Frieze Frame

Creating rules that relate objects in patterns

AIM

Students will represent patterns as tables of values and write the rule for each pattern.

MATERIALS

- Pattern blocks (optional)
- 1 copy of the blackline master (opposite) for each student

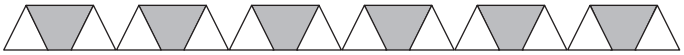
TEACHING NOTE

In North America, the term "trapezoid" is used to describe a quadrilateral that has only two parallel sides. In Australia, Europe, and elsewhere, the same shape is called a "trapezium".

REFLECTION

Refer to the blackline master and lead a discussion by asking questions such as, *How is the number of triangles* (*rhombuses*) *related to the number of hexagons? What rules can we write?*

1 Draw the pattern shown below on the board (or create the pattern using pattern blocks).



Say, *Imagine we are tiling a bathroom. This is our pattern. We always start and end with a triangle.* Draw the table shown below on the board.

Picture number	1	2	3	4	5
Number of trapezoids	1	2	3	4	5
Number of triangles					

Ask, *If we have 1 trapezoid, how many triangles do we have?* (2) *If we have 2 trapezoids, how many triangles do we have?* (4) Complete the table and ask, *If we have 10 (20, 100) trapezoids, how many triangles do we have?* (20, 40, 200) *What rule can we write to determine the number of triangles for any number of trapezoids?* Write ***Number of triangles = 2 × Number of trapezoids*** on the board.

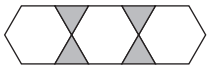
2 Have the students complete the blackline master. Ask volunteers to share their answers. Refer to Question 1 and ask, *How did you figure out the rule? If we multiply the number of hexagons by 2, what must we do to this number to give us the number of triangles?* Discuss ways of writing the rules including, "Number of triangles = 2 × number of hexagons – 2" and "Number of hexagons = (number of triangles + 2) ÷ 2".

Frieze Frame

Name _____

1. A bathroom mirror is framed with a pattern of hexagonal and triangular tiles.

   a. Extend this pattern. Finish each picture with a hexagon.

Picture 1	Picture 2	Picture 3	Picture 4	Picture 5
				

   b. Complete this table to match the pattern.

Picture number	1	2	3	4	5		
Number of hexagons							
Number of triangles							

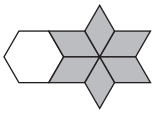
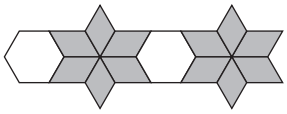
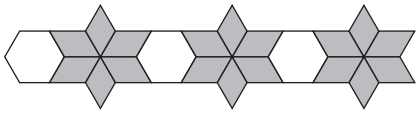
   c. If the frieze has 12 hexagons, how many triangles does it have? _____

   d. If the frieze has 46 triangles, how many hexagons does it have? _____

   e. Write a rule for figuring out the number of triangles when the number of hexagons is known.

   _____

2. a. Look at the first 3 pictures in this pattern.

Picture 1	Picture 2	Picture 3
		

   b. Complete this table to match the pattern.

Picture number	1	2	3	4	5		
Number of hexagons							
Number of rhombuses							

   c. Write a rule for figuring out the number of rhombuses when the number of hexagons is known.

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