

Estimating Volume

twinkl

Aim

- I can estimate volume using cubic centimetres (cm^3).

Success Criteria

- I can explain what volume is and measure it in cm^3 .
- I can estimate the number of centimetre cubes needed to build shapes.
- I can estimate the volume of cuboids in cm^3 .

Fill the Bucket!

Which of the other containers could you use to fill the bucket with exactly four litres of water?

How many times would you need to fill the container to fill the bucket?

Tilly uses the one-litre watering can to fill it. She fills the one-litre watering can four times to fill the larger bucket.

This bucket has a capacity of 4 litres.



What Is Volume?

In this lesson, we will use centimetre cubes to estimate volume.

Capacity is the amount that a container can hold altogether. We can use a range of measurements to measure the capacity of liquid, such as litres, millilitres or pints.

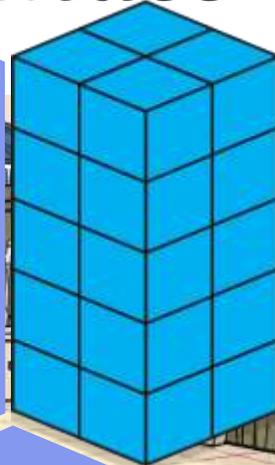
Volume is the amount of space taken up by an object. We use cubic units, such as cubic centimetres (written as cm^3), to measure volume.



How to Estimate Volume

How would we write the volume of each shape in cubic centimetres?

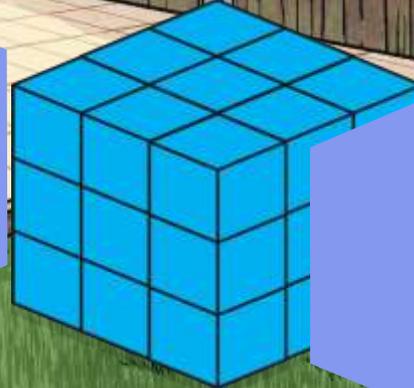
20 cubes



20cm³

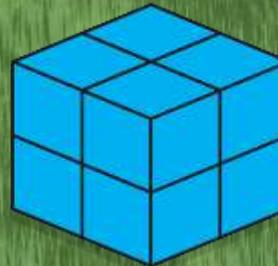
We can estimate the volume of a cube or cuboid by counting the centimetre cubes that it is built from.

