

Zara's Mathematical Masterpieces: The Art of Pattern

Learning objective: To identify, replicate, and create complex repeating patterns, exploring how geometry and symmetry inform artistic composition.

Zara the zebra has been studying the natural world to find inspiration for her latest art project. Patterns are everywhere! Your task is to analyse the geometric properties of patterns. Complete the questions below to help Zara categorise her designs, then use the drawing prompt to create your own tessellating or symmetrical design.

Word bank: Symmetry · Tessellation · Geometry · Rotation · Reflection · Sequence · Asymmetrical · Translation

1. Zara is sketching a pattern that repeats without any gaps or overlaps, like the scales on a fish. Explain why this is called a 'tessellation' and provide one example of a shape that can tessellate. (2 marks)

2. Look at a standard playing card or a butterfly wing. Compare and contrast 'reflectional symmetry' with 'rotational symmetry'. How can you tell the difference? (2 marks)

3. Zara creates a pattern by rotating a triangle 90 degrees clockwise four times. Justify why the final position of the triangle is identical to its starting position. (2 marks)

4. If a pattern is 'asymmetrical', does it mean it lacks beauty? Explain your reasoning using the concept of balance in art. (2 marks)

5. Imagine a pattern made of £1 coins placed in a row. If the pattern follows a sequence of 'Heads, Tails, Tails', what will the 10th coin show? Show your working. (2 marks)

6. What might happen to the visual impact of a geometric design if the primary colours were replaced entirely by shades of grey? Consider the role of contrast. (2 marks)

Draw: Using a ruler and a pencil, create a repeating pattern in the box below that uses at least two different geometric shapes. Your design must demonstrate either reflectional symmetry or a clear translation (sliding) sequence.



Extension challenge: Design a 'Zebra-style' pattern for a new school uniform fabric. Your pattern must use at least three different colours and include at least one example of rotational symmetry. Write a short paragraph explaining the mathematical steps you took to ensure the pattern repeats perfectly.