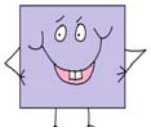
CONSTRUCTING TASK: Partitioning All Around My Shapes

Approximately 1 day



STANDARDS FOR MATHEMATICAL CONTENT

MCC1.G.1 Distinguish between defining attributes (e.g., triangles are **closed** and **three-sided**) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.

MCC1.G.2 Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape.

MCC1.MD.4. Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.

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

Students should understand how to construct plane shapes. Students should be familiar with composing and decomposing shapes.

ESSENTIAL QUESTIONS

- How can a shape be described?
- How do shapes fit together and come apart?
- What makes shapes different from each other?

MATERIALS

- Large construction paper square for demonstration
- *Shapes, Shapes, Shapes* by Tanya Hoban, or a similar book about shapes
- construction paper
- scissors
- glue
- Student shape page

GROUPING

Large Group, Partners

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

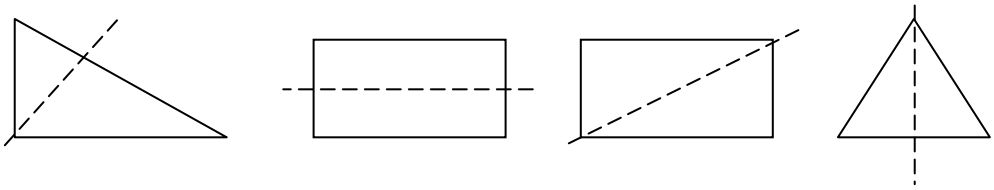
Part I
Read *Shapes, Shapes, Shapes* by Tanya Hoban (or another book about shapes). Review shapes by having the students find shapes in the classroom. Tell students, "Today, we want to see how many different shapes we can create using a square." Display a large square to the students and ask, "What will happen if I cut this shape straight down the middle? What shapes will be created?" During the conversation, student responses may be "Another square, two squares, or a rectangle and a square." After the teacher makes the cut and the students discuss the result, present the conversation about squares and rectangles.

Good questions to ask: "Why do we call these two shapes rectangles, not squares? How do you know a shape is a rectangle, but not a square? How are rectangles and squares alike? Are all rectangles squares? DO NOT ASK WHAT MAKES A SQUARE DIFFERENT FROM A RECTANGLE BECAUSE ALL SQUARES ARE RECTANGLES, BUT NOT ALL RECTANGLES ARE SQUARES. Instead, ask something like this: What makes a square special? A square is a rectangle, but what makes it a square? Ask students, "What characteristics does a rectangle have? To be a rectangle, what characteristics do I have to have? Are those the same characteristics needed to be a square?"

You are leading the students to an understanding that all squares are rectangles, but not all rectangles are squares. Discussion should continue with idea that squares are special kinds of rectangles. Horizontal, vertical and diagonal vocabulary could be used. Emphasize the lines that students cut have to be ***straight*** **horizontal, vertical, or diagonal and then demonstrate these to the students.** Example cuts should include ones that are **not** just straight through the middle; instead the teacher should snip off one corner demonstrating a small cut. This will show students their cuts can be of various lengths. Take turns having one student demonstrate a cut and then other students model the same cut.

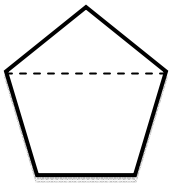
As one piece is cut off, teacher will lead students in a discussion of vocabulary terms of possible shapes such as: trapezoids, triangle, rectangles, and quadrilaterals. Be sure to save pieces that are snipped off in the individual zippered plastic bags for students, so that they can use them later in a center to compose and decompose shapes. As students create various shapes, they can label for future investigations.

Examples of cuts that can be made:



Part II
Give each student a set of shapes (attached.) Tell them to cut out each shape and see what shapes can be made by making one cut. Have the students glue their pieces down puzzle style. Have each student share how they cut one of their shapes and identify the new shapes they made.

Ex. Triangle and trapezoid



FORMATIVE ASSESSMENT QUESTIONS

- How many sides are in a triangle, rectangle, pentagon, etc.? Can you show me?
- How are these shapes different from one another?
- How are the shapes alike?
- How do shapes fit together and come apart?

DIFFERENTIATION

Extension
- Ask students, "What kind of shapes would be created by making two cuts?" Allow students to explore with combining three shapes to create a new shape.

Intervention
- Allow students who may be having a difficult time describing or making the shapes extra time with pattern blocks as a model. Students could also use tangram pieces if they are having difficulty with the cuts.