

Math 6 - Act. 10: Pattern Block Polygons

Summary

This activity will help students understand that most shapes are made up of other shapes.

Materials

- pattern blocks
- overhead pattern blocks
- recording handout
- paper
- pattern block stamps
- ink stamp pads (yellow, orange, red, blue, green, purple) or
- pattern block cutouts or
- pattern block stickers
- glue sticks
- colored markers
- pencil

Background for Teachers

This activity provides students with the opportunity to construct geometric shapes in a small group, exploratory setting. Students use pattern blocks to create two different 3-sided, 4-sided, 5-sided, 6-sided, 7-sided, 8-sided, 9-sided, and 10-sided polygons. Each polygon construction should be made up of at least two pattern blocks pieces (although the pattern blocks do not need to be different). In addition, sides of the pattern blocks should match up (as will be demonstrated in the session). Students record their constructions, utilizing a choice of methods that will be introduced (cutouts, stamping, tracing).

This particular activity allows students to realize that shapes are made up of other shapes. Once the constructions are complete, the activity serves as a knowledge base that the students will refer to in later activities to learn about the following concepts: convex polygon, concave polygon, symmetry, interior angles of a polygon, sum of the interior angles of a polygon, number of vertices (sides, angles) of specific polygons.

Intended Learning Outcomes

- 2. Become mathematical problem solvers.
- 6. Represent mathematical situations.

Instructional Procedures

Invitation to Learn

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Prepare a set of words with the same prefix as several of the polygons the students will construct, (e.g., trio, and triplets for triangle, octave, octopus, and octet for octagon, etc.) Prepare sets for at least: triangle, quadrilateral, pentagon, hexagon, octagon, and decagon. Divide the class into 6 groups. Have them use a dictionary to look up each word and write down a brief definition. Then have them observe what all of the words in their list have in common. Have groups share findings to reinforce the names of the polygons.

Instructional Procedures:

- Present the invitation to learn activity and have groups share their findings.

- Describe the goal of the task--to construct two different polygons out of pattern blocks for each

of the types of polygons, from triangles through decagons, according to the following two conditions: 1) pattern block sides must match up, and 2) at least two pattern blocks must be used for the construction. Constructions should be recorded.

Model how to record the constructions. One of the following methods may be suggested: tracing, pattern block stamps, or pattern block cutouts. Remind students to label the type of polygons they construct and to limit the number of sets of polygons they put on a page (room will be needed to record new information later).

Have students work in small groups/learning centers to construct the polygons and record their findings.

Closing: Have students volunteer to share one of their constructions by building it on the overhead with overhead pattern block manipulatives. Have students in the class identify the type of polygon it is.

Curriculum Integration

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Math / Real World / Art -- Connection to art through viewing pieces of art and observing a variety of geometric concepts (e.g., parallel lines, similar shapes, symmetry). The shape building can also be compared to puzzles and tilings.

Extensions

Once the polygons have been constructed, they serve as a rich knowledge base from which the students can explore other geometry concepts. For example, after the teacher introduces the concepts of convex polygons and concave polygons, students can go back and label each of the polygons they constructed as either convex or concave. Similarly, the students can use a mirror to test for line symmetry. If they find symmetry, they can draw dashed lines to indicate where the line of symmetry is.

Ask students about the strategies that they discovered when they constructed the polygons. For example, some students might come up with a strategy for certain polygons to get one more side by putting a triangle where there was a straight side before.

Homework & Family Connections:

Students can repeat or continue the activity at home with help from family members. They might be challenged to construct shapes using the fewest possible number of pattern block pieces.

Assessment Plan

Observation and questioning are good informal strategies for this activity. The teacher can observe and ask individual questions while the students are working in their groups, as well as when the students share their findings at the end of the lesson. The completed record of the polygon constructions is a good formal assessment.

A possible journaling prompt is "In your journals, write about the experience you had building the shapes. Include thoughts about which ones were more difficult for you (e.g., ones with an odd number of sides or an even number of sides) and any strategies you used."

Authors

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