Max’s Mathematical Symmetry Challenge

Learning objective: To identify, describe and represent the position of shapes and patterns after reflection, and to identify lines of symmetry in 2D shapes.

Help Max the monkey solve these symmetry puzzles! Use your knowledge of lines of symmetry and reflections to answer each question carefully. Remember to look for shapes that are identical on both sides of a line.

Answer Key: 1.C (Infinite lines), 2.True, 3.False (It has none), 4.Vertical, 5.False (Only one), 6.True, 7.B (Two lines), 8.Horizontal, 9.False (Reflections flip the orientation), 10.Rotational symmetry.

Word bank: Symmetry · Reflection · Line of Symmetry · Vertical · Horizontal · Diagonal · Polygon · Congruent

1. Max is looking at a circle. How many lines of symmetry does a circle have? A) 1, B) 4, C) Infinite*, D) 0 (1 mark)

2. True or False: A regular square has four lines of symmetry. (1 mark)

3. Does a scalene triangle have any lines of symmetry? (Yes/No) (1 mark)

4. If you draw a line straight down the middle of a capital letter 'A', what type of line of symmetry is it? (Vertical/Horizontal) (1 mark)

5. True or False: A rectangle has four lines of symmetry. (1 mark)

6. True or False: A regular pentagon has five lines of symmetry. (1 mark)

7. Which of these shapes has exactly two lines of symmetry? A) Equilateral triangle, B) Rhombus*, C) Regular hexagon, D) Circle (1 mark)

8. A capital letter 'B' (written in a standard font) typically has which type of line of symmetry? (Vertical/Horizontal) (1 mark)

9. True or False: When a shape is reflected, the size and shape of the object change. (1 mark)

10. What is the name for the type of symmetry where a shape looks the same after being turned around a central point? (1 mark)

Draw: Draw a complex, original creature that has one vertical line of symmetry down its body. Ensure the patterns on the left wing match the patterns on the right wing perfectly.

Extension challenge: 1. Explain why a rectangle does not have diagonal lines of symmetry, whereas a square does. 2. Compare and contrast the lines of symmetry in a regular hexagon versus a regular octagon. 3. Justify your answer: Can a shape have rotational symmetry but zero lines of reflectional symmetry? 4. What might happen to the symmetry of a pattern if you were to translate it across a grid? 5. If Max has a budget of £10 and buys tiles that are symmetrical, how could he arrange them to create a larger, symmetrical pattern? 6. Design a new shape that has exactly three lines of symmetry and describe its properties.