



Maths

Calculation Policy

Capacity and volume

2024

Year One → page 3

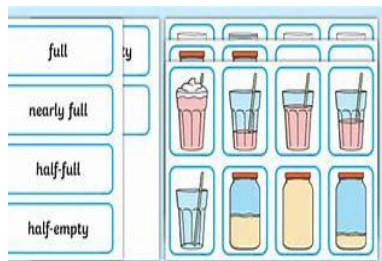
Year Two → page 4

Year Three and Four → page 5

Year Five and Six → page 7

EYFS:

- I can explore and compare capacity.
- I can use the vocabulary-full, empty, nearly full, nearly empty, half full, half empty



- How many _____ does it take to fill the container?
- Which container holds more/less?
- Can you show me the container-full, empty, nearly full, nearly empty?

Year One and Two (Both taught in Year One with a recap in Year Two)

0 ➡ I understand the terms 'full' and 'empty'

Match the pictures to the labels.



empty



nearly full



nearly empty



full

0 ➡ I can identify whether an object is full or empty

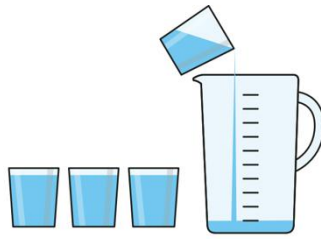
0 ➡ I can understand the term 'capacity'

The maximum amount that something can hold inside it.

0 ➡ I can measure the capacity of objects

1. Real life objects (jugs, cups etc)
2. Images

4 glasses of water fill 1 jug.



a) How many glasses will fill 2 jugs?

0 → I can compare the capacities of different items

1. Real life objects

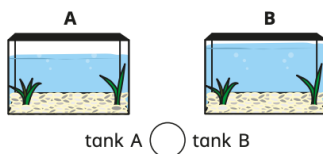
2. Images

0 → I can understand the term 'volume'

0 → I can measure volume

0 → I can compare volume using $<$, $>$ and $=$

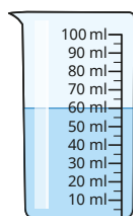
Write $<$, $>$ or $=$ to compare the volumes of water in the fish tanks.



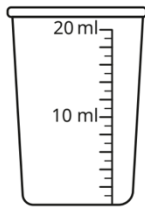
Year Two - recap Year One and Two prior learning but add these in

0 → I can measure volume in millilitres

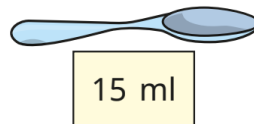
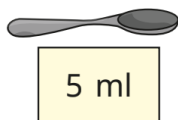
1. Scale increasing in 10s



2. Scale increasing in 10s with intervals of 5, 2 and 1



3. Using measuring spoons



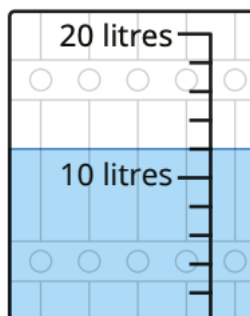
➡ I can measure volume in litres

1. Scale increasing in 1 litres



2. Scale increasing in 5 litres

3. Scale increasing in 10 litres with different intervals



4. Bottles/cartons

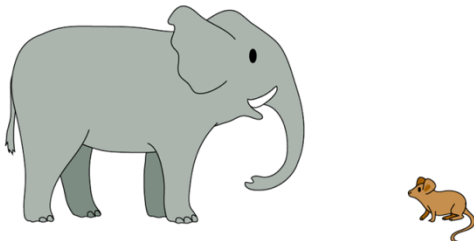


➡ I can apply the four operations to volume and capacity

Year Three and Year Four (Both to be taught in Year Three)

- ➡ I understand the terms 'full' and 'empty'
- ➡ I can identify whether an object is full or empty
- ➡ I can understand the term 'capacity'
- ➡ I can measure the capacity of objects
- ➡ I can compare the capacities of different items
- ➡ I can understand the term 'volume'

- 'Which takes up more space, the elephant or the mouse?'



