

UNIT 01 / 10 · LEARN & TRY

Patterns in Mathematics

Name: _____ Date: _____

Goal: Describe generalise and justify numerical and visual patterns.

Learn

A pattern needs a rule. Compare differences, arrangements or factors. A few examples can suggest a rule but do not prove that it always holds. Use a diagram or argument when possible.

Worked example

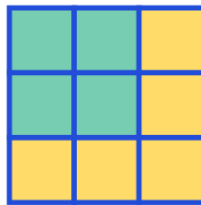
The first odd numbers add to squares: $1 = 1^2$, $1 + 3 = 2^2$, $1 + 3 + 5 = 3^2$. Each new L-shaped layer grows the square.



$$1^2 = 1$$



$$2^2 = 4$$



$$3^2 = 9$$

Add an L-shaped odd-number layer.

Count each newly added layer. Explain how consecutive odd numbers build successive squares.

1. Write the first six square numbers starting at 1^2 .

2. Continue 1, 3, 6, 10, 15 by adding the next whole number.

UNIT 01 · PRACTISE · 3–6

Patterns in Mathematics

3. Using the square-layer pattern, find $1 + 3 + 5 + 7 + 9$.

4. How many dots in an 8 by 8 square?

5. A row of n joined squares uses $3n + 1$ sticks. Find the count for $n = 10$.

6. Does checking three examples prove a rule for every whole number? Explain.

Explain one answer. Choose a question to revisit after a few days.

UNIT 01 · ANSWER GUIDANCE

Patterns in Mathematics

1. 1, 4, 9, 16, 25, 36
2. 21
3. 25
4. 64
5. 31
6. No. A general argument is needed; another case may fail.

Teaching note

Start by checking: Continue and explain simple sequences. Model the worked example, then ask for a reason as well as an answer. Revisit tasks 2 and 6 after two days, using different numbers where appropriate.