27 cubes



27cm³

8 cubes

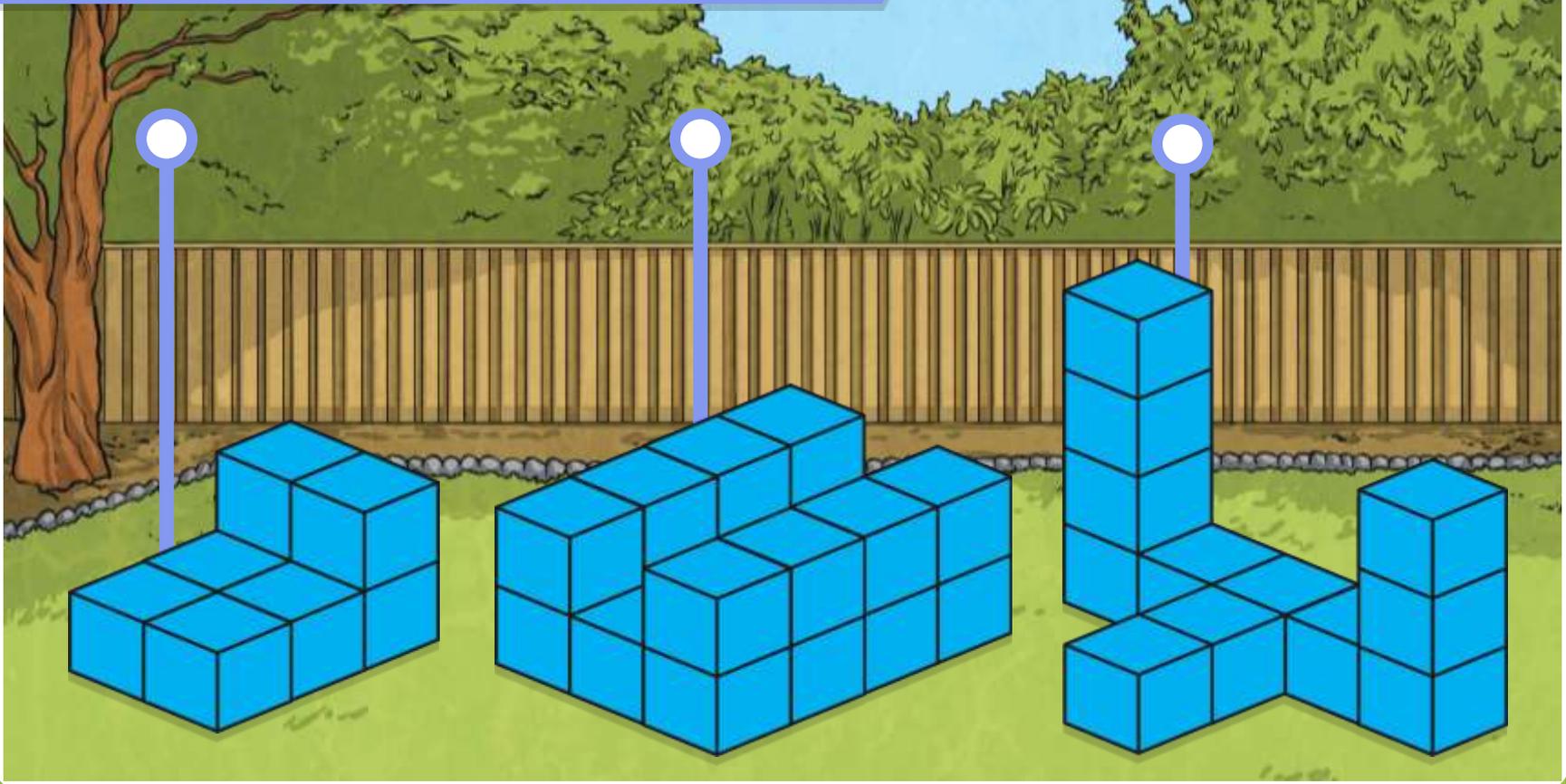


8cm³

How to Estimate Volume



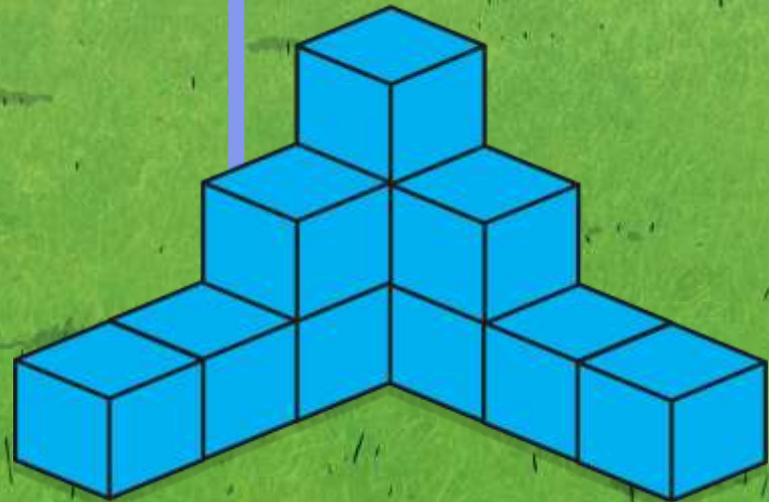
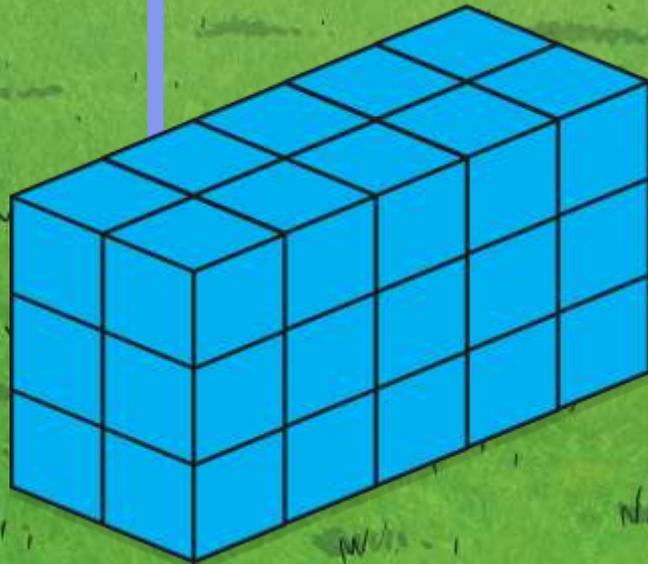
What is the volume of each shape?



How to Estimate Volume



Can you count the cubes to estimate the volume of each shape without building it? Remember to count the cubes that you can't see.



Calculating and Estimating Volume

To find the volume of any cuboid, we must first find the area of one of its faces.

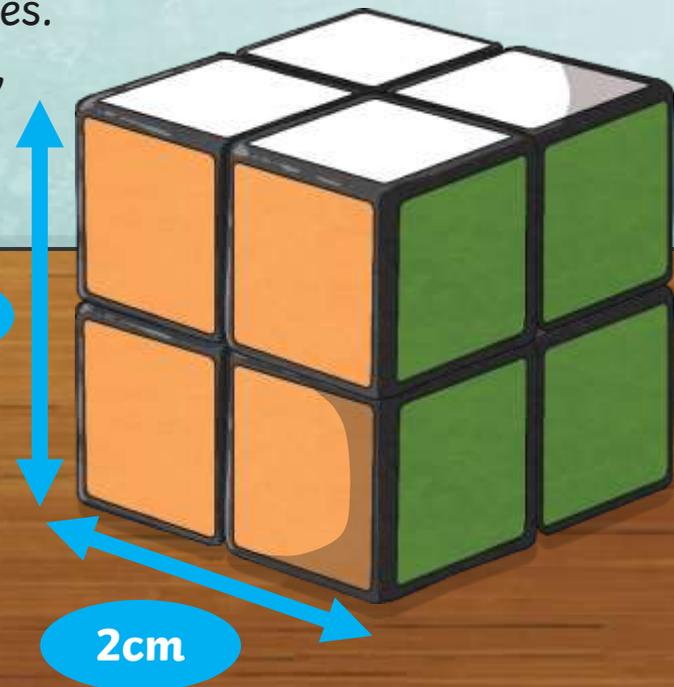
Area is measured using square centimetres. To find the area of a square or rectangle, we multiply the width by the length.

$$2\text{cm} \times 2\text{cm} = 4\text{cm}^2$$

$$\text{Area of one face} = 4\text{cm}^2$$

2cm

2cm



Calculating and Estimating Volume

To find the volume of a cuboid, we multiply the width by the length and then multiply this by the height.

We can write this volume calculation as

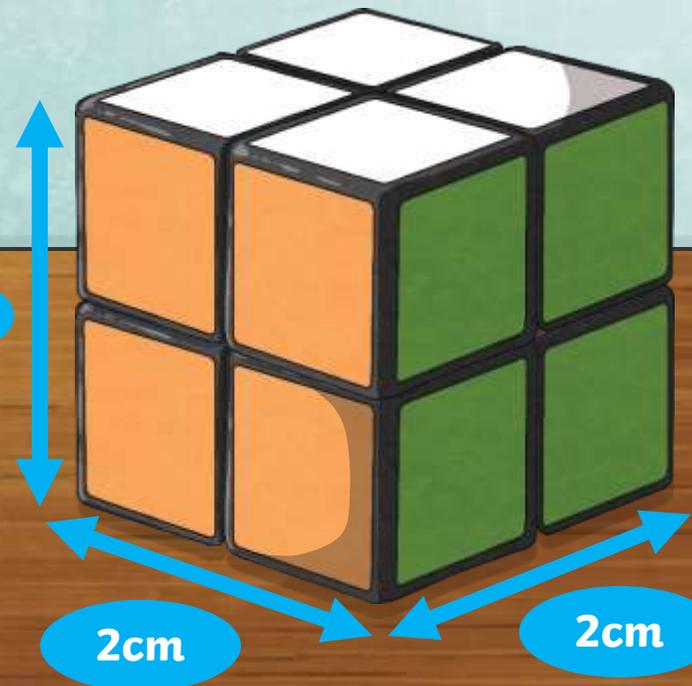
$$2\text{cm} \times 2\text{cm} \times 2\text{cm} = \mathbf{8\text{cm}^3}$$

Count the cubes to check.

