

INVESTIGATIONS

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HOPEFUL HEXAGONS

Making use of pattern blocks, *Hopeful Hexagons* quickly goes off in many fascinating directions. This problem encourages students to think carefully about the properties of shapes, and also invites them to look for patterns and organise data.

HOW IT WORKS

The best mathematical tools are ones we can keep using no matter how much we know – and pattern blocks are no exception! In this lesson, students will explore fascinating patterns made using pattern blocks

After presenting this arrangement of pattern blocks to students, ask: What do you notice? What do you wonder? These two questions will help students to slow down their thinking and make sense of the features of the shapes, before you pose the main challenge: *‘Are hexagons with more than 6 pattern block pieces possible? Is it possible to make hexagons with any number of pieces?’*

Allow students plenty of time to explore the challenge informally using their own set of pattern blocks. Encourage them to think about how they will record their findings.

If a student comes to you with an answer, prompt them to justify their thinking. For example, ask: Are you sure? How do you know? How might you convince me? If a student puts together a shape that isn’t a hexagon, use this as an opportunity to teach them about the features of hexagons. Hexagons can be regular (all 6 sides are the same) or irregular (some sides are different). You might ask: What could be changed to turn your shape into a hexagon?

Wrap up *Hopeful Hexagons* by inviting students to share their solutions, as well as the strategies they used to create hexagons and organise their data. A key insight that students may have noticed is the idea of substitution. A hexagon of the same area can be created by swapping pattern block pieces. For example, one trapezium can be swapped for three equilateral triangles.

GO DEEPER

Here are some prompts that can help students to take their thinking further, as they explore this problem:

- Do any of your hexagons look similar? How? Can you create other hexagons with the same feature(s)?



- How might you organise your ideas? If you use a table, what will go in each column?
- What have you convinced yourself/your partner/others is true? Explain how you know.
- Are irregular hexagons possible?
- What are you unsure of? What might be your next step?

WHY USE IT?

Hopeful Hexagons gives learners valuable practice in:

- Creating and naming shapes
- Looking for patterns and using algorithms
- Spatial reasoning
- Organising and making sense of data
- Making and breaking conjectures.

CURRICULUM LINKS



VC2M1SP01 (Level 1), VC2M2SP01, VC2M2M01 and VC2M2A01 (Level 2), VC2M3SP01 and VC2M3ST01 (Level 3), VC2M4SP01, VC2M4M02 and VC2M4ST01 (Level 4), VC2M5ST01 (Level 5), VC2M6A03 and VC2M6ST01 (Level 6). Scan the QR code to get a full lesson plan that includes variations of the task.

What kinds of investigations have you used in your classroom as a launch for mathematical exploration? Our readers would love to hear your experiences. You can share your ideas with us at primenumber@mav.vic.edu.au.