1.3 Patterns and Expressions TEKS *a.1, A.3.B*
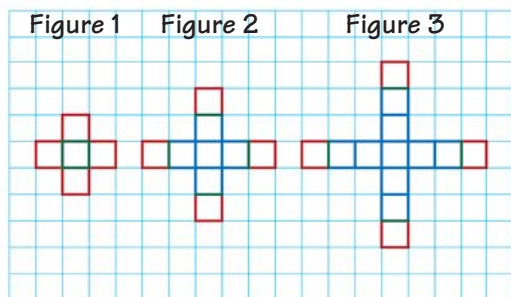
MATERIALS • graph paper

QUESTION How can you use an algebraic expression to describe a pattern?

EXPLORE Create and describe a pattern
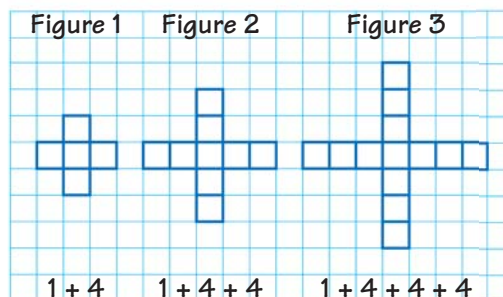
STEP 1

Figure 1 Figure 2 Figure 3

Draw a figure Draw a unit square on graph paper. Then draw a unit square against each side of the first square to form figure 1.

Copy figure 1 and draw a square on each "arm" to form figure 2. Use the same method to form figure 3.

STEP 2

Figure 1 Figure 2 Figure 3

1 + 4   1 + 4 + 4   1 + 4 + 4 + 4

Write expressions For each figure, write a numerical expression that describes the number of squares in the figure.

DRAW CONCLUSIONS Use your observations to complete these exercises

In Exercises 1–3, use the pattern in Steps 1 and 2 above.

1. How is the figure number related to the number of times 4 is added in the numerical expression? Predict the number of squares in the fourth figure. Create figure 4 and check your prediction.

2. *Describe* how to calculate the number of squares in the nth figure.

3. Write an algebraic expression for the number of squares in the nth figure. (*Hint:* Remember that repeated addition can be written as multiplication.)

4. Write an algebraic expression for the number of squares in the nth figure of the pattern shown.

Figure 1   Figure 2   Figure 3   Figure 4