Max’s Pattern Puzzles: A Non-Verbal Reasoning Challenge

Learning objective: To identify, replicate, and extend complex visual patterns and sequences through logical deduction and spatial awareness.

Max the monkey has found a collection of geometric patterns that need completing. Look closely at the sequence of shapes, rotations, and shading in each row. For each question, study the pattern carefully and draw the missing shape that should come next in the sequence. Provide a brief written justification for your choice using the vocabulary provided.

Word bank: clockwise · anticlockwise · rotation · reflection · symmetry · sequence · geometric · alternating

1. Sequence 1: A triangle points up, then a square, then a triangle pointing down, then a square. What shape and orientation comes next? Explain your reasoning. (2 marks)

2. Sequence 2: A shaded circle rotates 90 degrees clockwise inside a larger square frame. If the circle starts at the top, where will it be after three moves? Justify your answer. (2 marks)

3. Sequence 3: Compare and contrast a pattern that uses reflection versus one that uses rotation. How can you tell the difference by looking at the shapes? (2 marks)

4. Sequence 4: If a pattern follows a rule of 'add one side to the polygon, then rotate 45 degrees', what might happen if the sequence continues for ten steps? Predict the outcome. (2 marks)

5. Sequence 5: Max has a set of shapes worth £2.50 each. If the pattern shows four shapes, what is the total cost? If the pattern continues for six shapes, what is the new total? Show your working. (2 marks)

6. Sequence 6: Create your own sequence rule using at least two different geometric transformations (e.g., size change and rotation). Describe your rule clearly. (2 marks)

Draw: In the boxes provided below each sequence, draw the next shape in the pattern. Ensure your lines are precise and reflect the geometric properties observed in the previous three shapes.

Extension challenge: Design a complex 'master pattern' that incorporates three different rules (e.g., colour change, size change, and rotation). Challenge a partner to identify the rules you have used and explain why your pattern follows a logical sequence.