Does the shape have a volume of 8cm^3 ?

This is the same as finding the area of one face and multiplying it by the depth of the shape.

$$2 \text{ layers of } 4\text{cm}^3 = \mathbf{8\text{cm}^3}$$
$$\text{or } 2 \times 4\text{cm}^3 = \mathbf{8\text{cm}^3}$$



Calculating and Estimating Volume

Use length \times width \times height to find the volumes of these shapes.

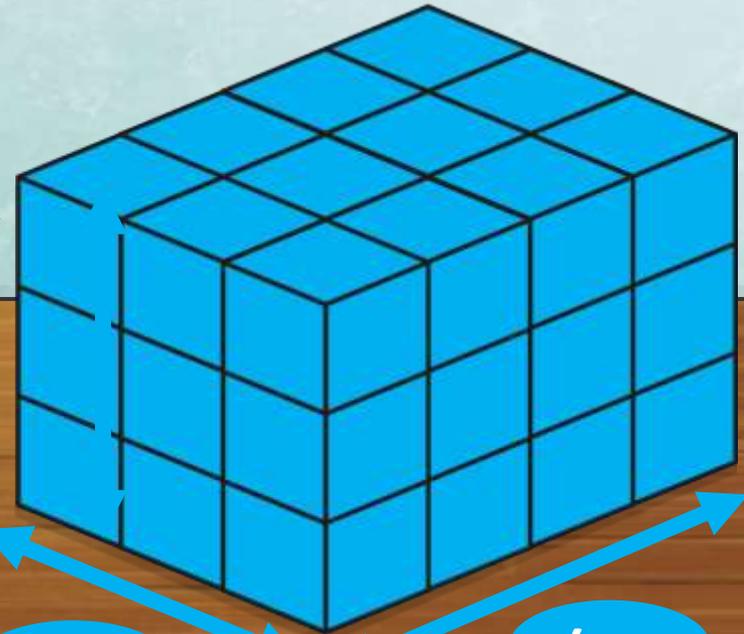
Does it change the answer if you multiply in a different order?
Discuss.

