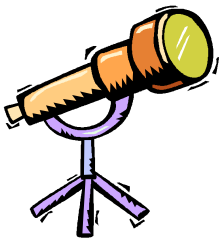

SCAFFOLDING TASK: Explorations of Shapes

Approximately 2-3 days (Adapted from Ohio DOE)

STANDARDS FOR MATHEMATICAL CONTENT

MCC.K.G.1. Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as *above*, *below*, *beside*, *in front of*, *behind*, and *next to*.

MCC.K.G.2. Correctly name shapes regardless of their orientations or overall size.

MCC.K.G.3. Identify shapes as two-dimensional (lying in a plane, "flat") or three-dimensional ("solid").

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

"Children need experiences with a rich variety of both two- and three-dimensional shapes. It is useful for students to be able to identify common shapes, notice likenesses and differences among shapes, become aware of the properties that different shapes have, and eventually use these properties to further define and understand their geometric world. As students find out more about shapes over time, they can begin to appreciate how definitions of special shapes come to be" (Van de Walle, p193).

ESSENTIAL QUESTIONS

- How can we describe the location of a shape?
- How can we describe shapes in our everyday life?
- What makes shapes different from each other?
- How can you describe triangles?
- How are quadrilaterals and triangles different?
- How can shapes be sorted?

MATERIALS

- small collection of two-dimensional shapes or attribute blocks
- paper shapes made of different color construction paper (pre-cut)
- chart paper
- Student Needs: manila drawing paper
- Markers
- glue
- different color paper shapes
- collection of stickers

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

Part I

Show students a small collection of two-dimensional shapes. It might be best to start with three rectangles, three triangles and three squares. The figures will need to be of varying sizes and color. Attribute blocks may be used if supplemented with different types of triangles (scalene, right, isosceles, obtuse, and acute).

Begin by asking students to identify each figure. Discuss characteristics of each shape. Record the characteristics on chart paper. Sometimes students may think that all shapes have sides, including circles. In the results from the field test of this task, one student tried to convince his/her teacher that the "sides of a circle could be counted the same way that you count the sides of a triangle or square." Further questioning of the student found that he/she was talking about the inside and outside of the circle. Students at this age often make associations with what they think a word means.

Next, ask students to look at a collection of shapes and sort figures into groups, explaining how the shapes in each group are alike. Possibilities include all the same shape, all the same size (different triangles, different rectangles, as well as different orientations), and all the same color. Ask students to discuss and explain differences among shapes and create collections of shapes that are all different in one way (size, color, or shape).

Ask students to look around the classroom to identify objects that have the same shape as a rectangle, square, circle, oval, triangle, etc. Stress that the surface of the desk is a rectangle, the surface of the door is a rectangle; the surface of the clock is a circle, etc. Misconceptions continue into adulthood that a ball is a circle and a block is a rectangle.

Show students several examples of the same shapes, such as different types of triangles (scalene, right, equilateral, isosceles, obtuse, and acute) in different orientations. Often, shapes are repeatedly presented to students in the same way. Students need to have experience looking and manipulating the same shape in different orientations.

PART II
Provide the students with the work mats *Shape Mats,* an assortment of stickers and the shapes discussed in class made of different colors of construction paper. Pre-cut the shapes before distributing them to the students.

Instruct the students to sort the shapes. Do not tell them how to sort the shapes.

Facilitate a discussion about the way the students sorted their shapes (color, size, shape).

Instruct the students to put squares above the line on the work mat and the triangles below the line on the same work mat. Give them time to glue the shapes on the paper. Observe where the students are placing the shapes.

Instruct the students to place a star above one of the triangles. Students sometimes confuse "above" and "below" with "up" and "down." If some students are challenged by these words, select other students to demonstrate the placement of the stickers and give an explanation. For example, some students may hold the sticker over the paper for above or under the table for below. Modeling the placement may help the students.

Ask the students where they placed the star. Give other directions for placing stickers on this mat, based on the type of stickers you have available. Ask the students about the placement. Repeat the activity with another work mat. One teacher used the following directions for the placement of the stickers.

- Put the frog above the circle.
- Put the apple below the circle.
- Put the fish on top of the circle.
- Put the smiley face beside the circle.
- Put the dinosaur inside the circle.
- Put the star outside the circle.
- Put the shark under the circle.

Observing the placement of the stickers should be done as the students are working. Questions should be asked pertaining to the placement of the stickers such as "Does 'under' the circle mean the same as 'below' the circle?" For example, some students may pick up the paper and place the sticker on the desk or place the sticker at the bottom of the paper.

FORMATIVE ASSESSMENT QUESTIONS

- Where do you see shapes in everyday life?
- Can you show me the difference between a side and a corner?
- Can you tell me the difference between a side and a corner?
- Are all triangles the same?

- Are all four sided shapes the same?

DIFFERENTIATION

Extensions

- These are ideas for all students to continue learning on this topic - in the classroom or outside of the classroom. Have a scavenger hunt for shapes that can be found in the classroom, school and community environment. Ask students to bring in objects or pictures for a featured "shape of the day or week." Ask parents to help their children identify shapes in their environment and label them. You could modify this activity for use with 3D Shapes.

Interventions

- Instruction is differentiated according to the learner needs, to help all learners either meet the intent of the specified indicator(s) or, if the indicator is already met, to advance beyond the specified indicator(s). Some children may have difficulty distinguishing shapes. Model how to trace the perimeter of shapes and encourage the children before they try to identify or describe the shape. Have the students trace the objects in shaving cream, salt, sugar, on sandpaper, or in pudding.
- Introduce two shapes at a time as follows: This is a _____ and this is a _____; show me a _____ and show me a _____; tell me what this is _____ and what this is _____