Unit 17

Measure – volume and capacity

In this unit we will ...

- Learn what the volume of a shape is
- Find volumes of shapes by counting unit cubes
- Draw shapes with different volumes
- Compare the volume of different shapes
- Estimate the capacity of different shapes

We will need some maths words. Which of these are new?

volume **cube** **cuboid** **3D shape**
solid **capacity** **calculate**
estimate **unit cubes**
least **greatest**

How many unit cubes are used to make this cube?

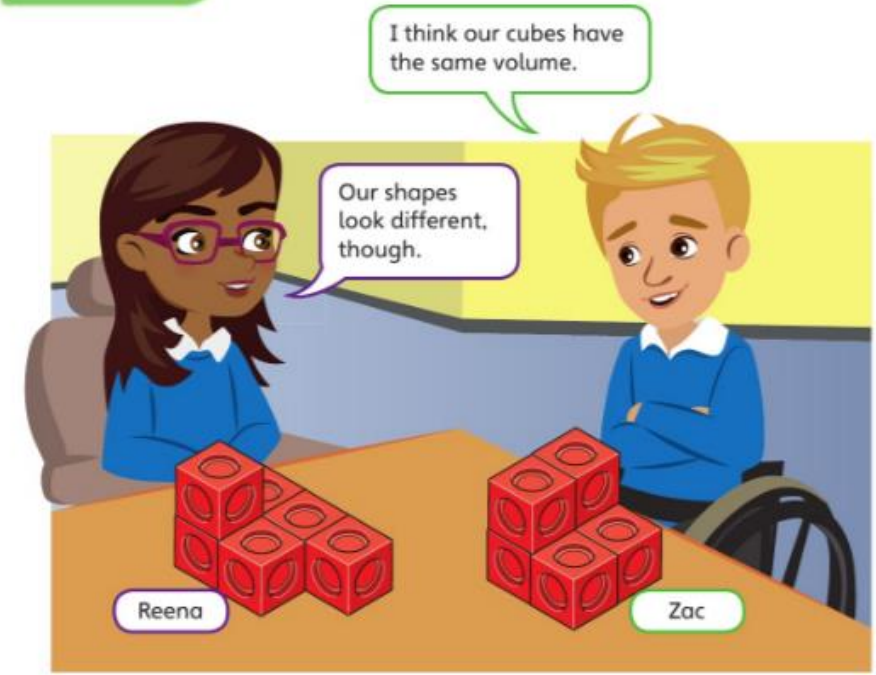
Which container do you think has the greatest capacity? Why?

Monday 15/6/2020 Year 5 Modelled Examples Unit 17 Lesson 1

Check out this video for extra guidance
https://www.bbc.co.uk/bitesize/topics/zjbg87h/articles/zcrxtyc

What is volume?

Discover



1 a) Is Zac correct?

What do you think is meant by **volume**?

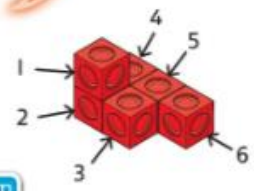
b) Build three other 3D shapes using cubes that have the same volume as Zac and Reena's shapes.

Share

a)

Volume means the amount of space that an object fills. We can use **unit cubes** as a way to measure volume.

I am going to count the number of unit cubes in each shape.



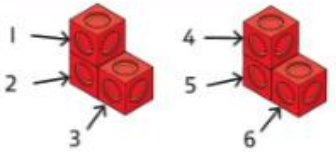
Reena's cube uses 6 cm cubes.

It has a volume of 6 unit cubes.

I think one of the cubes in Zac's shape is hidden.

Zac's shape also uses 6 unit cubes.

It has the same volume as Reena's shape.



b) Each of these shapes has a volume of 6 unit cubes, the same volume as Reena's and Zac's shapes.

Discuss with your carers then complete the activities in your maths book 5C p143

Think together

1 What is the volume of each shape?

a)

Volume = ☐ unit cubes

b)

Volume = ☐ unit cubes

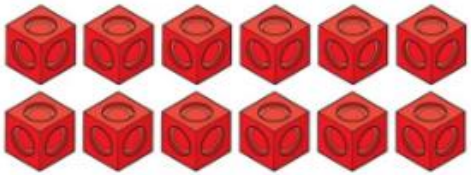
c)

Volume = ☐ unit cubes

d)

