Reasoning and Problem Solving
Step 1: What is Volume?

National Curriculum Objectives:

Mathematics Year 5: (5M8) Estimate volume [for example, using 1 cm3 blocks to build cuboids (including cubes)] and capacity [for example, using water]

Differentiation:

Questions 1, 4 and 7 (Reasoning)
Developing Count the cubes in cuboids to find a total volume which equals the volume of the container. Cuboids will be no greater than 12cm^3.
Expected Count the cubes in cuboids to find a total volume which equals the volume of the container. Cuboids will be no greater than 24cm^3.
Greater Depth Count the cubes in the compound 3D shapes to find a total volume which equals the volume of the container. Compound 3D shapes will be no greater than 24cm^3.

Questions 2, 5 and 8 (Problem Solving)
Developing Explain which is the odd one out by matching two cubes/cuboids to three possible volumes of up to 12cm^3.
Expected Explain which is the odd one out by matching three cubes/cuboids to four possible volumes of up to 24cm^3.
Greater Depth Explain which is the odd one out by matching four compound 3D shapes to five possible volumes.

Questions 3, 6 and 9 (Reasoning)
Developing Explain if a statement describing the volume of cuboids is correct, using cuboids of no more than 12cm^3.
Expected Explain if a statement describing the volume of cuboids is correct, using cuboids of no more than 24cm^3.
Greater Depth Explain if a statement describing the volume of compound 3D shapes is correct, using compound 3D shapes of no more than 24cm^3.

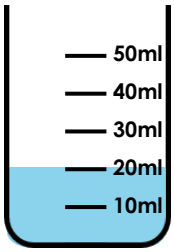
More Year 5 Volume resources.

Did you like this resource? Don't forget to review it on our website.

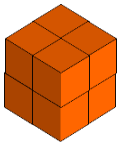
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What is Volume?

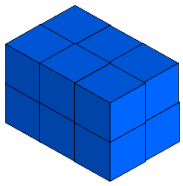
1a. Circle the cuboids that are equal to the volume of the container.



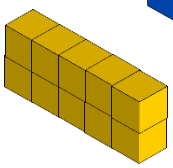
A.



C.



B.



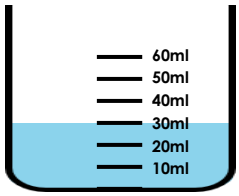
Prove it.

D

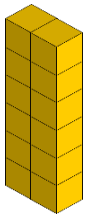
R

What is Volume?

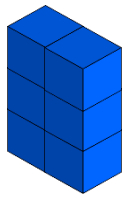
1b. Circle the cuboids that are equal to the volume of the container.



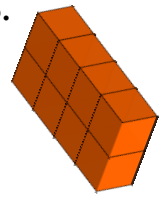
A.



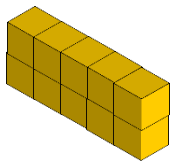
C.



B.



D.



Prove it.

D

R

2a. Find the odd one out by matching the shape to the correct volume.

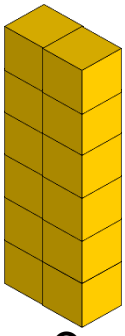
$8cm^3$

$12cm^3$

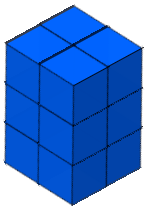
$12cm^3$

$14cm^3$

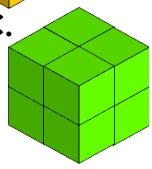
A.



B.



C.



Explain your reasoning.

D

PS

2b. Find the odd one out by matching the shape to the correct volume.

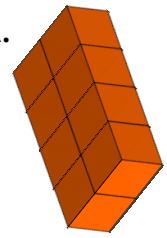
$6cm^3$

$8cm^3$

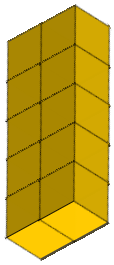
$10cm^3$

$12cm^3$

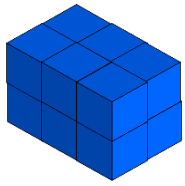
A.



B.



C.



Explain your reasoning.

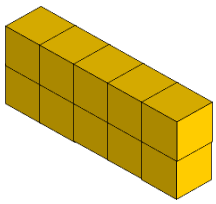
D

PS

3a. Tyler is calculating the volume of his shape.



I have counted 17 faces on my cuboid so the cuboid has a volume of $17cm^3$.



Is Tyler correct? Explain your answer.

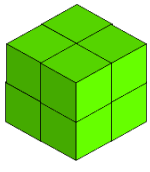
D

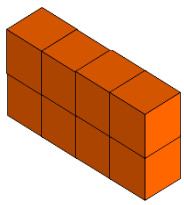
R

3b. Meera is calculating the volume of the shapes she has made.



My shapes both have 4 cubes on top and 4 cubes on the bottom so they must both have the same volume.





Is Meera correct? Explain your answer.

