

Max's Mathematical Pattern Challenge

Learning objective: To identify, predict, and apply logical sequences and spatial reasoning patterns.

Read each question carefully. Use your logic and spatial awareness to solve the puzzles. Show your working where necessary. You have 45 minutes to complete this assessment.

Max the monkey is helping his friends organise their equipment. He has noticed that everything in the forest follows a logical pattern. He needs your help to finish these sequences and solve these spatial puzzles to keep the forest tidy.

Word bank: Rotation · Reflection · Symmetry · Sequence · Clockwise · Anticlockwise · Orientation · Transformation

1. Max has a sequence of shapes: a triangle, a square, a pentagon, a hexagon. Describe the rule Max is using and name the next shape in the sequence. (2 marks)

2. A star is rotated 90 degrees clockwise. If the star had a small dot at the top point, where would the dot be after the rotation? Explain your reasoning. (3 marks)

3. Look at these three sets of coins: A) £1.20, £1.40, £1.60. B) £2.50, £2.25, £2.00. C) £0.50, £1.00, £2.00. Which of these sequences is a 'geometric' pattern rather than an 'arithmetic' pattern? Justify your answer. (4 marks)

4. Compare and contrast a reflection and a rotation. Use the example of a butterfly's wings to explain your answer. (4 marks)

5. A pattern changes: First, a square is shaded. Second, a circle is added to the right. Third, the square is moved to the bottom and the circle is shaded. What might happen if this pattern continued for a fourth step? Draw or describe the result. (3 marks)

6. Max finds a mystery sequence: 10p, 20p, 40p, 80p... Explain why this pattern is different from a simple addition sequence and calculate the next two values. (4 marks)

7. Extended Writing: Design a complex visual pattern using three different shapes and two different colours. Explain the rules of your pattern and describe how someone could predict the 10th item in your sequence. (5 marks)

Draw: In the space provided, draw a shape that possesses rotational symmetry of order 2. Label the centre point of rotation.



Extension challenge: Total: /25