Volume = ☐ unit cubes

2 Using 12 cubes, build three different 3D shapes.



3 CHALLENGE

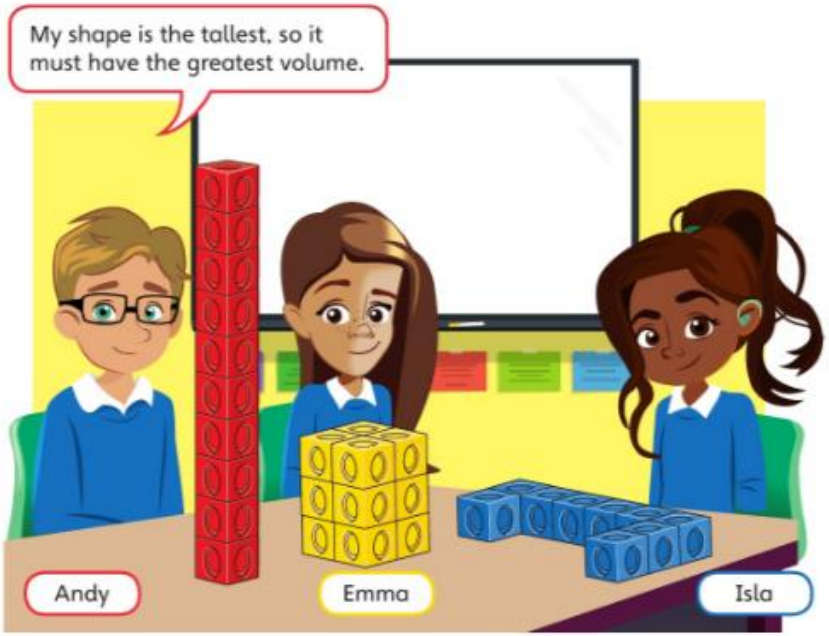
a) On isometric paper, draw more cubes like this one.

b) Draw the following 3D shapes on isometric paper.

What is the volume of each of your shapes?

Comparing volumes

Discover



1 a) Who has built the 3D shape with the greatest volume?

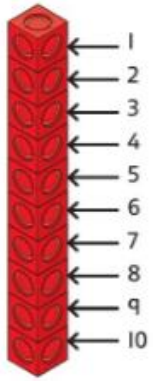
b) Isla adds more cubes to her shape so that it has the same volume as Emma's shape.

What could Isla's shape look like now?

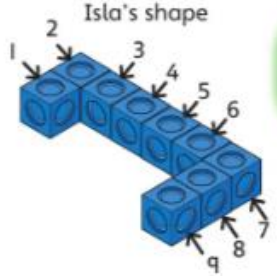
Share

a) Andy and Emma have made cuboids. Isla's shape is irregular.

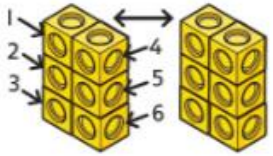
Andy's shape

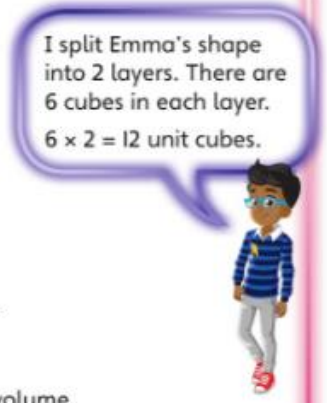


Isla's shape



Emma's shape



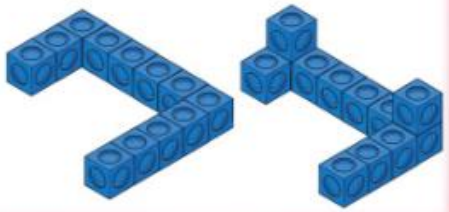


Andy's shape has a volume of 10 unit cubes.
Isla's shape has a volume of 9 unit cubes.
Emma's shape has a volume of 12 unit cubes.

9 < 10 < 12

Emma has built the shape with the greatest volume.

b) Isla's shape has 9 cubes. Emma's shape has 12. Isla needs to add 3 more cubes for her shape to have the same volume as Emma's. It might look like one of these two shapes.



Discuss with your carers then complete the activities in your maths book 5C p146

Think together

1 Isla and Emma make another two shapes.
Whose shape has the smaller volume?

Emma's shape

Isla's shape

Emma's shape is made of ☐ unit cubes.

Isla's shape is made of ☐ unit cubes.

☐ < ☐

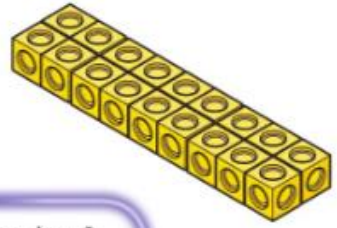
_____ shape has the smaller volume.

2 Order these shapes from least to greatest volume.

A

B

C



I will count all the cubes. I wonder if there is a different method I could also use.

3 **a)** Andy and Emma have made some more 3D shapes.

CHALLENGE

I think my shape has a larger volume as I have used more cubes.

