

Scaffolding Task: Super Hero Symmetry

STANDARDS FOR MATHEMATICAL CONTENT

MCC.4.G.3 Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.

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

Pattern blocks are used to introduce and show symmetry in this lesson. Many of the pattern blocks, such as the blue rhombus and yellow hexagon, can be divided down the middle into two congruent pieces that show symmetry. For instance, when two green triangles are placed on top of a blue rhombus, the line between the two triangles is the line of symmetry. As students trace the pattern blocks for their masks, it may be helpful to have them trace them on isometric dot paper to keep it neat.

ESSENTIAL QUESTIONS

- What is symmetry?
- How are symmetrical figures created?

MATERIALS

- Pattern blocks
- Paper
- Pencils
- Copies of “Isometric Dot Paper”

GROUPING

Partner/Small Group Task

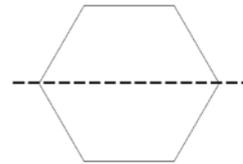
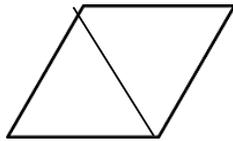
TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

The purpose of this task is for students to begin exploring congruency and symmetry by recognizing points where a shape has been reflected over a line of symmetry.

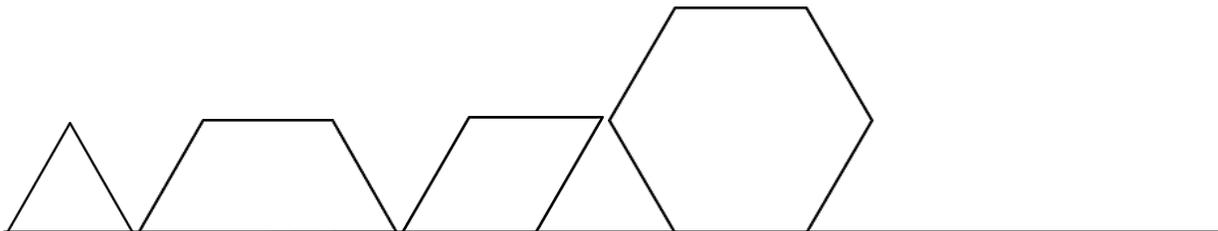
Task Directions

PART I

- Introduce the problem scenario below as a context for this task.
Seth wants to make the mask of his favorite super hero to wear to his super hero birthday party. He tore the mask he wore to last year's party and only has half of it. He's hoping to use that half as a pattern for making his new mask. Use what you know about symmetry to help Seth create a new mask using the half he has from last year.
- Discuss with students what symmetry is by modeling with pattern block.
- Have each student trace a blue rhombus on their paper and decide what two pattern block can be placed inside of it so that there are two, congruent parts. Have them draw in the triangles and the lines that divide them. Explain that this shows a line of symmetry in the blue rhombus because it would be folded over that line and the two triangles would overlap exactly. Repeat using the hexagon and trapezoid pieces.



- Tell students that they can create a group of shapes with symmetry, too. Have students fold a sheet of paper in half and draw the line down the middle. They should place pattern blocks along one side of the line and trace them. Then, a partner should match up the shapes that belong on the other side of the line of symmetry.



- Have students fold along the line of symmetry to make sure the lines from the partner match up with the lines of the original pattern
- After looking at, examining, and explaining how they know their patterns are symmetrical, use the following guiding questions to facilitate discussion:
 - How did you know what you filled in on your partner's paper would make a symmetrical image?
 - What is a mirror image?
 - What mistakes (if any) did you make as you completed the patterns?
- Revisit the original problem about Seth's mask. Have students create their own masks by folding paper along the center and placing pattern blocks along the fold. Have them trace their design and then unfold the paper. Have students use pattern blocks to complete the other

half of the mask. Student should cut out their masks and be prepared to explain how they know their masks are symmetrical.

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FORMATIVE ASSESSMENT QUESTIONS

- How do you know that your mask has symmetry?
- How can you test your mask for symmetry?
- How did you use symmetry to create the mask when you only knew what half of it looked like?
- Were students able to create symmetrical image by matching pattern blocks over a line of symmetry?
- Could students explain what symmetry is and how to prove something is symmetrical?

DIFFERENTIATION

Extension

- Have students fold their paper into four squares and create a mask that is symmetrical across both folds in the paper.

Intervention

- As students trace a pattern block on one side of the line of symmetry, have them immediately flip the block over the line of symmetry and trace it right then. This will help them see the mirror image immediately.

Isometric Dot Paper

