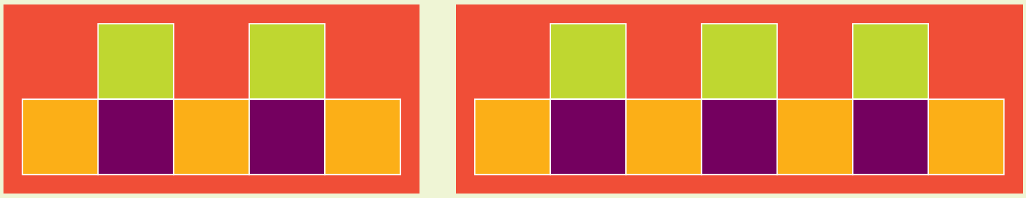
Patterns and Designs

ACTIVITY

You need: square dot paper

1. Greer is a textile designer. Here are two sections from one of her designs.



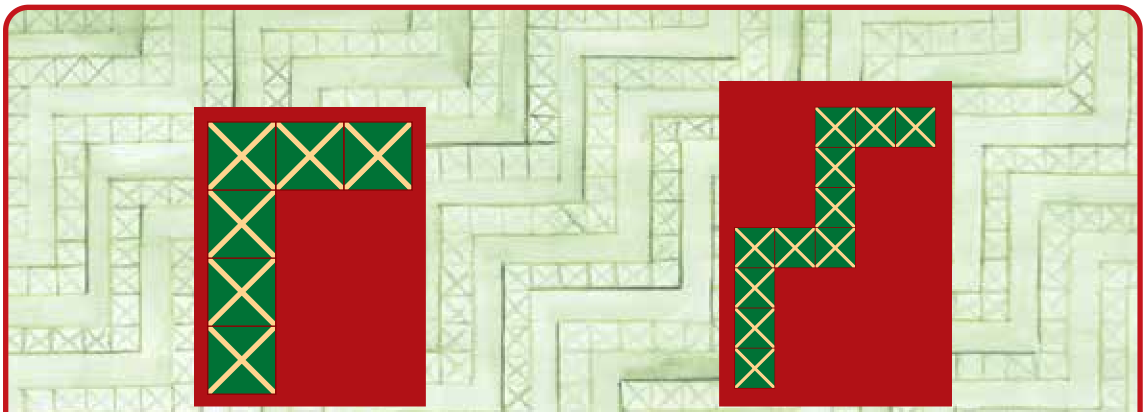
2 green squares   3 green squares

   a. Draw a section from Greer's design that has 4 green squares.
   b. There are 2 x 2 + 3 coloured squares altogether in the section with 2 green squares.
      i. Draw a diagram to show how this short cut works.
      ii. Predict the total number of coloured squares in a section with 28 green squares.
   c. Another short cut for the section with 2 green squares is 2 x 3 + 1.
      Draw a diagram to show how this short cut works.
   d. Copy and complete the tables below. Show your calculations.

Number of green squares	Total number of coloured squares
5	
7	
12	
37	
143	

Number of green squares	Total number of coloured squares
	25
	31
	52
	85
	100

2. Hine's family is making a tukutuku panel for their wharenui.
   The pattern is named poutama and looks like a sequence of steps.



1-step pattern   2-step pattern

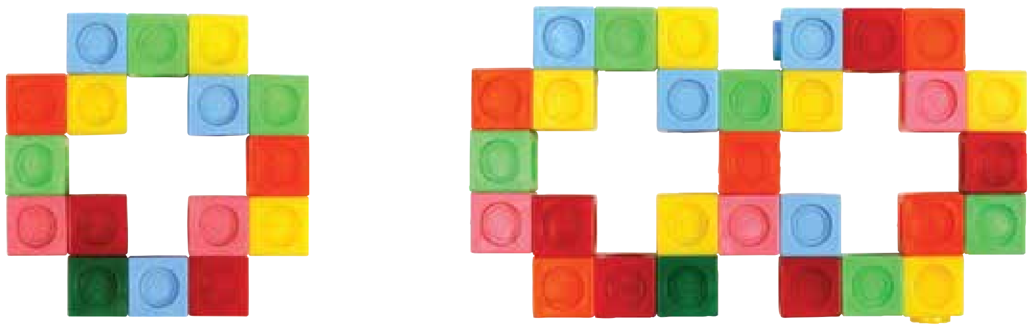
   a. Draw the pattern with 3 steps on square dot paper.
   b. See if you can devise a short cut to predict the number of crosses in this pattern with 7 steps. Explain how the short cut works.

c. Hine suggests using 5 x 6 – 4 as a short cut for calculating the number of crosses in the pattern with 5 steps. Is this short cut correct? Explain how it works.

d. Complete the following table. Show your calculations.

Number of steps	Number of crosses	
	Your rule	Hine's rule
5		5 x 6 – 4 = 26
10		
37		
78		
100		
342		

3. Jeremy makes plus signs inside rings of multilink cubes.



1 plus sign

2 linked plus signs

a. Draw a diagram for 3 linked plus signs on square dot paper.

b. Devise a short cut or rule to predict the number of multilink cubes for 5 linked plus signs.

c. Draw a diagram of 5 linked plus signs on square dot paper and check that your rule works.

d. Complete the table below. Show your calculations using your rule.

Number of plus signs	Number of multilink cubes
3	
7	
10	
100	
343	

4. Jeremy's friend Tracey uses the short cut 4 x 16 – 3 x 3 to predict the number of multilink cubes needed for 4 linked plus signs.

a. Is this short cut correct? Explain how it works.

b. Write Tracey's short cut for the number of multilink cubes needed for 8 linked plus signs. Check this result using your short cut.

c. Use Tracey's short cut to calculate how many multilink cubes are needed for 1 000 linked plus signs.