

Max's Mathematical Cube Challenge

Learning objective: To recognise, calculate, and apply cube numbers up to 10 cubed, and to understand the relationship between a number and its cube.

Help Max the monkey solve these cube number puzzles. Use your knowledge of multiplication to find the volume of shapes or the product of a number multiplied by itself twice. Remember: a cube number is the result of multiplying a whole number by itself and then by itself again (e.g., $2^3 = 2 \times 2 \times 2$).

Word bank: Product · Volume · Cubed · Three-dimensional · Integer · Sequence · Calculation · Multiply

1. The Basic Cube Table: List the cube numbers for 1, 2, 3, 4, and 5. Show your working out for each calculation. (5 marks)

2. Pattern Spotting: Explain why multiplying a number by itself three times is called finding the 'cube' of that number. Think about 3D shapes. (3 marks)

3. Max's Puzzle: If a small wooden cube has a side length of 4cm, calculate its total volume. Explain the method you used to reach your answer. (3 marks)

4. Compare and Contrast: Compare the sequence of square numbers (1, 4, 9, 16...) with the sequence of cube numbers (1, 8, 27, 64...). What do you notice about how quickly they increase? (4 marks)

5. Justify your answer: Is it true that every cube number is also a square number? Provide an example or a counter-example to justify your reasoning. (4 marks)

6. Creative Application: If you had 125 small unit cubes, how would you arrange them into one large, perfect cube? What would the dimensions of that cube be? (2 marks)

Extension challenge: Challenge: Investigate the sum of cube numbers. What happens if you add the first two cube numbers together ($1^3 + 2^3$)? Is the result a square number? Research the pattern of adding consecutive cube numbers and present your findings to the class.