- 'The amount of space the elephant takes up is its volume.'
- 'The amount of space the mouse takes up is its volume.'
- 'The elephant has a larger volume than the mouse.'
- 'Which has a larger volume, the melon or the apple?'



- 'The melon has a larger volume than the apple.'

Introduce the term 'volume' using the following stem sentence: **'The amount of space the ___ takes up is its volume.'** Encourage children to use the following stem sentence to compare objects: **'The ___ has a larger volume than the ___.'**

- ➡ I can measure volume
- ➡ I can measure volume in millilitres
- ➡ I can measure volume in millilitres up to 1,000ml

Vary the scales

1. Scales with intervals of 100 up to 1000
2. Scales with intervals of 500 up to 1000
3. Scales with intervals of 100 up to 500 etc
4. Scales with intervals of 200 up to 1000
5. Scales with intervals of 200 up to 400 etc

➡ I can measure volume in litres

➡ I can recognise the relationship between millilitres and litres

$$1 \text{ litre} = 1000\text{ml}$$

$$1 \text{ litre} = 10 \times 100\text{ml}$$

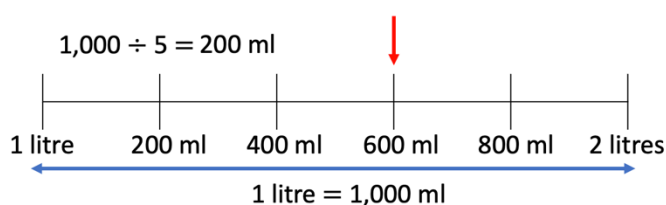
➡ I can convert between millilitres and litres

➡ I can measure volume in millilitres and litres



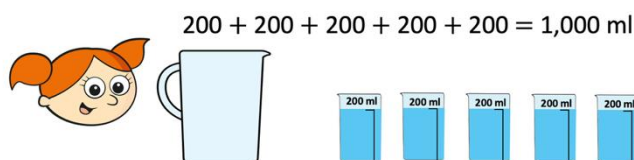
What is the volume of water in this jug? 1 litre and 600 ml

1 litre and 300 ml?

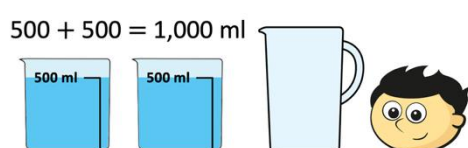


➡ I can apply the four operations to volume and capacity

➡ I can combine different volumes



They had the same amount of water.



- 0 → I can compare volume using < , > and =
- 0 → I can compare capacity and volume (including using < , > and =)
- 0 → I can compare capacity and volume (including using < , > and =)
- 0 → I can apply the four operations to volume and capacity

Year Five and Year Six (Both to be taught in Year Five)

https://www.ncetm.org.uk/media/zo4i4d5q/ncetm_spine2_segment20_y5.pdf

- 0 → I can understand the term 'volume'
- 0 → I can measure volume in millilitres up to 1,000ml
- 0 → I can recognise the relationship between millilitres and litres

1 litre = 1000ml
1 litre = 10 × 100ml

- 0 → I can convert between millilitres and litres

Use multiplying and dividing calculation policy to support if needed

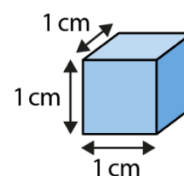
Millilitres → litres $\text{_____ ml} \div 1000 = \text{_____ l}$

Litres → millilitres $\text{_____ l} \times 1000 = \text{_____ ml}$

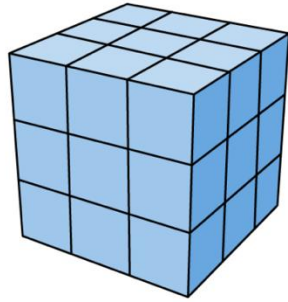
- 0 → I can measure volume in millilitres and litres
- 0 → I can combine different volumes
- 0 → I can compare capacity and volume (including using < , > and =)
- 0 → I can apply the four operations to volume and capacity
- 0 → I understand that volume is measured in cubic units
- 0 → I can find the volume using centimetres cubed

1. Using cubes

A 1 cm³ cube:



volume = 1 cm³



So this cube has a volume of 27 cm^3

• 'Shape A has been made using twenty-seven cubes.'