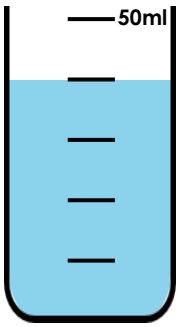
D

R

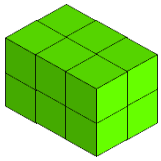
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What is Volume?

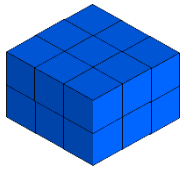
4a. Circle the cuboids that are equal to the volume of the container.



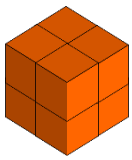
A.



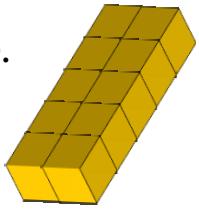
C.



B.



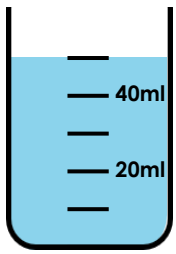
D.



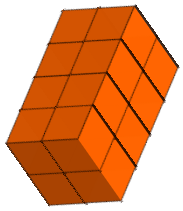
Prove it.

R

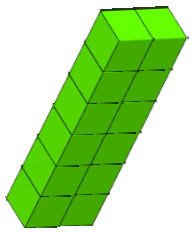
4b. Circle the cuboids that are equal to the volume of the container.



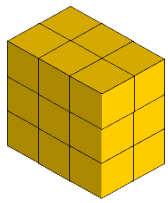
A.



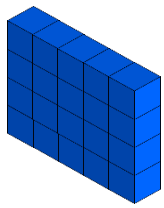
C.



B.



D.



Prove it.

R

5a. Find the odd one out by matching the shape to the correct volume.

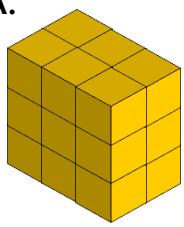
18cm³

16cm³

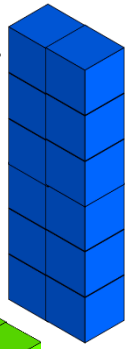
12cm³

8cm³

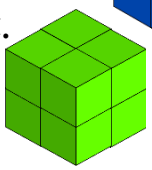
A.



B.



C.



Explain your reasoning.

PS

5b. Find the odd one out by matching the shape to the correct volume.

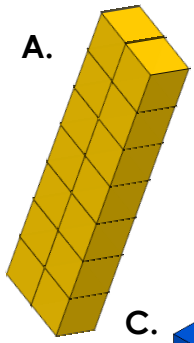
12cm³

18cm³

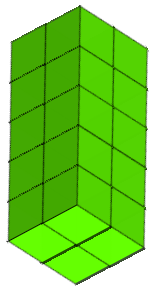
20cm³

14cm³

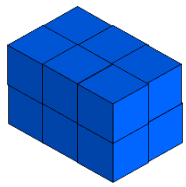
A.



B.



C.



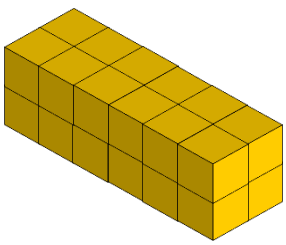
Explain your reasoning.

PS

6a. Amina is calculating the volume of her shape.



My shape has a length of 6 cubes, a width of 2 cubes and a height of 2 cubes. To find the volume I add these together.



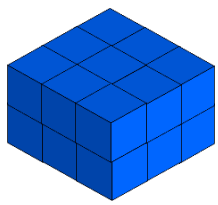
Is Amina correct? Explain your answer.

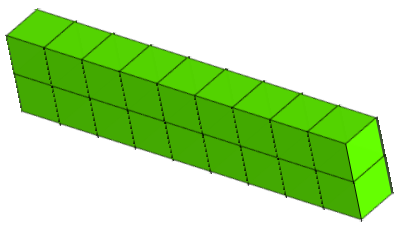
R

6b. Finley is calculating the volume of the shapes he has made.



My shapes don't look the same so the volumes must be different.





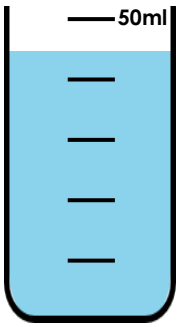
Is Finley correct? Explain your answer.

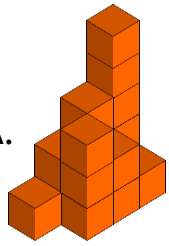
R

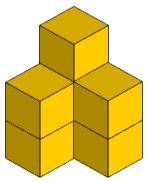
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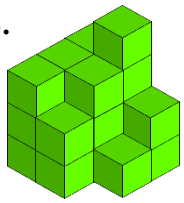
What is Volume?

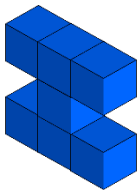
7a. Circle the cuboids that are equal to the volume of the container.









