

Zara's Symmetry Studio: The Pattern Explorer

Learning objective: To identify, describe, and draw lines of symmetry in 2D shapes, and to complete symmetrical patterns across a horizontal or vertical line of symmetry.

Zara the zebra is designing a new art gallery! She believes that nature and maths are perfectly connected through symmetry. In this activity, you will act as Zara's apprentice. First, use a ruler to draw all possible lines of symmetry on the shapes provided. Then, solve the advanced geometric challenges to help Zara complete her mural patterns. Ensure your lines are precise and your reasoning is clear.

Word bank: Symmetry · Vertical · Horizontal · Reflect · Line of Symmetry · Polygon · Equilateral · Isosceles · Congruent

1. Zara has drawn a regular pentagon. How many lines of symmetry does a regular pentagon have? Explain how you found your answer. (2 marks)

2. Compare an equilateral triangle and a scalene triangle. Justify why one has multiple lines of symmetry while the other has none. (3 marks)

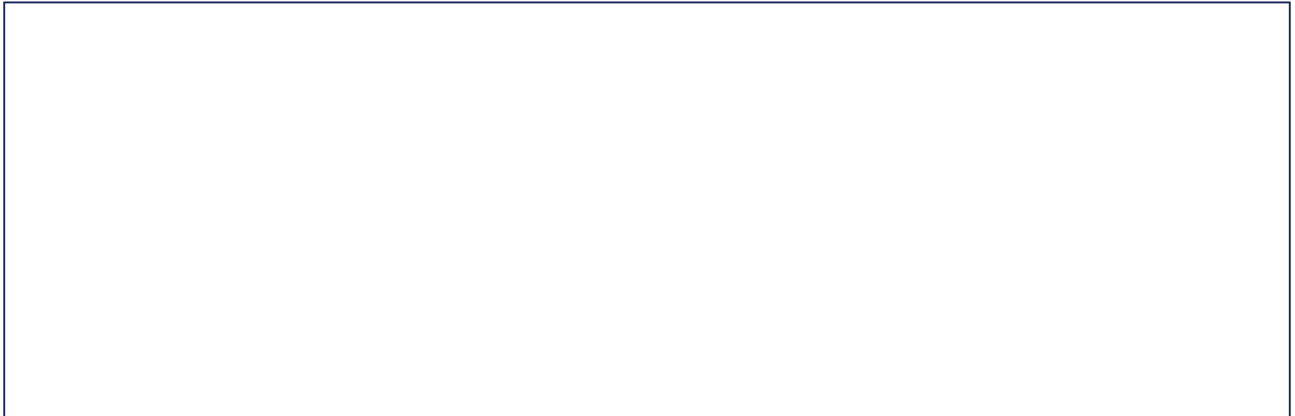
3. If a shape is reflected across a vertical line of symmetry, what happens to the coordinates of the points? Explain why the distance from the line remains the same for each point. (3 marks)

4. Zara finds a rectangular tile that costs £2.50. If she creates a pattern by reflecting this tile across a diagonal line of symmetry, will the shape still be a rectangle? Justify your answer. (2 marks)

5. What might happen to the symmetry of a shape if you rotate it by 90 degrees? Does the number of lines of symmetry change? Why or why not? (3 marks)

6. Design a complex shape that has exactly two lines of symmetry. Describe its properties and name the shape. (2 marks)

Draw: Draw a 6x6 grid. Shade in a pattern of 5 squares in the top-left quadrant. Then, draw a vertical line of symmetry down the centre and a horizontal line across the middle. Carefully shade the remaining three quadrants to ensure the entire grid has both horizontal and vertical symmetry.



Extension challenge: Challenge: Investigate 'Rotational Symmetry'. Can you find a shape in your classroom that has rotational symmetry but NO lines of reflectional symmetry? Draw it and explain the order of its rotation.