

WA5MMGTH3

Three-dimensional space and structures

Core + Challenge

NAPLAN-style

Volume with Cubes

I can build and compare rectangular prisms from cubes and find their volume in cubic centimetres.

Name: _____ Date: _____ Score: _____ / 56

Key idea

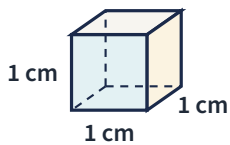
Volume is the amount of space an object takes up. We can measure it by counting **cubes**.

A **cubic centimetre (cm³)** is a cube with edges 1 cm long. Bigger things are measured in **cubic metres (m³)**: cubes with 1 m edges.

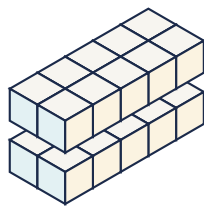
Build a rectangular prism in **layers**. Count the cubes in **one layer**, then add or multiply by the **number of layers**.

Example: 5 cubes in each row and 2 rows make **10 cubes** in a layer. 2 layers: $10 + 10 = 20 \text{ cm}^3$.

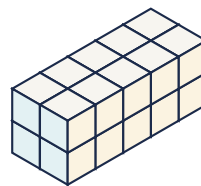
1 cm³ (true size)



2 layers of 10 cubes



Together: 20 cm³

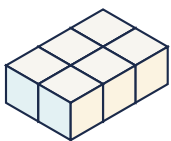


A Warm up *count cubes, layers and hidden cubes*

/ 16 marks

Each model is a solid rectangular prism made of 1 cm cubes (no gaps inside). What is its volume? 1 mark each.

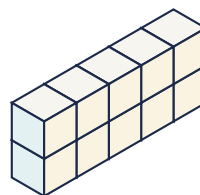
1



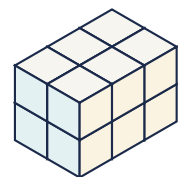
2



3



4



Which unit would you use to measure the volume? Circle **cm³** or **m³**. 1 mark each.

5

The volume of a **sugar cube**

cm³

m³

6

The volume of a **school hall**

cm³

m³

7

The volume of a **tissue box**

cm³

m³

8

The volume of a **rainwater tank**

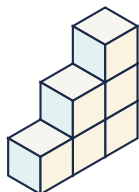
cm³

m³

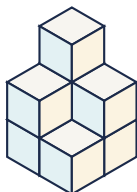
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Count the cubes. Every cube sits on the table or on another cube, so count the **hidden** cubes too. 1 mark each.

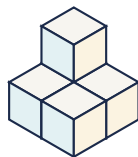
9



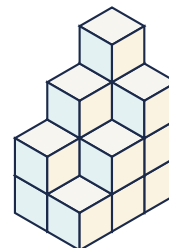
10



11

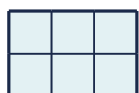


12

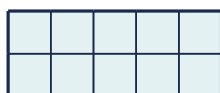


The grid shows one layer of cubes. How many cubes are in the prism? 1 mark each.

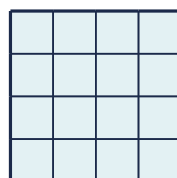
13 4 layers like this



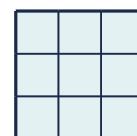
14 3 layers like this



15 2 layers like this



16 3 layers like this

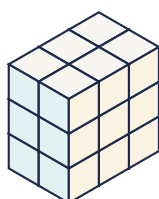


B Practise *use the skill*

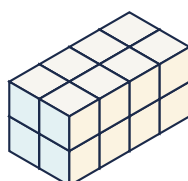
/ 21 marks

- 1 Both prisms are made of 1 cm cubes. Which prism has the **greater** volume? By how much? [2 marks]

A

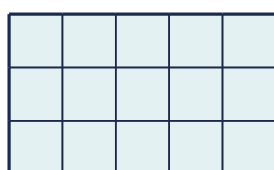


B



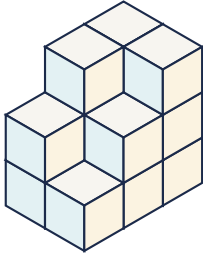
Answer: _____

- 2 A rectangular prism is made of **45** cubes. One layer is shown. How many layers does the prism have? Explain. [2 marks]



Answer: _____

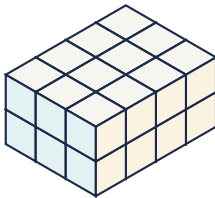
- 3 Kim is building a rectangular prism **3 cubes long, 2 cubes wide and 3 cubes high**. Every cube sits on the table or on another cube. **a)** How many cubes has she used so far? **b)** How many cubes will the finished prism have? **c)** How many **more** cubes does she need? [3 marks]



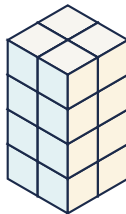
Answer: _____

- 4 Complete the table for prisms A, B and C. They are made of 1 cm cubes. [3 marks]

