01 / STUDENT ACTIVITY

How many tiles make a border?

Suggested MYP Years 1-3 | 35 minutes | Patterns and algebra

Name: _____ Class: _____ Date: _____

Inquiry question

How can you count the one-tile-wide border of any square grid without counting each tile?

Draw square grids with side lengths 3, 4 and 5 tiles. Shade only the outside border. A corner tile counts once. Investigate whole-number side lengths n of at least 3.

You need: Squared paper; two colours

1. Choose a way to count border tiles and organise your results. Investigate more sizes if helpful.

2. Describe the relationship and write a rule for the border count B in terms of n.

3. Predict the count for a 12 by 12 grid; check it by another method.

4. Explain why your rule works for every permitted n. Compare two different counting methods.

Record your investigation

Use the space below and extra paper for diagrams, tables, calculations and your conclusion.

Exit response: What did you revise, and what evidence changed your mind?

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01 / TEACHER NOTES

How many tiles make a border?

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Teaching purpose

The same picture supports several valid expressions, giving students a reason to explain equivalence rather than simply simplify algebra.

Expected findings / checked solution

Counts for n = 3, 4, 5 are 8, 12, 16. B = 4n - 4: four sides count each corner twice, so subtract four. Alternatively B = n^2 - (n - 2)^2. For n = 12, B = 44. The stated domain is whole numbers n >= 3.

Neutral teacher prompt

Which tiles does each part of your expression count?

Support

Allow physical counters and a partially drawn grid.

Extension

Generalise to an a by b rectangle with a, b >= 3, then to a border two tiles wide.

Suggested lesson rhythm

Launch for 5 minutes; explore for 20 minutes; compare approaches for 7 minutes; finish with a 3-minute exit response.

Formative evidence

Look for chosen methods, defined variables, independent checks and explanations. These are teaching activities, not IB-issued assessments or automatic criterion scores. Use current school assessment guidance for summative work.

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