

Volume of a cuboid

Notes and guidance

In this small step, children move on from counting cubes to finding the volumes of cuboids using multiplication and applying a formula.

Children discover that they can use multiplication to find the number of cubes in one “layer” of the shape and then multiply this by the number of layers to find the total volume. This will help children identify the formula: volume of cuboid = length \times width \times height. They should recognise that the formula works whichever way they look at the cuboid and what they think of as a “layer”.

Once children understand the formula, encourage them to find the most efficient method to calculate the volume using the associative law of multiplication.

Things to look out for

- Children may think that it is impossible to find the volume without cubes.
- Children may think that they must always multiply $l \times w \times h$ in that order, which may not always be the most efficient calculation.
- When finding the volumes of cubes, children may think that they need more than one measurement.

Key questions

- What is volume?
- How many cubes are there in one layer? How do you know?
- How do you find the total volume of the cuboid?
- What is the formula to find the volume of a cuboid?
- What is the same and what is different about area and volume?
- What is the most efficient order to multiply the three numbers together?

Possible sentence stems

- There are _____ cubes in each layer.
There are _____ layers.
The volume of the cuboid is _____
- The length is _____. The width is _____. The height is _____.
The volume of the cuboid is _____ \times _____ \times _____ = _____

National Curriculum links

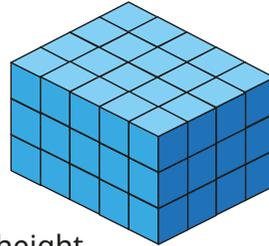
- Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm^3) and cubic metres (m^3), and extending to other units

Volume of a cuboid

Key learning

- The cuboid is made using centimetre cubes.

- ▶ What is the volume of the cuboid?
- ▶ What is the length, width and height of the cuboid?
- ▶ Find the product of the length, width and height.

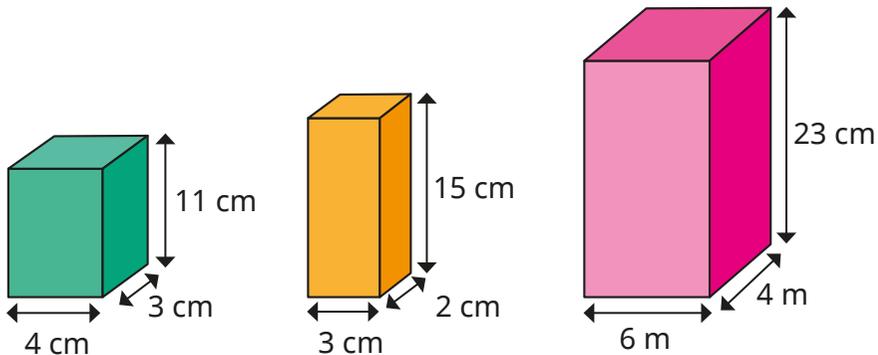


What do you notice?

- Here is the formula for the volume of a cuboid.

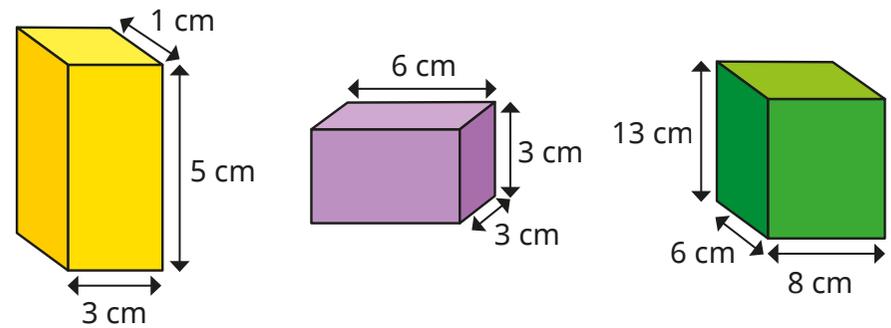
$$\text{volume} = \text{length} \times \text{width} \times \text{height}$$

Use the formula to find the volumes of the cuboids.

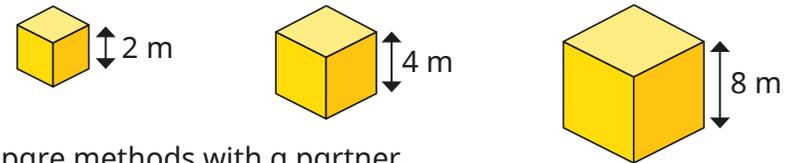


Does it matter in which order you multiply the numbers?

- Find the volumes of the cuboids.

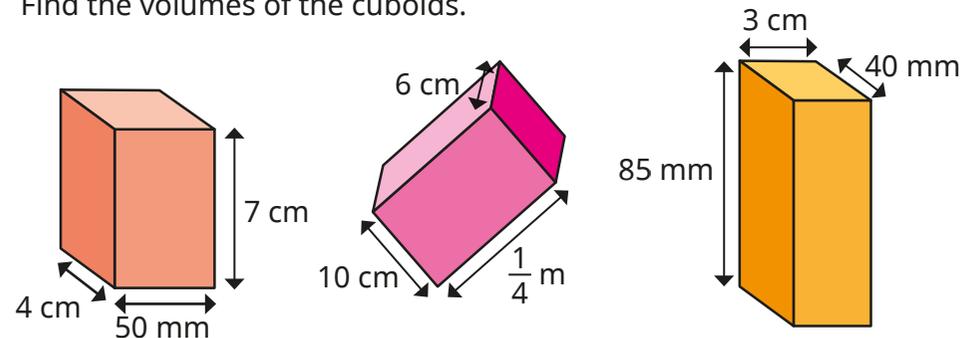


- Find the volumes of the cubes.



Compare methods with a partner.

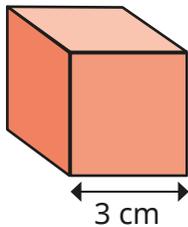
- Find the volumes of the cuboids.



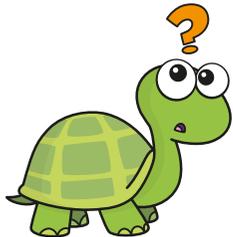
Volume of a cuboid

Reasoning and problem solving

Here is a cube.



I cannot work out the volume of the cube, because I do not know its width or height.

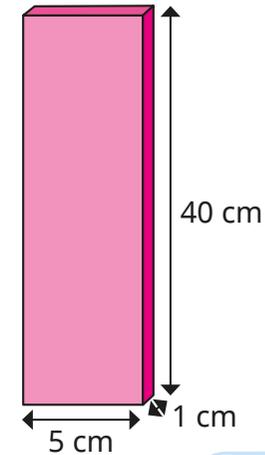
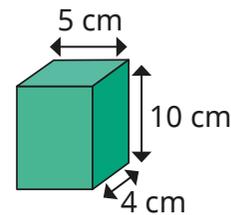


Do you agree with Tiny?

Explain your answer.

No

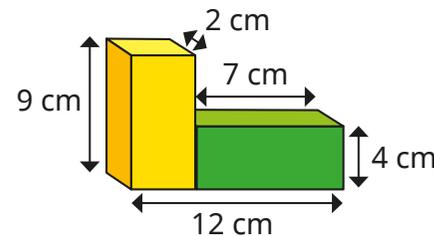
Which cuboid has the greater volume?



Both cuboids have the same volume: 200 cm^3

Explain how you know.

Calculate the volume of the compound shape.



146 cm^3