

Max's Magnificent Volume Adventures

Learning objective: To calculate and compare the volume of 3D shapes using cubic centimetres (cm³) and to estimate the volume of irregular objects.

Max the monkey is helping his friends organise their supplies. Use your knowledge of volume to solve these mathematical challenges. Remember to show your working out for each calculation.

Word bank: Volume · Cubic centimetres · Capacity · Dimensions · Irregular · Estimate · Length · Width · Height

1. Max has a box for his building blocks that measures 5cm in length, 4cm in width, and 3cm in height. Calculate the total volume of the box in cm³. Explain the formula you used to arrive at this answer. (2 marks)

2. Pip the caterpillar has a small wooden crate with a volume of 72cm³. If the length is 6cm and the width is 3cm, what must the height of the crate be? Show your calculation. (2 marks)

3. Compare and contrast: A rectangular prism has dimensions 8cm x 2cm x 2cm. Another prism has dimensions 4cm x 4cm x 2cm. Do they have the same volume? Justify your answer mathematically. (3 marks)

4. Bea the honeybee finds a honeycomb segment that is not a perfect cube. It is an irregular shape. Describe a method Bea could use to estimate the volume of this irregular object using a displacement method with water. (3 marks)

5. Max is selling cubes of magical fruit. Each cube has a volume of 1cm³. If one fruit cube costs £0.20, how much would it cost to fill a container with a volume of 15cm³? (2 marks)

Draw: Draw a set of three different rectangular prisms that all share the exact same volume of 24cm^3 , labelling the length, width, and height of each one.



Extension challenge: What might happen if we doubled all the dimensions of a $2\text{cm} \times 2\text{cm} \times 2\text{cm}$ cube? Explain why the volume does not simply double, but increases by a factor of eight. Provide a written justification for your findings.