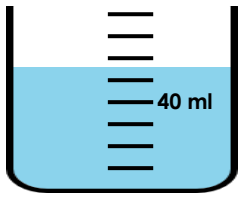


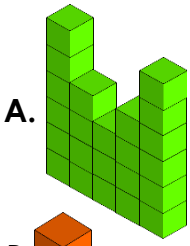
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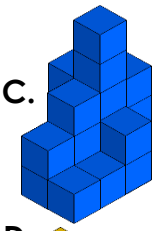
GD

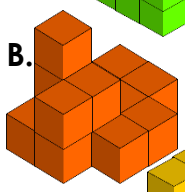
R

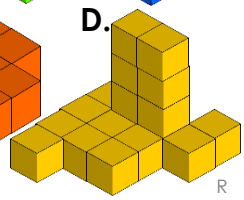
7b. Circle the cuboids that are equal to the volume of the container.











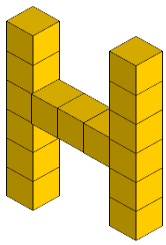
Prove it

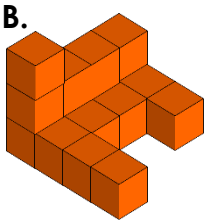
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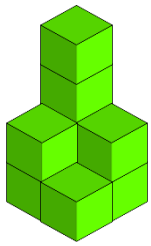
R

8a. Find the odd one out by matching the shape to the correct volume.

- 9cm³
- 16cm³
- 8cm³
- 15cm³







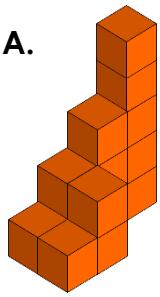
Explain your reasoning.

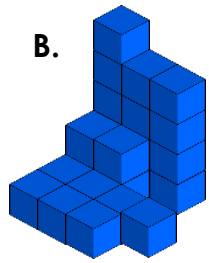
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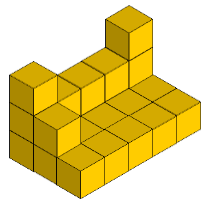
PS

8b. Find the odd one out by matching the shape to the correct volume.

- 23cm³
- 24cm³
- 20cm³
- 14cm³







Explain your reasoning.

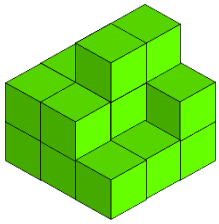
GD

PS

9a. Phoebe is calculating the volume of her shape.



If I move the 2 top cubes in to the second layer my shape will be a 3 x 3 x 2 cuboid so the volume will be 18cm³



Is Phoebe correct? Explain your answer.

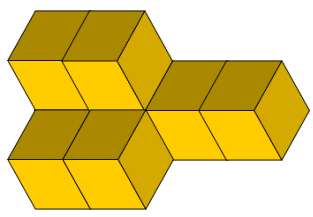
GD

R

9b. Patrick is calculating the volume of the shapes he has made.



To make my shape in to a cuboid I need to add 6 more cubes.



Is Patrick correct? Explain your answer.

GD

R

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Reasoning and Problem Solving
What is Volume?

Developing

1a. A + C. A has 8 cubes and C has 12 cubes. 8 + 12 = 20.

2a. $14cm^3$ is the odd one out because there is no cuboid that has this number of cubes.

3a. No. By counting the faces he has counted some cubes more than once. There cuboid has a volume of $10cm^3$

Expected

4a. A + C + D. A has 12 cubes, C has 18 cubes and D has 10 cubes. 12 + 18 + 10 = 40.

5a. $16cm^3$ is the odd one out because there is no cuboid that has this number of cubes.

6a. No. To find the volume you have to multiply the length by the width by the height. 6 x 2 x 2 = $24cm^3$

Greater Depth

7a. A + B + (C or D). A has 17 cubes, B has 21 cubes and C and D both have 7 cubes. 17 + 21 + 7 = 45.

8a. $8cm^3$ is the odd one out because there is no cuboid that has this number of cubes.

9a. Yes. By moving the top 2 cubes to the second layer she creates a cuboid that is 3 x 3 x 2 = $18cm^3$.

Reasoning and Problem Solving
What is Volume?

Developing

1b. A + C + D. A has 12 cubes, C has 8 cubes and D has 10 cubes. 12 + 8 + 10 = 30.

2b. $6cm^3$ is the odd one out because there is no cuboid that has this number of cubes.

3b. Yes. Both cuboids have a volume of $8cm^3$

Expected

4b. B + C + D. B has 18 cubes, C has 12 cubes and D has 20 cubes. 12 + 18 + 20 = 50.

5b. $18cm^3$ is the odd one out because there is no cuboid that has this number of cubes.

6b. No. Both cuboids have a volume of $18cm^3$

Greater Depth

7b. A + B + D. A has 23 cubes, B has 14 cubes and D has 18 cubes. 23 + 14 + 18 = 55.

8b. $20cm^3$ is the odd one out because there is no cuboid that has this number of cubes.

9b. No. The cuboid would be 4 cubes long, 2 cubes wide and 2 cubes high. Its volume would be 4 x 2 x 2 = $16cm^3$

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