2. Real life objects

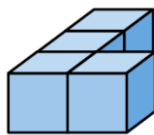
Using a $1\text{cm} \times 1\text{cm} \times 1\text{cm}$ cube, estimate the volume of different things:

- *Cereal boxes*
- *Books*
- *Lunchboxes etc*

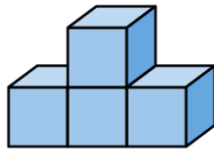
Work towards the following generalised statement: **'You can measure volume in cubic centimetres. You write this as " cm^3 ".'**

3. Images

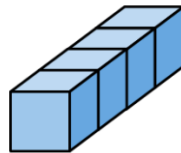
'What is the volume of each shape?'



4 cm^3



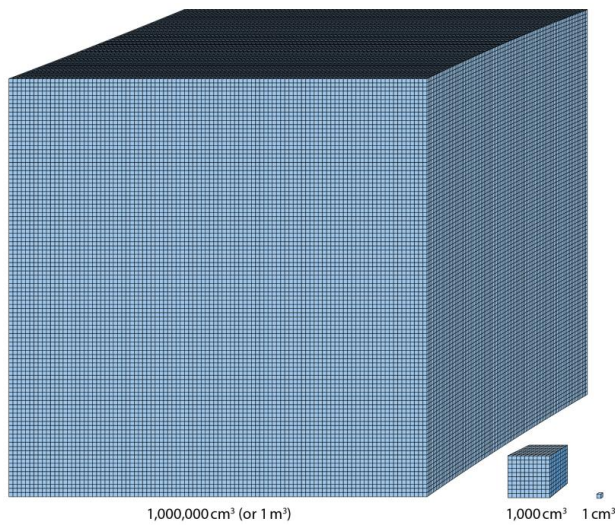
4 cm^3



4 cm^3

• 'This shape has a volume of 4 cm^3 .'

➡ I can find the volume using metres cubed



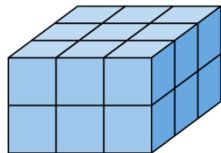
🔑 I can use multiplication to find the volume of a cuboid

1. Recap properties of a cuboid

- It has six rectangular faces.
- It has twelve edges.
- It has eight vertices.

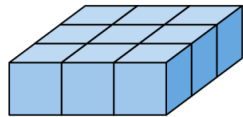
2. Using smaller cubes (can use cubes to support)

What is the volume of this cuboid?



3. Using layers (can use cubes to support)

Step 1 – working out the volume of one layer:



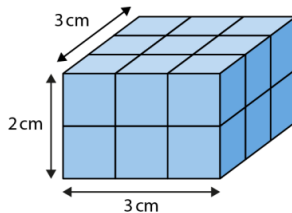
- 'This layer has three rows of three cubes.'
- $3 \times 3 = 9$
- 'So there are nine 1 cm^3 cubes in this layer.'
- 'This layer has a volume of 9 cm^3 .'

Step 2 – adding the layers together:

- 'There are two layers of 9 cm^3 .'
- $9 \times 2 = 18$
- 'The volume of the cuboid is 18 cm^3 .'

Finding the volume of a complete cuboid:

'What is the volume of this cuboid?'

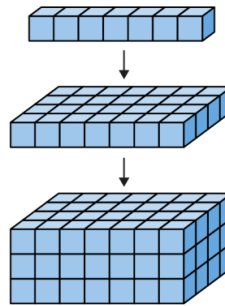


$$3 \text{ cm} \times 3 \text{ cm} \times 2 \text{ cm} = 18 \text{ cm}^3$$

- 'The volume of the cuboid is 18 cm^3 .'