width \times height \times length
or
height \times length \times width

3cm

3cm

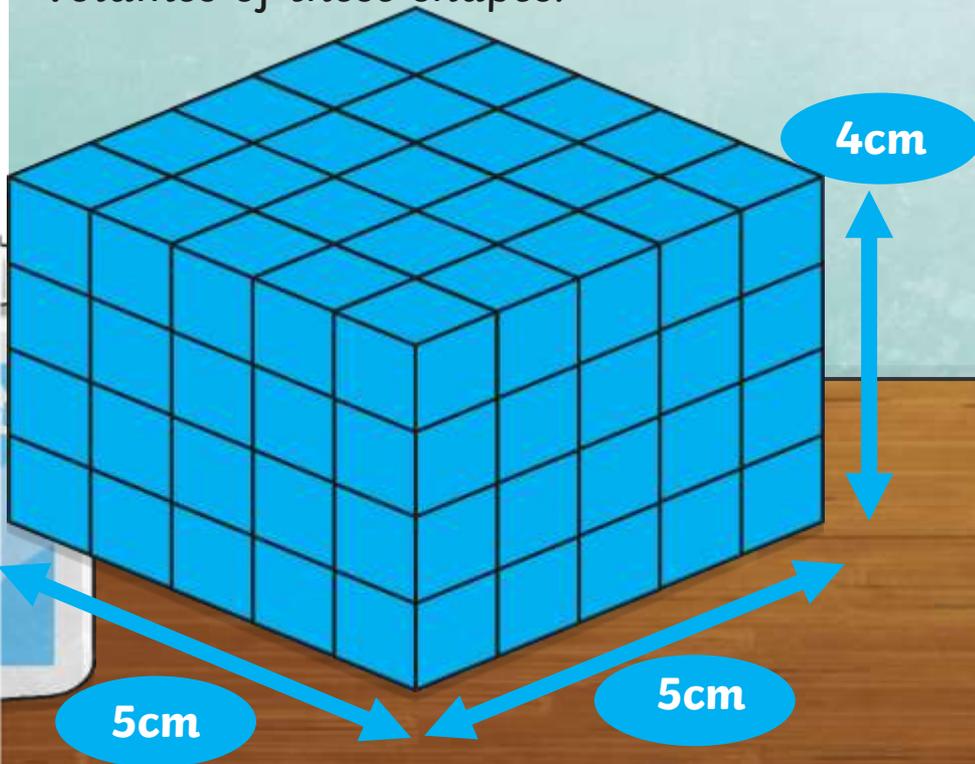
4cm



Calculating and Estimating Volume

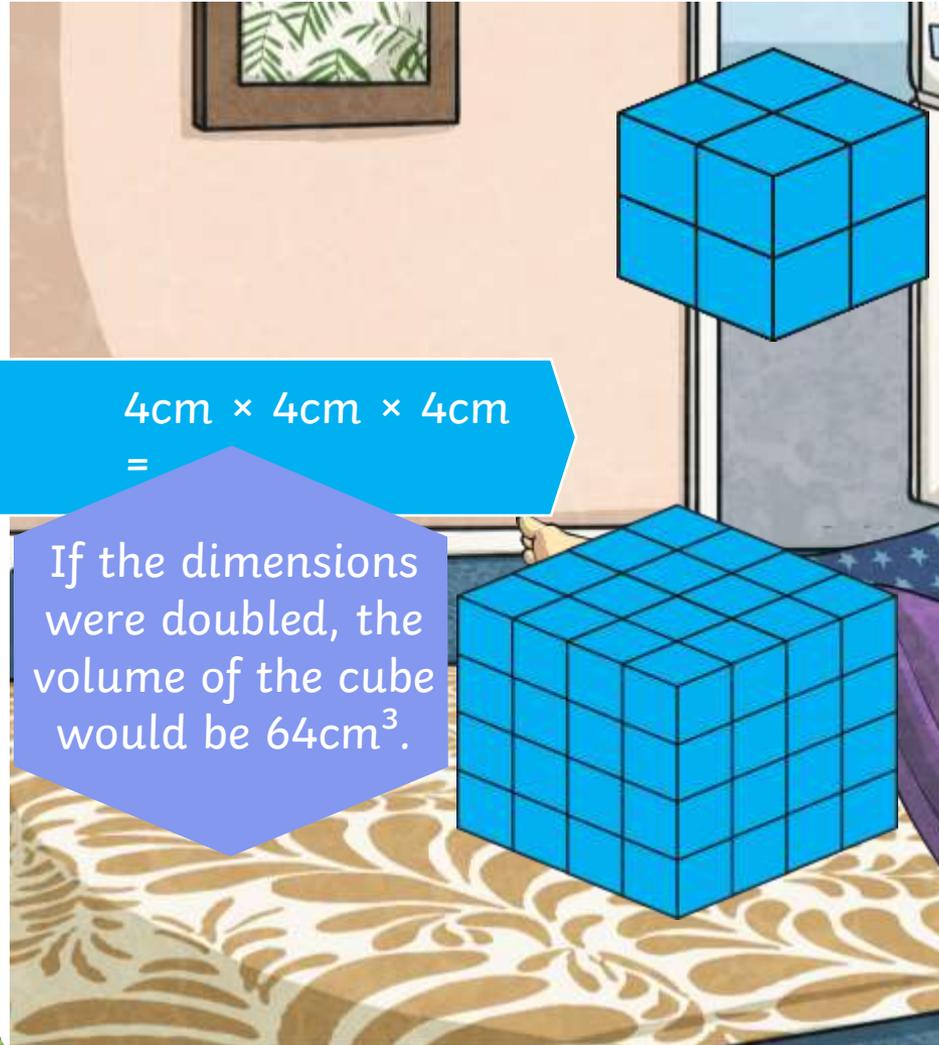
Use length \times width \times height to find the volumes of these shapes.

Does it change the answer if you multiply in a different order?
Discuss with your partner.



width \times height \times length
or
height \times length \times width

Volume Problems



$$4\text{cm} \times 4\text{cm} \times 4\text{cm} =$$

If the dimensions were doubled, the volume of the cube would be 64cm^3 .

The **dimensions** of a shape refer to its measurements in a particular direction. In this case, we have measured the cube's length, width and height.

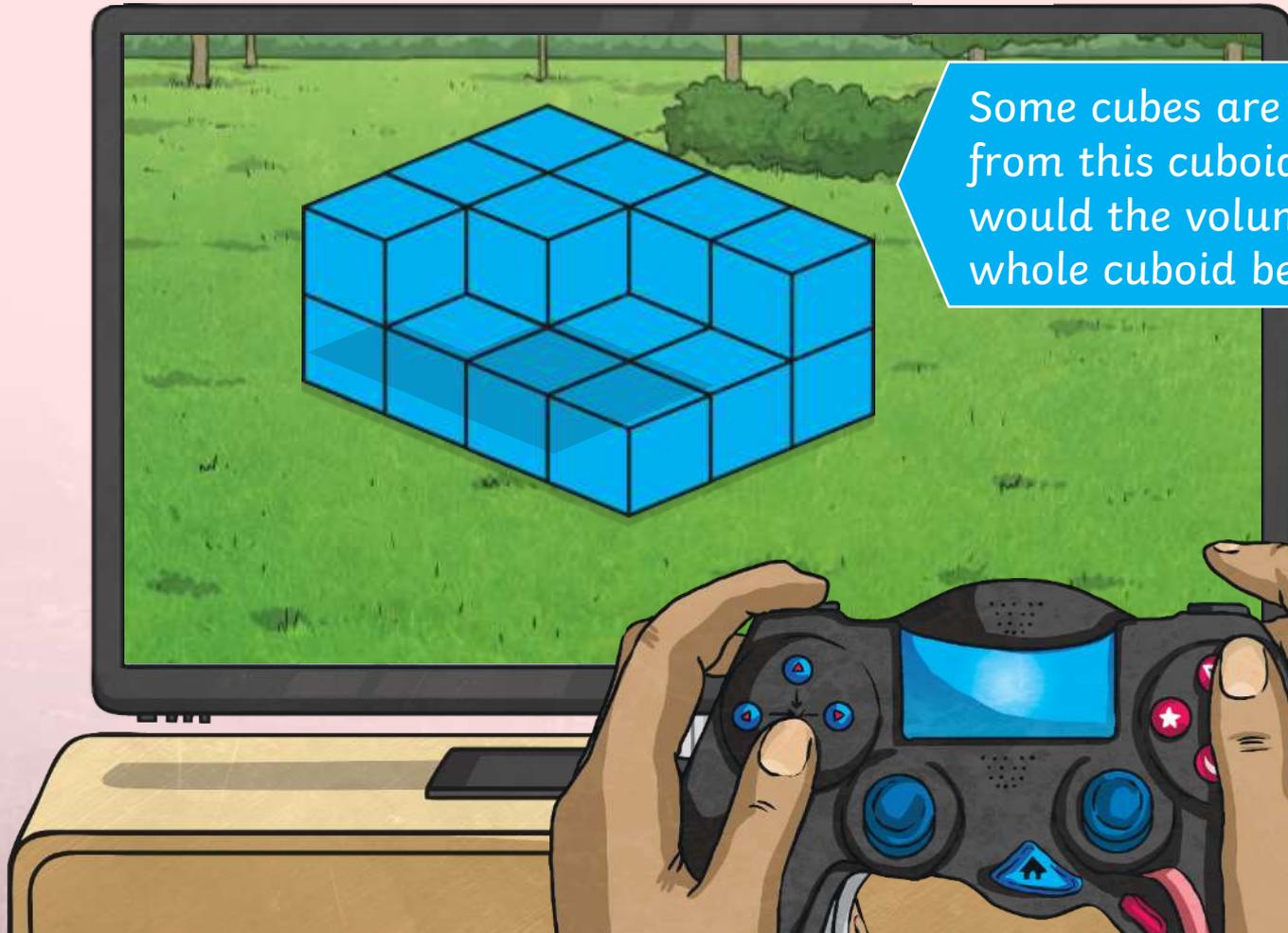
If the dimensions of this cube were doubled, what do you predict the volume of the cube would be?

