

## How to Convert in Metric - Cubic Measure

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Cubic measure has a different dimension than linear and square measure. We need to consider this when converting in cubic measure.

### Cubic Measure Conversion

The metric system is based on the number ten. Cubic measures have three dimensions, so we triple the conversion (i.e. ten times ten times ten,  $10 \times 10 \times 10 = 1000$ ). So instead of progressing between units by tens as we did with linear measurement, and by hundreds with square measure, we progress by thousands. Cubic measure has two measures - *capacity* and *volume*. These two measures are used interchangeably, but they do mean different things. Capacity is the amount of space available *inside* something. It is usually measured in Litres (L). Volume is the amount of space occupied by matter, and it is usually measured in cubic metres ( $m^3$ ).

<i>cubic measure</i>	cubic kilometre	cubic hectometre	cubic decametre	cubic metre	cubic decimetre	cubic centimetre	cubic millimetre
- <i>volume</i>	$km^3$	$hm^3$	$dam^3$	$m^3$	$dm^3$	$cm^3$	$mm^3$
	1 000 000 000 $m^3$	1 000 000 $m^3$	1000 $m^3$	1 $m^3$	0.001 $m^3$	0.000 001 $m^3$	0.000 000 001 $m^3$
- <i>capacity</i>				kilolitre	litre	millilitre	
				kL	L	mL	
				1000 L	1 L	0.001 L	

**Note: Volume and Capacity are linked:**

$$1 \text{ kL} = 1 \text{ m}^3$$

$$1 \text{ L} = 1 \text{ dm}^3$$

$$1 \text{ mL} = 1 \text{ cm}^3$$

$$1 \text{ L} = 1000 \text{ cm}^3$$

**Converting between units in cubic measure is almost identical to square measure.**

How to convert 6.5 cubic metres into cubic centimetres. (i.e  $6.5 \text{ m}^3 \rightarrow \text{_____ cm}^3$ )

1. We still remember "King Henry drank milk during Christmas mass."

2. Make a chart.  $\rightarrow$

km <sup>3</sup>	hm <sup>3</sup>	dam <sup>3</sup>	m <sup>3</sup>	dm <sup>3</sup>	cm <sup>3</sup>	mm <sup>3</sup>
			6.5			

3. Write in the number you are converting. Make sure it is in the proper column.  
(e.g. put the 6.5 in the cubic metres column)

4. Put a line in the column you want to end up in.  
(e.g. put a line in the cubic centimetres column)

5. Count how many columns you need to move from the number to the line and multiply it by three (three dimensions, remember?).  
(e.g. from 6.5 to \_\_\_\_\_, there are 2 columns times 3 = 6)  
-----> that is how many decimal places you move  
(in our example, 6 decimal places)

6. Which direction did you move, left or right?  
(e.g. to go from 6.5 to \_\_\_\_\_, we move to the right)  
-----> that is the direction you move the decimal  
(in our example, move it 6 decimal places to the right 65 \_\_\_\_\_  
which is 6 500 000.

7. Write the answer on the line. (e.g. you would write the answer on the line, 6 500 000)

8. The solution to our problem:  $6.5 \text{ m}^3 = 6\,500\,000 \text{ cm}^3$ .

Examples:

Convert the following:

a. 33 L  $\rightarrow$  \_\_\_\_\_ mL

b. 15.1 mL  $\rightarrow$  \_\_\_\_\_ m<sup>3</sup>

c. 8 dam<sup>3</sup>  $\rightarrow$  \_\_\_\_\_ m<sup>3</sup>

d. 9000 hm<sup>3</sup>  $\rightarrow$  \_\_\_\_\_ km<sup>3</sup>

	km <sup>3</sup>	hm <sup>3</sup>	dam <sup>3</sup>	m <sup>3</sup>	dm <sup>3</sup>	cm <sup>3</sup>	mm <sup>3</sup>
				kL	L	mL	
a.					33	_____	
b.				_____		15.1	
c.			8	_____			
d.	_____	9000					

You do the following for homework:

Exercise I

a.  $379.3 \text{ km}^3 = \underline{\hspace{2cm}} \text{ hm}^3$

c.  $99.9 \text{ dm}^3 = \underline{\hspace{2cm}} \text{ m}^3$

e.  $350 \text{ cm}^3 = \underline{\hspace{2cm}} \text{ mm}^3$

g.  $1.7 \text{ m}^3 = \underline{\hspace{2cm}} \text{ cm}^3$

i.  $2500 \text{ cm}^3 = \underline{\hspace{2cm}} \text{ m}^3$

k.  $9.176 \text{ dm}^3 = \underline{\hspace{2cm}} \text{ mm}^3$

b.  $0.0153 \text{ dam}^3 = \underline{\hspace{2cm}} \text{ dm}^3$

d.  $7.13 \text{ hm}^3 = \underline{\hspace{2cm}} \text{ m}^3$

f.  $4\,000\,000 \text{ m}^3 = \underline{\hspace{2cm}} \text{ km}^3$

h.  $1.03 \text{ km}^3 = \underline{\hspace{2cm}} \text{ dam}^3$

j.  $7.953 \text{ hm}^3 = \underline{\hspace{2cm}} \text{ dam}^3$

l.  $5 \text{ dam}^3 = \underline{\hspace{2cm}} \text{ cm}^3$

Exercise II

a.  $29 \text{ m}^3 = \underline{\hspace{2cm}} \text{ hm}^3$

c.  $77 \text{ kL} = \underline{\hspace{2cm}} \text{ L}$

e.  $9.97 \text{ m}^3 = \underline{\hspace{2cm}} \text{ kL}$

g.  $5.015 \text{ kL} = \underline{\hspace{2cm}} \text{ mL}$

i.  $65 \text{ mL} = \underline{\hspace{2cm}} \text{ dm}^3$

k.  $112 \text{ mL} = \underline{\hspace{2cm}} \text{ kL}$

b.  $0.9 \text{ L} = \underline{\hspace{2cm}} \text{ mL}$

d.  $5.7 \text{ L} = \underline{\hspace{2cm}} \text{ cm}^3$

f.  $4752 \text{ L} = \underline{\hspace{2cm}} \text{ m}^3$

h.  $33.2 \text{ dm}^3 = \underline{\hspace{2cm}} \text{ mL}$

j.  $8 \text{ kL} = \underline{\hspace{2cm}} \text{ mL}$

l.  $5 \text{ m}^3 = \underline{\hspace{2cm}} \text{ mL}$