Building up layers to find the volume:

'What is the volume of this cuboid?'



$$7 \text{ cm} \times 4 \text{ cm} \times 3 \text{ cm} = 84 \text{ cm}^3$$

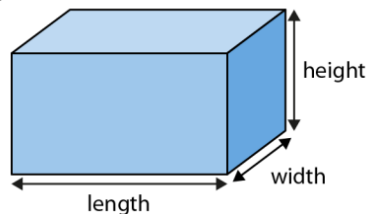
- 'The volume of the cuboid is 84 cm^3 .'

stem sentences:

- 'This layer has ____ rows of cubes.'
- 'There are ____ 1 cm^3 cubes in this layer.'
- 'This layer has a volume of ____ cm^3 .'
- 'There are ____ layers of ____ cm^3 .'
- 'The volume of the cuboid is ____ cm^3 .'

4. Multiplication

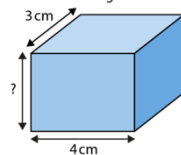
Finding the volume of a cuboid:



Use the following generalised statement: **'The volume of a cuboid can be found by multiplying the length by the width by the height.'**

➡ I can find a missing length using volume

'A box has a volume of 36 cm^3 . The width is 3 cm and the length is 4 cm . What is the height?'



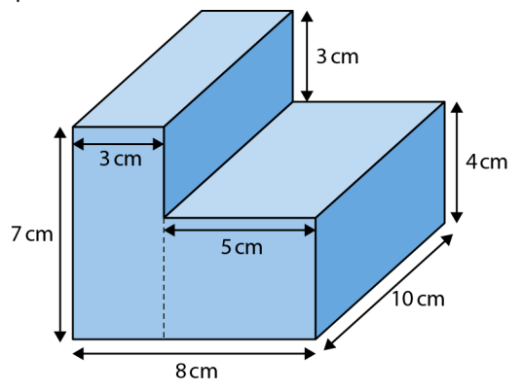
- 'We know the width is 3 cm .'
- 'We know the length is 4 cm .'
- 'We know the volume is 36 cm^3 .'
- 'We need to find the height.'
- 'We can write this as'
- $3 \times 4 \times ? = 36$
- 'which is the same as'
- $12 \times ? = 36$
- 'And we know that'
- $12 \times 3 = 36$
- 'So the height is 3 cm .'

0→ I can find the volume of compound shapes (rectilinear)

1. Splitting it into two cuboids

Show that it doesn't matter which way you split it, the volume will remain the same.

Split 1:



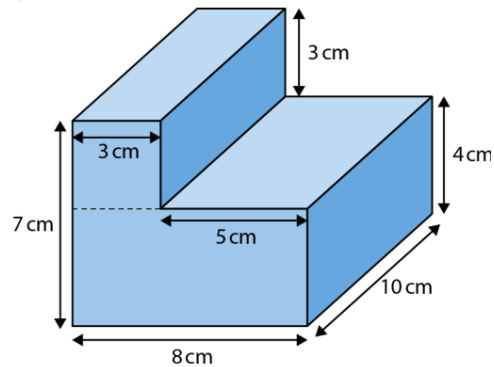
Cuboid 1: $7\text{ cm} \times 3\text{ cm} \times 10\text{ cm}$

Cuboid 2: $5\text{ cm} \times 4\text{ cm} \times 10\text{ cm}$

$$V = 7\text{ cm} \times 3\text{ cm} \times 10\text{ cm} + 5\text{ cm} \times 4\text{ cm} \times 10\text{ cm}$$

$$V = 410\text{ cm}^3$$

Split 2:



Cuboid 1: $3\text{ cm} \times 3\text{ cm} \times 10\text{ cm}$

Cuboid 2: $8\text{ cm} \times 4\text{ cm} \times 10\text{ cm}$

$$V = 3\text{ cm} \times 3\text{ cm} \times 10\text{ cm} + 8\text{ cm} \times 4\text{ cm} \times 10\text{ cm}$$

$$V = 410\text{ cm}^3$$

2. Subtracting a section

0→ I can estimate the volume and capacity of different objects

Include ml, l, cm^3 and m^3

0→ I can understand and use approximate equivalences between metric and imperial units

0→ I can apply the four operations to volume and capacity