What would be the length?

What would be the width?

What would be the height?

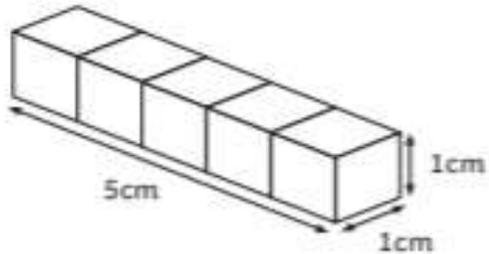
Volume Problems



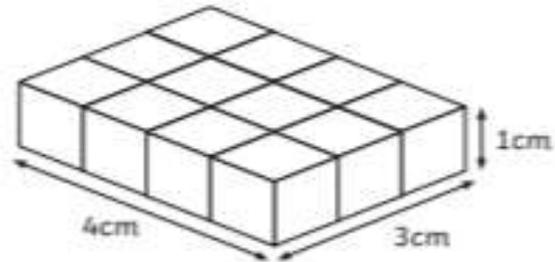
Some cubes are missing from this cuboid. What would the volume of the whole cuboid be?

1. Use centimetre cubes to estimate the volume of these shapes.

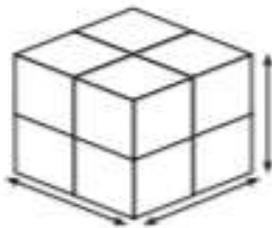
a) Volume = _____ cm^3



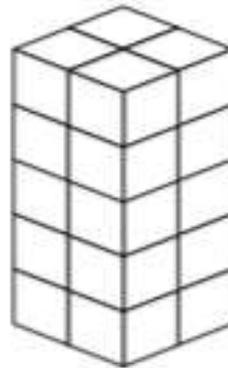
b) Volume = _____ cm^3



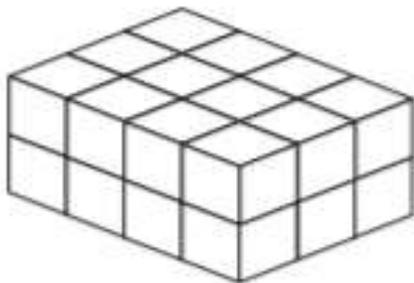
c) Volume = _____ cm^3



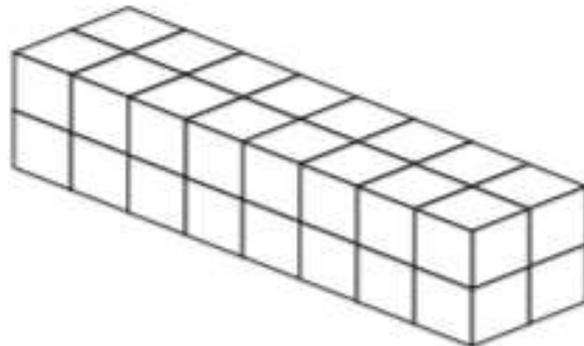
d) Volume = _____ cm^3



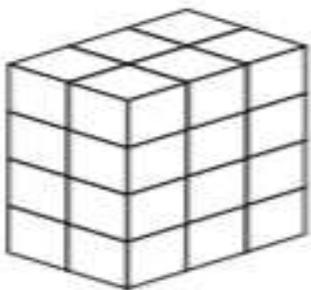
e) Volume = _____ cm^3



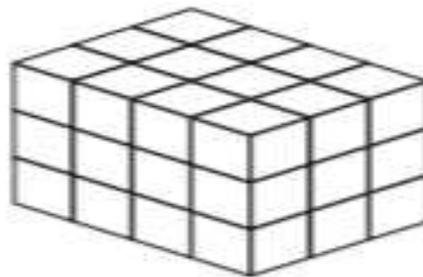
f) Volume = _____ cm^3



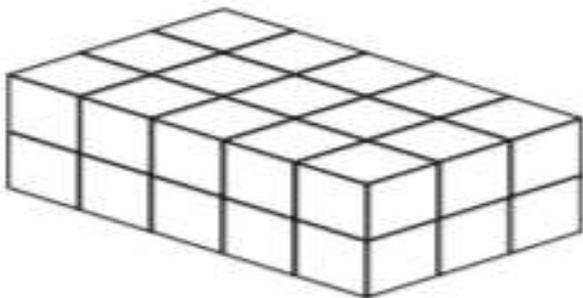
g) Volume = _____ cm^3



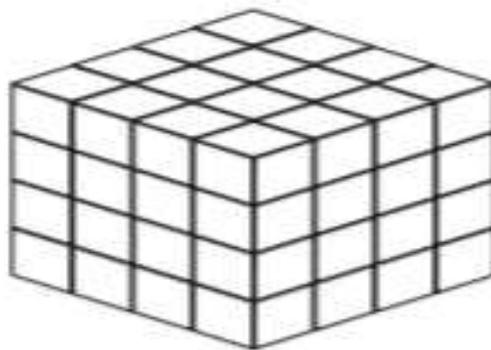
h) Volume = _____ cm^3



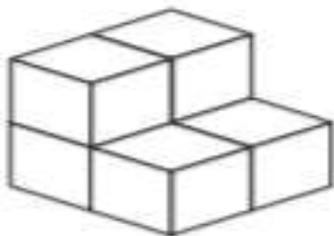
i) Volume = _____ cm^3



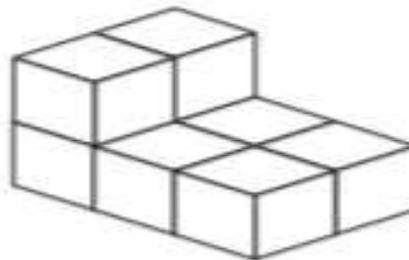
j) Volume = _____ cm^3



k) Volume = _____ cm^3

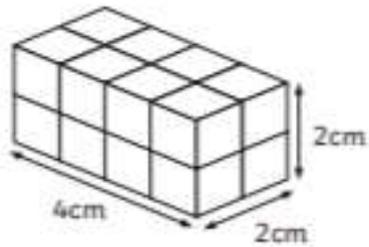


l) Volume = _____ cm^3

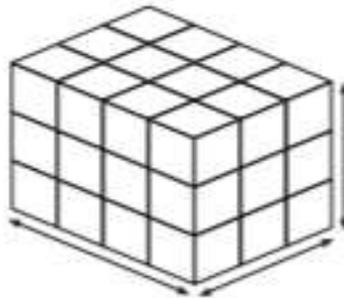


