




STARTER FOR 10...

0.2.7. Unit conversions 2 – Volume

The SI unit for volume is **metre cubed, m³**. However as volumes in chemistry are often smaller than 1 m³, fractions of this unit are used as an alternative.

centimetre cubed, cm ³	decimetre cubed, dm ³
centi- prefix one hundredth	deci- prefix one tenth
1 cm = $\frac{1}{100}$ m so,	1 dm = $\frac{1}{10}$ m so,
1 cm ³ = $\left(\frac{1}{100}\right)^3$ m ³ = $\left(\frac{1}{1\,000\,000}\right)$ m ³	1 dm ³ = $\left(\frac{1}{10}\right)^3$ m ³ = $\left(\frac{1}{1\,000}\right)$ m ³

1. Complete the table by choosing the approximate volume from the options in bold for each of the everyday items (images not drawn to scale). (1 mark)

	1 cm³	1 dm³	1 m³
			
	drinks bottle	sugar cube	washing machine
Approx. volume			

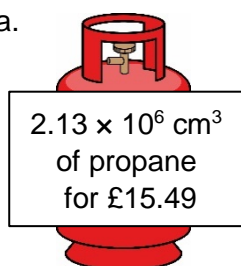
2. Complete the following sentences; (1 mark)

To convert a volume in **cm³** into a volume in **dm³**, divide by.....

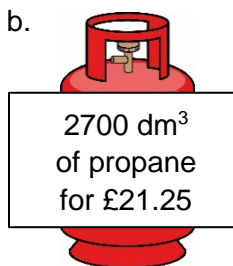
To convert a volume in **cm³** into a volume in **m³**, divide by.....

3. a. A balloon of helium has a volume of 1600 cm³. What is its volume in units of dm³?
 b. The technician has prepared 550 cm³ of HCl(aq). What is its volume in units of m³?
 c. An experimental method requires 1.35 dm³ of NaOH(aq). What volume is this in cm³?
 d. A swimming pool has a volume of 375 m³. What volume is this in cm³?
 e. A 12 g cylinder of CO₂ contains 6.54 dm³ of gas. What volume of gas is this in units of m³? (5 marks)
4. Which cylinder of propane gas is the best value for money? (3 marks)

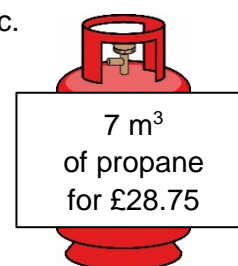
a.



b.



c.





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0. TRANSITION SKILLS Answers

0.2.6. Unit conversions 1 – Length, mass and time

- 12 mm (1 mark)
- 72.00 m (1 mark)
- 270 s (1 mark)
- 154 s (1 mark)
- 2 h 25 min (1 mark)
- 15.5 t (1 mark)
- 26.5 g (1 mark)
- 75 mg/tablet = 0.075 g/tablet
1 g ÷ 0.075 g/tablet = 13.3 tablets
Minimum number of tablets needed = 14 (1 mark)
- 30 g/min (1 mark)

NOTE In this example, as you are converting 1/the unit, you need to do the inverse of what is described in the diagram eg instead of ÷ 60, × 60.
- 10.44 kg/h = 10 440 g/h = 174 g/min = 2.9 g/s (1 mark)

0.2.7. Unit conversions 2 – Volume

- drinks bottle, 1 dm³; sugar cube, 1 cm³; washing machine, 1 m³ (1 mark)
- To convert a volume in **cm³** into a volume in **dm³**, divide by 1000. (½ mark)
To convert a volume in **cm³** into a volume in **m³**, divide by 1 000 000. (½ mark)
- 1.6 dm³ (1 mark)
 - 5.5 × 10⁻⁴ m³ (1 mark)
 - 1350 cm³ (1 mark)
 - 375 000 000 cm³ (1 mark)
 - 0.006 54 m³ (1 mark)
-

	£ per m ³		p per cm ³		p per dm ³
Cylinder 'a'	7.27	or	7.27 × 10 ⁻⁴	or	0.727
Cylinder 'b'	7.87		7.87 × 10 ⁻⁴		0.787
Cylinder 'c'	4.11		4.11 × 10 ⁻⁴		0.411

(1 mark)

(1 mark)

(1 mark)

Therefore 'c' is the best value for money.



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