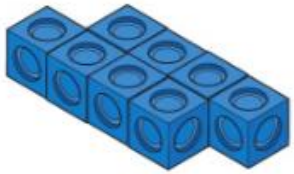
Andy

Are you sure? I think our shapes have the same volume.

Emma

Who is correct? Explain your answer.

b) Isla makes the following shape, using bigger cubes.



Does Isla's shape have the same volume as Andy's?

They must have the same volume as they have the same number of cubes.

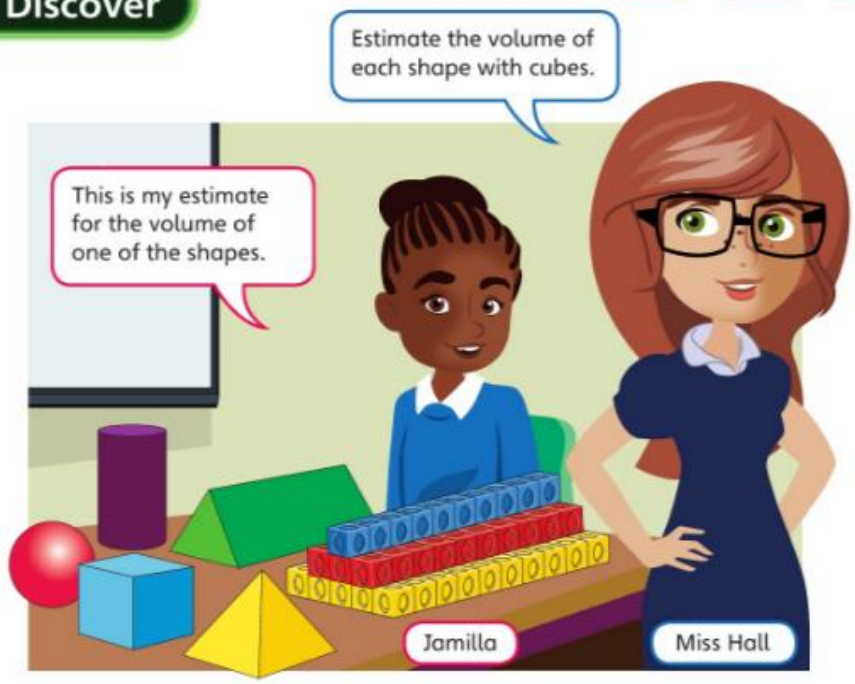
They have the same number of cubes, but Isla's cubes do not look the same size as Andy's.

Wednesday 17/6/2020 Year 5 Modelled Examples Unit 17 Lesson 3

Check out this link for extra guidance
https://classroom.thenational.academy/lessons/volume-to-estimate-the-volume-of-objects

Estimating volume

Discover



1 a) Which 3D shape did Jamilla estimate the volume of?

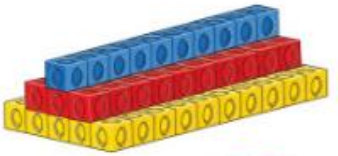
What is the estimate of the volume of the shape?

b) Why is it only an estimate?

Share

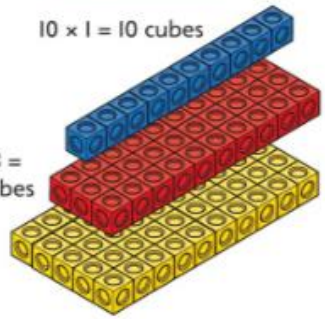
a) Jamilla estimated the volume of the triangular prism by making a shape out of cubes that could fit inside it.

I worked out the volume of each layer and added them together.



10 × 1 = 10 cubes

10 × 3 = 30 cubes



10 × 5 = 50 cubes

50 + 30 + 10 = 90 unit cubes

I tried another way. I worked out the volume in each 'slice' and multiplied.

10 × 9 = 90 unit cubes

An estimate of the volume of the triangular prism is 90 unit cubes.

b) The volume is an estimate because it is not exact, as there would still be spaces left in the triangular prism if it were filled with the cubes.

The volume of the 3D shape is likely to be a bit more than 90 cubes.

Discuss with your carers then complete the activities in your maths book 5C p149

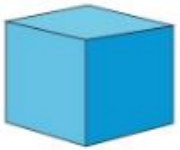
Think together

1 Use the models to estimate the volume of each of the 3D shapes.

a)

b)

c)



Which do you think is the most accurate estimate of the volume? Explain your answer.

2 Pick an object in your classroom.

How can you use cubes to estimate the volume of the object?

CHALLENGE

3 a) Discuss how to compare the volume of each ball.