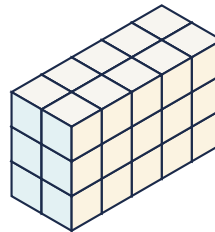
A



B

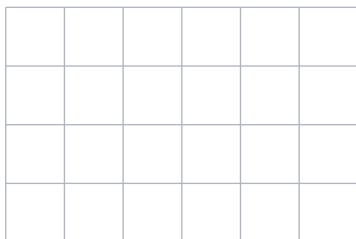


C



Prism	Cubes in one layer	Number of layers	Volume
A			
B			
C			

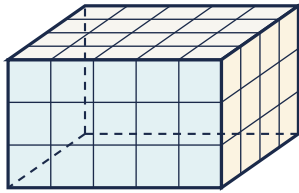
- 5 Leo builds a prism with 1 cm cubes. It is **4 cubes long, 2 cubes wide and 3 cubes high**. **a)** Shade one layer on the grid. **b)** How many cubes are in one layer? **c)** What is the volume of Leo's prism? [3 marks]



Answer: _____

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- 6 A box of sugar cubes is packed with **5 rows of 4 cubes** in each layer, and there are **3 layers**. Each sugar cube is about **1 cm³**. How many sugar cubes are in the box? What is the volume of sugar? [2 marks]



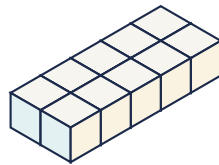
Answer: _____

- 7 Which prism has a volume of **12 cm³**? Each cube is 1 cm³. Circle its letter. [2 marks]

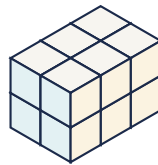
A



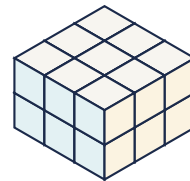
B



C

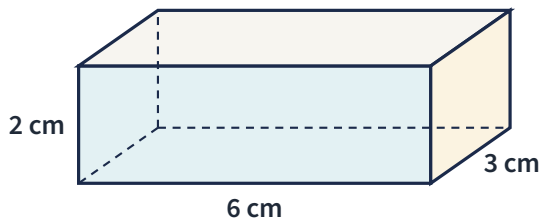


D



Answer: _____

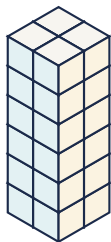
- 8 Hana fills a box with 1 cm cubes. The inside of the box is **6 cm** long, **3 cm** wide and **2 cm** high. How many cubes fit? What is the volume of the box? [2 marks]



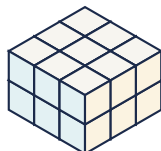
Answer: _____

- 9 Jin builds a tower with a **2 by 2** base that is **6 cubes** high. Amy builds a tower with a **3 by 3** base that is **2 cubes** high. Who used more cubes? How many more? [2 marks]

Jin



Amy

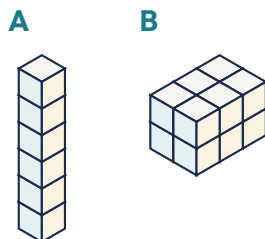


Answer: _____

C Think it through *explain your thinking*

/ 10 marks

- 1 Ben says prism A has a **bigger volume** than prism B because it is **taller**. Do you agree with Ben? Explain. [2 marks]



- 2 **True or false?** “A prism 4 cubes long, 3 cubes wide and 2 cubes high has the **same** volume as a prism 2 cubes long, 3 cubes wide and 4 cubes high.” Explain. [2 marks]

- 3 **Always, sometimes or never true?** “If you add **one more layer** to a rectangular prism, its volume **doubles**.” Circle one and give examples. [2 marks]

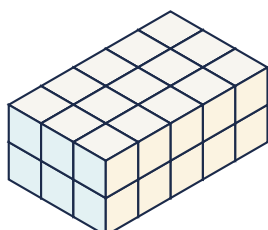
Always

Sometimes

Never

- 4 Which prism is the **odd one out**? $2 \times 2 \times 6$, $3 \times 4 \times 2$, $12 \times 2 \times 1$, $5 \times 5 \times 1$ (cubes long $\times$ wide $\times$ high). Explain. [2 marks]

- 5 Explain how to find the number of cubes in this solid prism **without counting every cube**. Use the words **row** and **layer**. [2 marks]



D

Challenge *stretch yourself*

/ 9 marks

- 1 Find **all** the different rectangular prisms you can build with exactly **12** cubes. (A $2 \times 2 \times 3$ prism is the same as a $3 \times 2 \times 2$ prism.) Which one is **closest to a cube**? [3 marks]

Length	Width	Height	Volume
			12 cubes
			12 cubes
			12 cubes
			12 cubes
			12 cubes
			12 cubes

Closest to a cube: _____

- 2 Cube towers grow like this: Tower 1 is 1 cube, Tower 2 is a $2 \times 2 \times 2$ cube and Tower 3 is a $3 \times 3 \times 3$ cube. **a)** How many cubes are in Tower 4? **b)** How many cubes must be added to Tower 3 to make Tower 4? **c)** Which is the first tower that needs **more than 200** cubes? [3 marks]

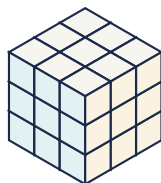
Tower 1



Tower 2



Tower 3



Answer: _____

- 3 A rectangular prism is built from **36** cubes. It is **3 cubes high**. Its base is a rectangle whose length is **1 cube longer** than its width. How long and how wide is the base? Show your working. [3 marks]

Answer: _____

How did I go?

Warm up ____ / 16 Practise ____ / 21 Think it through ____ / 10 Challenge ____ / 9 **Total** ____ / 56

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