1. Estimate the volume of these shapes. You can use centimetre cubes to check your answer.

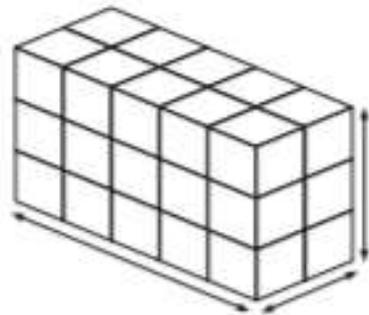
a) Volume = _____ cm^3



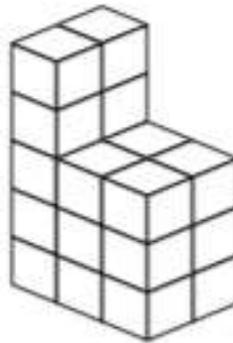
b) Volume = _____ cm^3



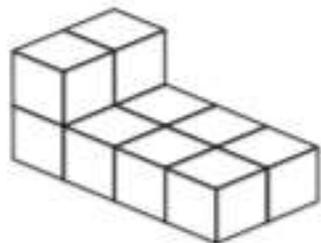
c) Volume = _____ cm^3



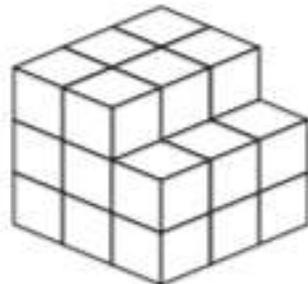
d) Volume = _____ cm^3



e) Volume = _____ cm^3

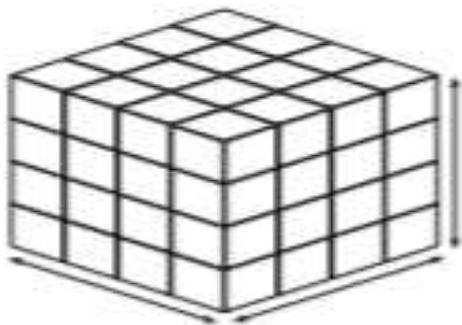


f) Volume = _____ cm^3

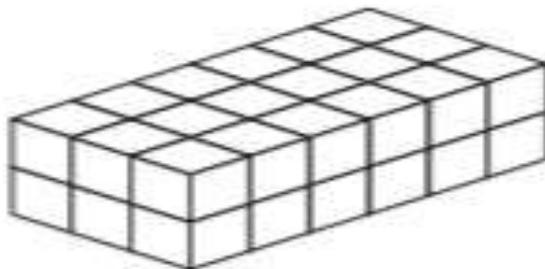


2. Calculate the volume of these shapes. Can you do this without using centimetre cubes?

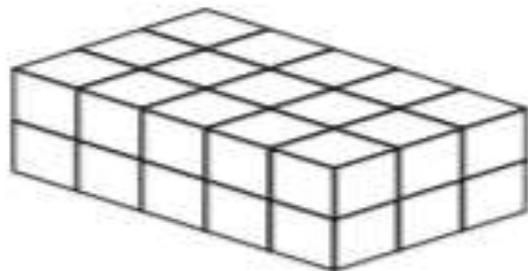
a) Volume = _____ cm^3



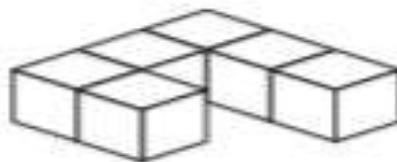
b) Volume = _____ cm^3



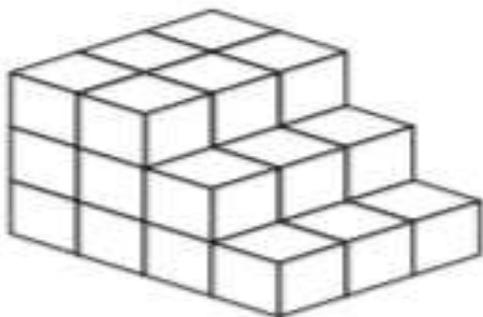
c) Volume = _____ cm^3



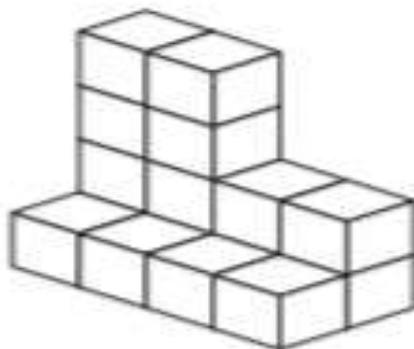
d) Volume = _____ cm^3



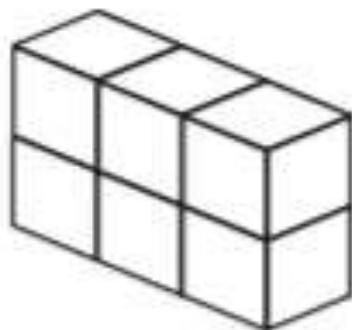
e) Volume = _____ cm^3



f) Volume = _____ cm^3



3. Estimate the volume of this shape if each dimension were doubled.

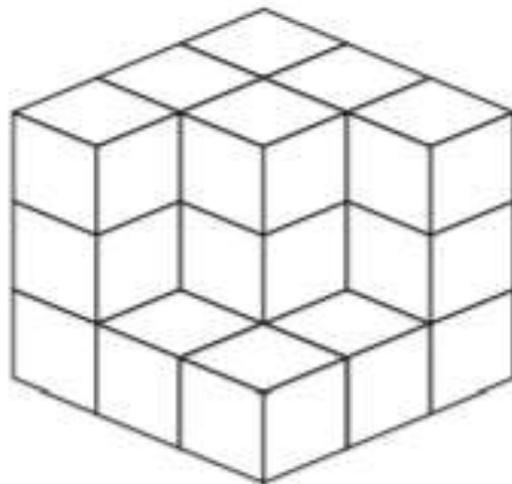


Estimated volume = _____ cm^3

Now use centimetre cubes to build the shape. What is the volume?