I will make a model of each shape with cubes.

b)

Reena

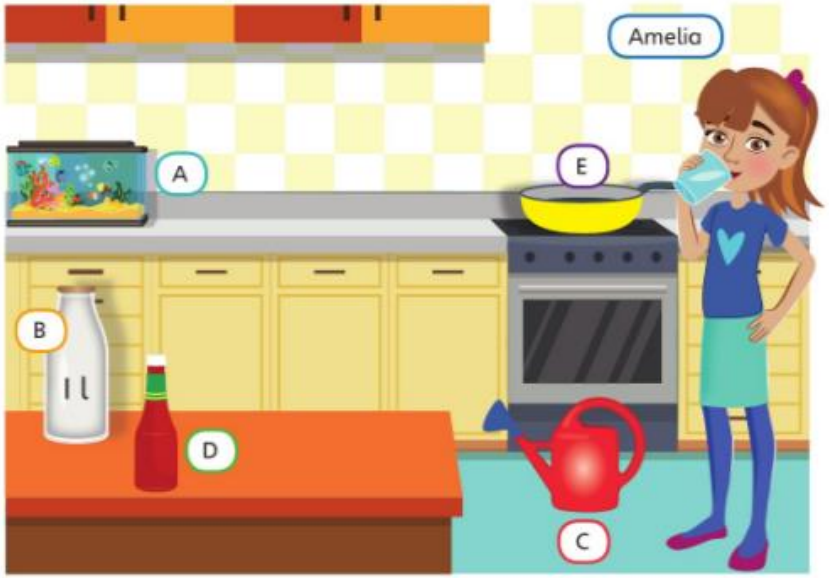
The football is about three times as tall as the tennis ball, so I think the volume will be three times greater, too.

Do you agree with Reena?

I will imagine each ball is a cube.

Estimating capacity

Discover



1 a) How much water do you estimate Amelia's glass will hold?

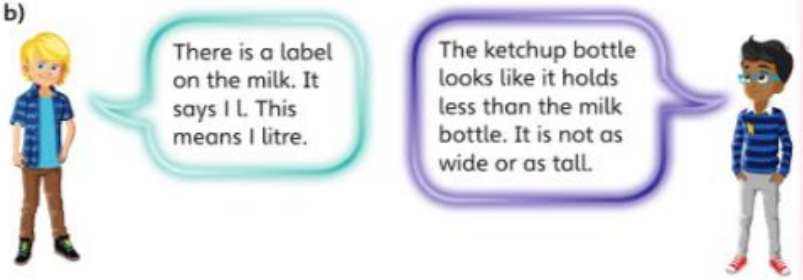
b) There are five containers in the kitchen, labelled A to E.

Put these containers in order, from the one with the smallest capacity to the one with the greatest capacity.

Share

a)

b)



The pan, watering can and fish tank hold more water than the milk bottle.

Smallest capacity ⟷ Greatest capacity

Discuss with your carers then complete the activities in your maths book 5C p152

Think together

1 Choose the best estimate of the capacity of each of these items.

a)

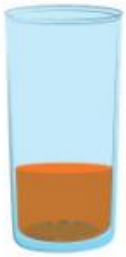
b)

500 ml	2 ml	5 l	2 l	500 l	20 l

2 100 ml of juice has been poured into each glass.

Estimate the capacity of each glass.

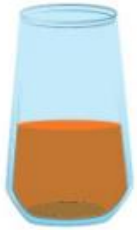
A



B

C

D



3 a) How can Danny measure the capacity of the colander?

Danny

I think there might be a way to use cubes to estimate.

I wonder if you could use rice or sand.

b) Discuss different methods for estimating the capacity of these containers accurately.

Friday 18/6/2020 Year 5 Modelled Examples Unit 17 End of unit check

Discuss these questions with your carer. Carer – check behind the image below to see the answers and what to look out for.

End of unit check

1 What is the volume of this shape?

A 8 unit cubes
B 7 unit cubes
C 9 unit cubes
D 17 units cubes

2 Which shape does not have the same volume as the other shapes?

A 
C 
B 
D 

3 Which shape has the greatest volume?

A 
C 
B 
D 

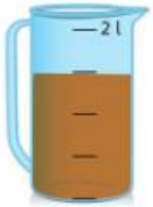
4 What is the most suitable estimate for a can of soft drink?

A 30 ml B 330 ml C 3 l D 30 l

5 300 ml of juice has been poured into the glass. Estimate the capacity of the glass.

A 300 ml C 700 ml
B 400 ml D 1 l

6 This jug was full. Now a pint has been poured from it. Use this information to estimate the number of ml in one pint.



7 Estimate how many spheres of this size will fit in the box. Explain your workings.

Complete the activities in your maths book 5C p155

Check out this links for extra practice

https://classroom.thenational.academy/lessons/volume-to-describe-volume-in-cubic-units