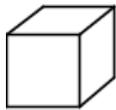


## Cuboid Calculations

**Volume** is the **real space** **inside** a 3D shape.

*In other words, volume is asking:*  
**How many *cubes* fill the shape?**

The standard size of cube used is a 'cubic centimetre', or  $cm^3$ :



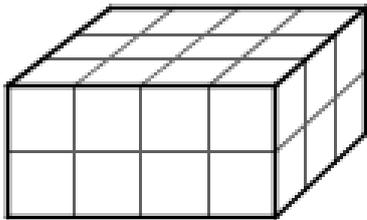
**Surface Area** is the **flat space** on the **surface** of a 3D shape.

*In other words, surface area is asking:*  
**How many *squares* cover the shape?**

The standard size of square used is a 'square centimetre', or  $cm^2$ :

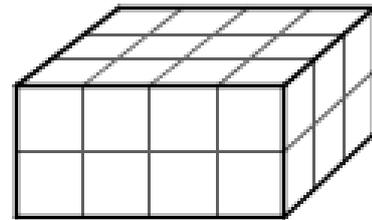


*Check that you understand:*  
 Find the **volume** of this cuboid:



Volume = \_\_\_\_\_  $cm^3$

*Check that you understand:*  
 Find the **surface area** of this cuboid:



Surface Area = \_\_\_\_\_  $cm^2$

### Calculating Volume

To work out the volume without counting cubes, notice that each layer has 3 rows of 4 cubes, and there are 2 layers in total, so we have 2 lots of 3 lots of 4.

Altogether this gives a total of:

$$2 \times 3 \times 4 = \mathbf{24cm^3}$$

### Calculating Surface Area

To work out the surface area without counting squares, notice that the front and back faces are 2 rows of 4, the left and right are 2 rows of 3 and the top and bottom are 3 rows of 4.

All six faces together give a total of:

$$8 + 8 + 6 + 6 + 12 + 12 = \mathbf{52cm^2}$$

In general, to work out the volume:  
 Multiply **all three dimensions** together:  
*length  $\times$  width  $\times$  height*

In general, to work out surface area:  
 Add together the **area** of all 6 faces:  
*front + back + left + right + top + bottom*

# Cuboid Calculations

**Task A:** Find a cuboid

You will need to find an actual object which is (roughly) cuboid-shaped, such as a cereal box, a microwave, a DVD case, a shoebox, etc. Just make sure you can measure it.

What cuboid have you chosen to use? \_\_\_\_\_

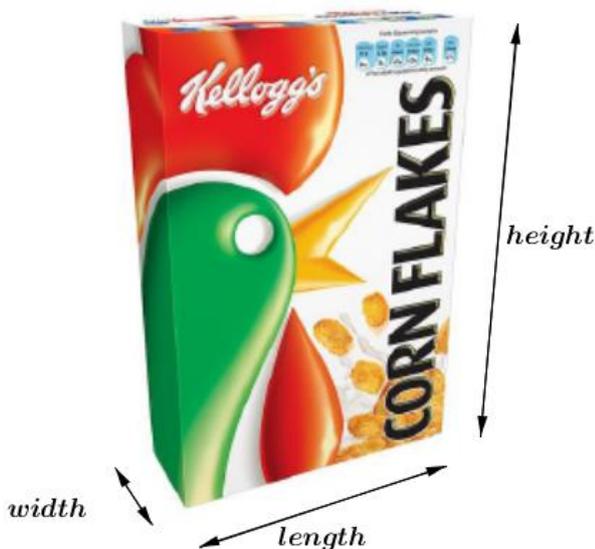
**Task B:** Measure your cuboid     You will need either a ruler or a tape measure.

Measure the **length**, **width** and **height**. Circle the units you used to measure.

**Length** (distance from the left to the right): \_\_\_\_\_ mm / cm / m

**Width** (distance from the front to the back): \_\_\_\_\_ mm / cm / m

**Height** (distance from the top to the bottom): \_\_\_\_\_ mm / cm / m



**Task C:** Calculate the volume  
Multiply all three dimensions together.

$$\text{length} \times \text{width} \times \text{height}$$

$$\text{_____} \times \text{_____} \times \text{_____}$$

Volume of my cuboid:

$$V = \text{_____} \text{ mm}^3 / \text{cm}^3 / \text{m}^3$$

**Task D:** Calculate the surface area     Add together the area of all six faces.

**Front:** length  $\times$  height

$$\text{_____} \times \text{_____} = \text{_____}$$

**Back:** same as the front

$$= \text{_____}$$

**Right:** height  $\times$  width

$$\text{_____} \times \text{_____} = \text{_____}$$

**Left:** same as the right

$$= \text{_____}$$

**Top:** length  $\times$  width

$$\text{_____} \times \text{_____} = \text{_____}$$

**Bottom:** same as the top

$$= \text{_____}$$

Total surface area: front + back + right + left + top + bottom

$$SA = \text{_____} \text{ mm}^2 / \text{cm}^2 / \text{m}^2$$