.hsv.k12.al.us/schools/art/dixon/architecture.htm#Pyramids>

<http://www.kidsgeo.com/geography-games/>

This website has a variety of geography lesson that you can incorporate in your classroom: <http://www.enchantedlearning.com/geography/>

http://ology.amnh.org/einstein/stufftodo/threed_dimension.html

Books

Architecture Shapes. Micheal J. Crosbie, Steve Rosenthal. 1993.

Bridges: Amazing Structures to Design, Build, and Test. Carol A. Johmann, Elizabeth Rieth. 1999.

Building. Andrew Haslam. 1997.

Skyscrpaers! : Super Structures to Design and Build. Carol A. Johmann. 2001.

Structures: Or Why Things Don't Fall Down. J. E. Gordon. 2003.

Why Buildings Stand Up: The Strength of Architecture. Mario G. Salvadori. 2002.

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