Spatial patterns (including drawing next pattern and converting to pattern)

Mana Maths

Te reo Māori terms

hikuaua pūwāhi
spatial pattern
Open in Te Aka

tā
drawing
Open in Te Aka

āhua
shape
Open in Te Aka

panuku
next
Open in Te Aka

Spatial patterns (including drawing next pattern and converting to pattern) — Foundation

1. Pattern 1 is a row of 2 tiles. Pattern 2 is a row of 3 tiles. Pattern 3 is a row of 4 tiles. Draw Pattern 4 and say how many tiles it has.

2. Pattern 1 is an L-shape with 3 tiles. Pattern 2 is an L-shape with 5 tiles. Pattern 3 is an L-shape with 7 tiles. Draw Pattern 4 and say how many tiles it has.

3. Pattern 1 is a staircase with 3 tiles. Pattern 2 is a staircase with 6 tiles. Pattern 3 is a staircase with 10 tiles. Draw Pattern 4 and say how many tiles it has.

4. Complete the row pattern table: term 1 = 2, term 2 = 3, term 3 = 4, term 4 = ? tiles.

5. Complete the L-shape pattern table: term 1 = 3, term 2 = 5, term 3 = 7, term 4 = ? tiles.

6. Complete the staircase pattern table: term 1 = 3, term 2 = 6, term 3 = 10, term 4 = ? tiles.

7. A growing pattern has tile counts $3, 5, 7, 9$. Draw a simple square-tile picture for term 1, 2, and 3.

8. A pattern has tile counts $2, 3, 4, 5$. Describe what happens from one term to the next.

9. A pattern has tile counts $4, 7, 10, 13$. How many tiles should Pattern 5 have?

10. A row pattern starts with 2 tiles in term 1 and adds 1 tile each time. Which term has 6 tiles?

11. An L-shape pattern starts with 3 tiles in term 1 and adds 2 tiles each time. Which term has 11 tiles?

12. Sofia says the staircase pattern $3, 6, 10$ adds 2 tiles each time. Is she correct? Explain.

Spatial patterns (including drawing next pattern and converting to pattern) — Proficient

1. Pattern 1 is a row of 3 tiles. Pattern 2 is a row of 5 tiles. Pattern 3 is a row of 7 tiles. Draw Pattern 4 and write the tile counts for terms 1 to 4.

2. Pattern 1 is an L-shape with 5 tiles. Pattern 2 has 7 tiles. Pattern 3 has 9 tiles. Draw Pattern 4 and write the tile counts for terms 1 to 4.

3. Pattern 1 is a T-shape with 4 tiles. Pattern 2 has 7 tiles. Pattern 3 has 10 tiles. Draw Pattern 4 and write the tile counts for terms 1 to 4.

4. For the row pattern with counts $3,\ 5,\ 7,\ 9,$ which pattern number has 15 tiles?

5. For the L-shape pattern with counts $5,\ 7,\ 9,\ 11,$ which pattern number has 17 tiles?

6. For the T-shape pattern with counts $4,\ 7,\ 10,\ 13$ how many tiles are in Pattern 8?

7. A picture pattern gives the number pattern $6, 8, 10, 12$. Describe one possible square-tile design for it.

8. Another picture pattern gives $5, 8, 11, 14$. How many tiles would Pattern 10 have?

9. Hana says Pattern 5 has 12 tiles. The first four counts are $3, 5, 7, 9$. Is Hana correct? Explain.

10. A spatial pattern starts with 6 tiles and adds 3 tiles each time. Draw Patterns 1, 2, and 3, then state Pattern 6.

11. Which grows faster: $2, 5, 8, 11$ or $4, 8, 12, 16$? Explain using the change each time.

12. A pattern is made from square tiles. Pattern 1 has 4 tiles and Pattern 5 has 20 tiles. If it grows by the same amount each time, write the counts for Patterns 1 to 5.

Spatial patterns (including drawing next pattern and converting to pattern) — Excellence

1. An L-shape pattern has counts $5,\ 7,\ 9$. Draw Pattern 5 and explain how you know the number of tiles without counting one by one.

2. A staircase pattern has counts $3,\ 6,\ 10$. Draw Pattern 4 and Pattern 5. How many extra tiles are added each time?

3. A row pattern has counts $5,\ 8,\ 11,\ 14$. Which pattern number has 35 tiles? Explain.

4. An L-shape pattern has counts $7,\ 9,\ 11,\ 13$. Which pattern number has 31 tiles? Explain.

5. A staircase pattern has counts $3,\ 6,\ 10,\ 15$. Is it increasing by a constant amount? Explain using the differences.

6. Two students convert the same picture pattern into numbers. Ari gets $4,\ 7,\ 10,\ 13$. Moana gets $4,\ 8,\ 12,\ 16$. Give one possible reason one of them is wrong.

7. Pattern 6 of a row pattern has 15 tiles. If the pattern grows by 2 tiles each time, what are the counts for Patterns 1 to 6?

8. Pattern 5 of an L-shape has 13 tiles. Work backwards to find the counts for Patterns 1 to 5.

9. A spatial pattern grows by 4 tiles each time. Pattern 3 has 18 tiles. Find the counts for Patterns 1 to 5.

10. Maia says: If a pattern uses more tiles each time, it must be adding the same number every term. Use one example to explain why this is not always true.

11. Create your own spatial pattern with square tiles where Pattern 1 has 4 tiles and Pattern 4 has 19 tiles. Draw or describe Patterns 1 to 4.

12. A pattern has counts $6, 10, 14, 18$. Another has $4, 7, 10, 13$. Compare the growth rules and say which reaches 30 tiles first.