

Max's Magnificent Volume Investigation

Learning objective: To calculate the volume of 3D shapes using the formula $\text{length} \times \text{width} \times \text{height}$ and to understand cubic units (cm^3).

Help Max the monkey solve his latest maths puzzle! Use this template to record your measurements of 3D objects. Measure the length, width, and height of your chosen items in centimetres, then use the formula ($\text{Length} \times \text{Width} \times \text{Height}$) to calculate the volume. Remember to use the correct unit, cm^3 , for your final answers.

Word bank: Volume · Cubic centimetres · Dimension · Calculate · Capacity · Formula · Rectangular prism · Space

1. Object Description: Choose a rectangular object (like a box or a book). Describe its shape and list its dimensions (length, width, and height) in cm. (2 marks)

2. The Calculation: Write down the formula you are using and show your step-by-step working out to find the total volume. (3 marks)

3. Result: State the final volume of your object. Why is it important to use ' cm^3 ' instead of ' cm^2 ' when describing volume? (2 marks)

4. Comparison: If you had a box with double the height but the same length and width, explain why the volume would also double. (3 marks)

5. Justification: Max has a box with a volume of 100cm^3 . He says the dimensions must be 10cm by 10cm by 1cm. Is he correct? Explain your reasoning. (3 marks)

6. Creative Challenge: What might happen if we tried to calculate the volume of an irregular shape, such as a rock or a crumpled piece of paper? How could we find the space it occupies? (4 marks)

Extension challenge: Design a 'Max-sized' storage crate that has a total volume of exactly $1,000\text{cm}^3$. Provide three different combinations of length, width, and height that would achieve this. Justify which dimensions would be most practical for storing books.