Volume = _____ cm^3

4. Some cubes are missing from this cube.



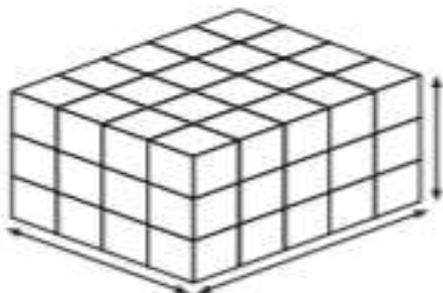
a. What are the fewest cubes possible that you could add to make this shape a cube? _____

b. What would the volume of the cube be?

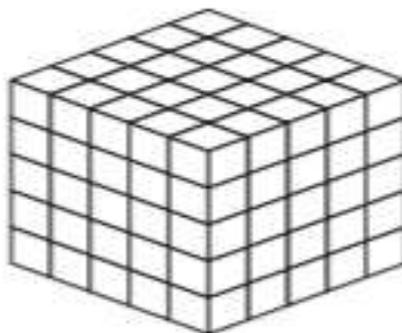
Volume = _____ cm^3

1. Calculate the volume of these shapes. Can you do it without using centimetre cubes?

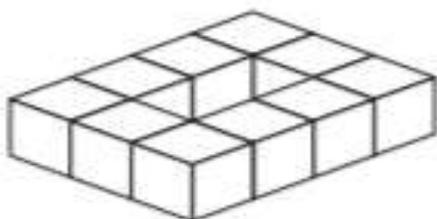
a) Volume = _____ cm^3



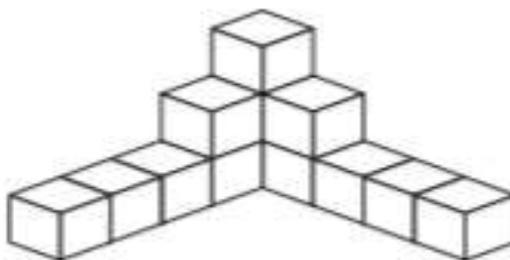
b) Volume = _____ cm^3



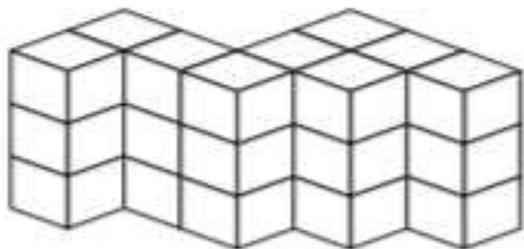
c) Volume = _____ cm^3



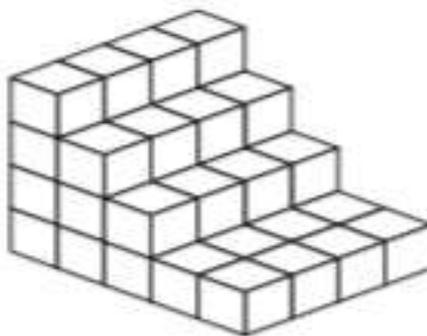
d) Volume = _____ cm^3



e) Volume = _____ cm^3

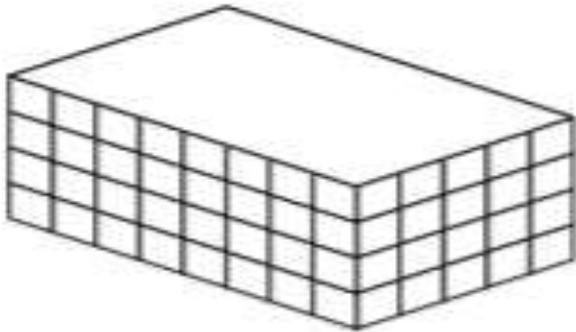


f) Volume = _____ cm^3

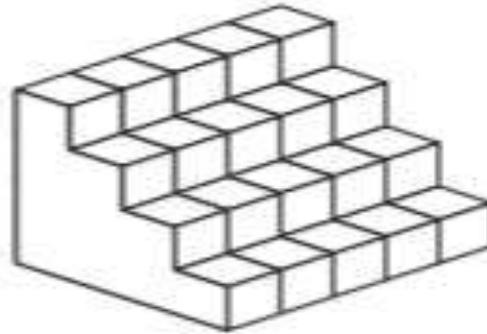


2. Not all of the centimetre cubes have been shown on these shapes. Calculate the volume of each shape.

