

Max's Pattern Puzzles: Mastering Non-Verbal Reasoning

Learning objective: To develop logical thinking and spatial awareness by identifying relationships between 2D shapes, rotations, and sequences.

Help Max the monkey solve these logical puzzles! Use your observation skills to identify the rules governing the patterns, rotations, and transformations. Write your answers clearly and explain your reasoning for the more complex challenges.

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

1. Max has a square that rotates 90 degrees clockwise in each step of a sequence. If the first square has a shaded triangle in the top-right corner, draw the position of the shaded triangle after three rotations. Explain why the position changes in this way. (3 marks)

2. Look at these three shapes: a circle with one dot, a circle with two dots, and a circle with three dots. If the rule is 'add one dot and rotate the circle 45 degrees clockwise', draw the next two shapes in the sequence. (2 marks)

3. Compare and contrast a reflection and a rotation. What happens to the orientation of an irregular shape when it is reflected across a vertical mirror line compared to when it is rotated 180 degrees? (3 marks)

4. A pentagon contains a small arrow pointing upwards. After a transformation, the arrow points downwards. Justify whether this could be a rotation or a reflection. Could it be both? Explain your answer. (3 marks)

5. A series of shapes follows this rule: 'The number of sides increases by one, and the shape alternates between shaded and unshaded.' If the first shape is a triangle (shaded), describe what the fourth shape in the sequence would look like. (2 marks)

Draw: Draw a complex geometric pattern that follows a specific rule of rotation. For example, draw a star that rotates 45 degrees clockwise each time, and include a key that explains your sequence to Max the monkey.



Extension challenge: Design your own Non-Verbal Reasoning puzzle for a partner. Your puzzle must include a sequence of at least four shapes that follow a 'two-step' rule (e.g., a rotation and a change in colour). Write a short paragraph explaining the logic behind your sequence and predict what might happen if the pattern was extended to the tenth shape.