

Max's Geometric Explorer Field Guide

Learning objective: To identify, describe, and classify 2D and 3D shapes, including regular and irregular polygons and the properties of prisms and pyramids.

Join Max the monkey on his mathematical expedition! Your task is to use your knowledge of geometry to classify shapes found in your surroundings. Use the vocabulary provided to write precise descriptions of the properties of your chosen shapes. Ensure you use mathematical terminology such as 'parallel', 'perpendicular', 'vertices', 'faces', and 'edges'.

Word bank: Polygon · Parallel · Perpendicular · Vertex/Vertices · Prism · Pyramid · Acute · Obtuse · Reflex · Symmetry

1. Shape Identification: Sketch a 2D polygon you have found. Name the shape and justify why it is a polygon by discussing its sides and vertices. (3 marks)

2. Property Analysis: Describe the properties of a 3D shape (e.g., a square-based pyramid). Explain how many faces, edges, and vertices it has. (3 marks)

3. Compare and Contrast: Compare a cube and a cuboid. Explain the similarities and differences in their geometric properties. (4 marks)

4. Angle Investigation: Identify an angle within your shape. Is it acute, obtuse, or reflex? Explain your reasoning. (2 marks)

5. Logical Deduction: If you increase the number of sides on a regular polygon, what happens to the internal angles? Justify your prediction. (3 marks)

6. Creative Synthesis: If you were to create a new 3D shape by joining a triangular prism and a cube, what would the total number of faces be? Show your working. (4 marks)

Extension challenge: Design a 'Geometric Treasure Hunt' for a friend. Create three complex clues that describe a specific 3D shape using only its mathematical properties (e.g., 'I have 5 faces, 9 edges, and 6 vertices. What shape am I?'). Explain why these clues are sufficient to identify the shape uniquely.