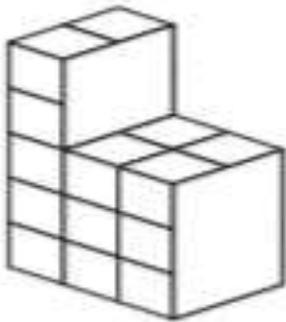
a) Volume = _____ cm^3



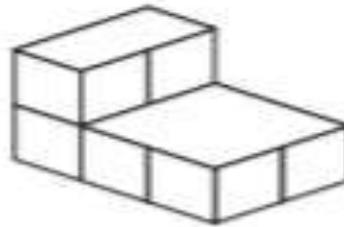
b) Volume = _____ cm^3



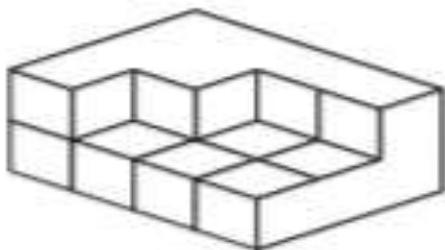
c) Volume = _____ cm^3



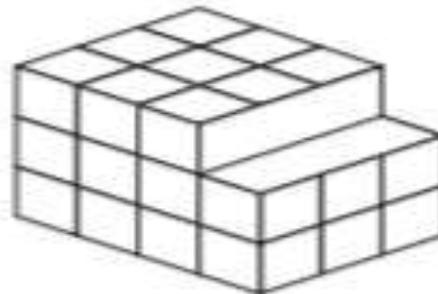
d) Volume = _____ cm^3



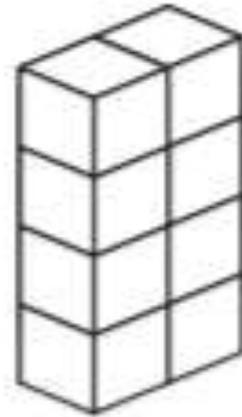
e) Volume = _____ cm^3



f) Volume = _____ cm^3



3. Estimate the volume of this shape if each dimension were doubled.

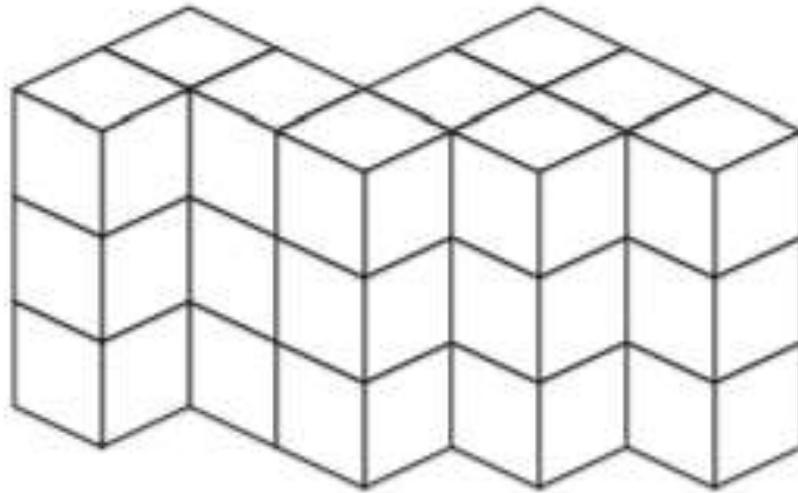


Estimated volume = _____ cm^3

Now use centimetre cubes to build the shape. What is the volume?

Volume = _____ cm^3

4. Some cubes are missing from this cuboid.



a. What are the fewest cubes possible that you could add to make this shape a cuboid? _____

b. What would the volume of the cuboid be?

Volume = _____ cm^3

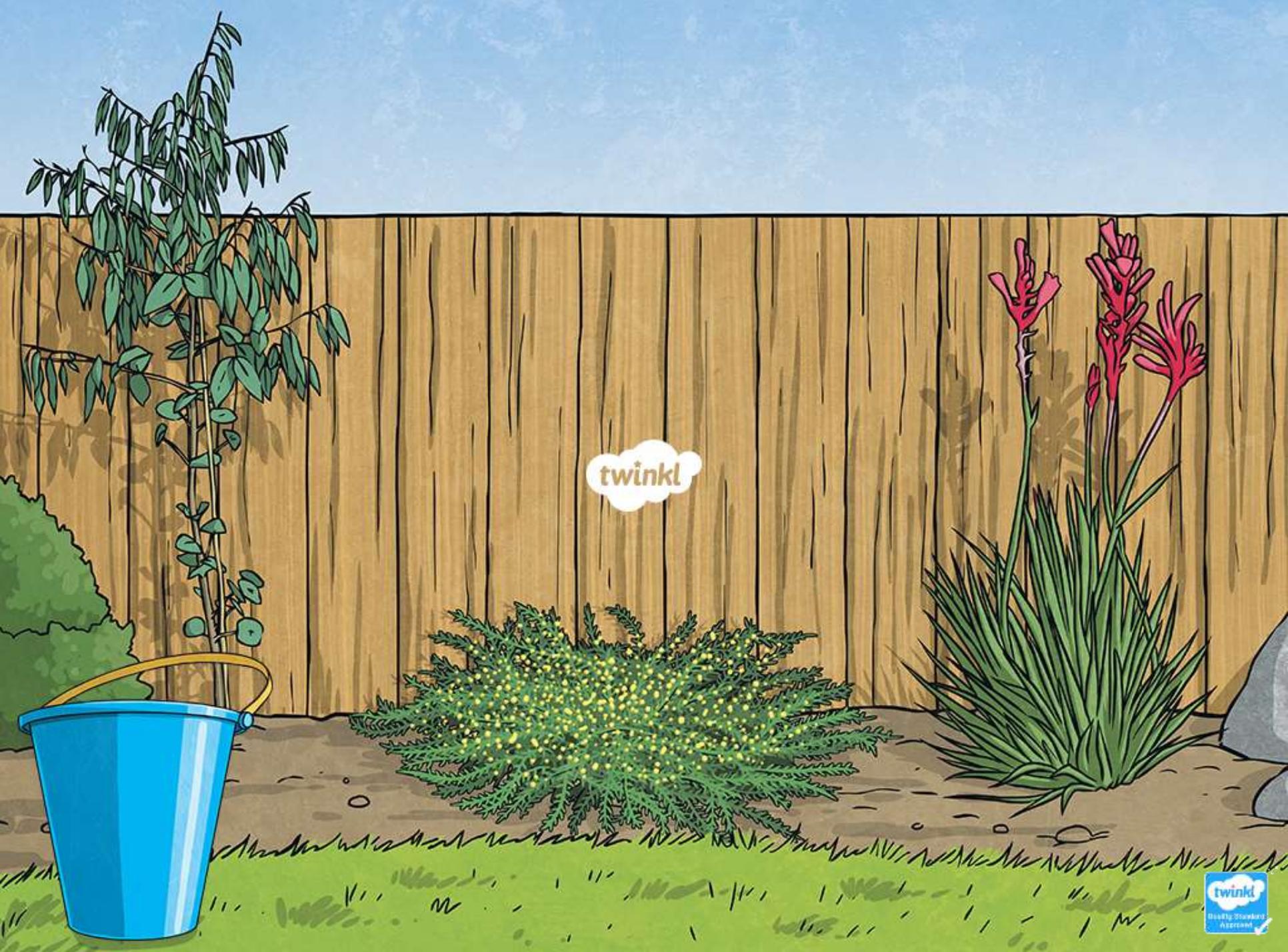
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