

Ways to Fill a Hexagon

After working with pattern blocks for a few days, this class has a discussion about ways to fill or cover the different pattern-block shapes. They have talked about how to cover the rhombus and the trapezoid, and they then begin to talk about the hexagon. The teacher models the names of geometric shapes as students share their solutions for covering the hexagon.

Teacher: You have all had a chance to play the game *Fill the Hexagon*. I noticed as you played this game that you found many different ways to put blocks together to fill a hexagon. What are some ways that you filled a hexagon?

Tamika: You can take the blue thing and stick it on one of the sides and if you put a triangle and another blue and another triangle it can all fit.

Teacher: What's this blue thing called?

Tamika: Rhombus.

Jacob: Me and Deshawn did it that same way.

Jacinta: I did it a different way than Tamika.

Teacher: What did you do? Tell me with words and I will do the actions.

Jacinta: Put a trapezoid on one side.

Teacher: And when I do that what shape is left?

Jacinta: Trapezoid. Or put a triangle on one of those sides. And then put a hexagon, I mean, the rhombus.

Teacher: Can you tell me about that, Jacinta? What can you use to cover a hexagon?

Jacinta: You can use three blues. If you put three blue rhombuses on there it will make a hexagon.

Teacher: So you're telling me that you can use two trapezoids; one trapezoid, one rhombus, and one triangle; and three rhombuses to fill one hexagon.

Bruce: Me and Diego did all blues.

Teacher: So one hexagon is the same as three rhombuses. And how many of these trapezoids are one hexagon?

Chris: Two.

Isabel: You can use triangles too.

Teacher: Does anyone know how many triangles it takes to fill a hexagon?

Seth: More than the rhombuses.

Teacher: Why is that?

Seth: Because they're smaller.

Teacher: Let's count together.

The teacher fills a hexagon with triangles and they count the six triangles together.

Teacher: You have talked about a few different ways to fill a hexagon. What shape would you use if you wanted to fill the hexagon with the most blocks?

Jacob: Trapezoid?

Teacher: Would using a trapezoid let us fill in the hexagon with the most blocks?

Jacob: It's the biggest one.

Teacher: What if we wanted to use many, many blocks to fill in the hexagon? What if we wanted to use the most?

Emilia: (starts putting triangles on top of a hexagon) This is the longest.

Teacher: What do you mean the longest?

Emilia: You need lots of them. Remember that we figured out six? And you only need two of those trapezoids.

Allie: The red one, that's the littlest because it's so big.

Teacher: It's the littlest because it's so big?

Allie: Yeah, you just put one and then two and it's all filled because the red one is big.

After a few students shared some ways to fill the hexagon, the teacher lists the ways they have shared, encouraging them to think about which ways they have not come up with yet. After students have considered a number of different combinations, the teacher then asks them to focus on which of the ways would use the most and fewest blocks. Some of the students are able to reason that the larger the block, the fewer are needed to fill a space.