

Year 5 Mathematics: Mastering Volume and Capacity

Learning objective: To calculate and compare the volume of cubes and cuboids using standard units (cm^3), and to understand the relationship between volume and capacity.

Read each question carefully. Show your working out clearly, as marks are awarded for your method even if the final answer is incorrect. Use the provided space for your calculations.

Max the monkey is organising his collection of wooden building blocks. He wants to build a storage crate that perfectly fits his collection. Each wooden block is a cube with a side length of 1cm, meaning each block has a volume of 1cm^3 . Max needs to calculate the space inside different containers to ensure all his blocks fit safely.

Word bank: Volume · Capacity · Cubic centimetres · Dimensions · Length · Width · Height · Compound shapes

1. Max has a small box with a length of 4cm, a width of 3cm, and a height of 2cm. Calculate the total volume of this box in cm^3 . Explain your method. (2 marks)

2. If a larger crate has a volume of 60cm^3 and a base area of 12cm^2 , what is the height of the crate? Show your calculation. (2 marks)

3. Compare and contrast the volume of a cube with side lengths of 3cm and a cuboid with dimensions 2cm x 3cm x 5cm. Which container is larger and by how much? (3 marks)

4. A container is filled with water. It has a capacity of 1,000ml. If Max pours 450ml into the container, how much more water is needed to reach the total capacity? Express your answer in litres. (3 marks)

5. Max builds a compound shape using two cuboids. The first cuboid is 3cm x 2cm x 4cm. The second cuboid is 2cm x 2cm x 2cm. Calculate the total volume of the combined structure. Justify your answer. (4 marks)

6. What might happen if Max tries to fit 100cm³ of wooden blocks into a box that has a capacity of 95cm³? Discuss the physical constraints of volume and capacity in this scenario. (3 marks)

7. Extended Writing: Imagine you are an engineer helping Max design a new wooden crate. The crate must have a total volume of 72cm³. Write a proposal detailing the possible dimensions of this crate. Explain why you chose these specific measurements and how they might be practical for storing Max's 1cm³ blocks. (5 marks)

Draw: Draw a net of a cuboid with a volume of 12cm³ on the squared paper provided below. Label the length, width, and height clearly on your drawing.



Extension challenge: Total: /25