

4.4 - Volume



Volume is the amount of space an object occupies. It is measured in cubic units.

Capacity is the amount of material a container holds. It is measured in cubic units or capacity units.

PROBLEMS... Different systems:

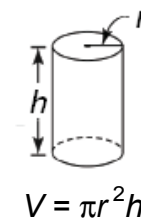
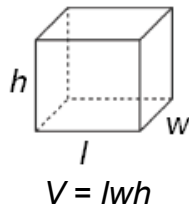
US and British units of volume are different. A US pint contains 16 US fl oz, while a British pint contains 20 British fl oz. US gallons and British gallons are also different: a US gallon equals 3.785 L, while a British gallon equals 4.54609 L.

Students can discuss the fact that an imperial cup is 284.13 mL; a metric cup is 250 mL in Canada, Australia, and New Zealand; a US legal cup is 240 mL; and a Japanese cup is 200 mL. Students can then create an international table of conversions to see what the recipe would look like in a different country.

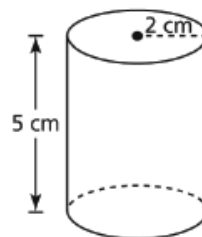
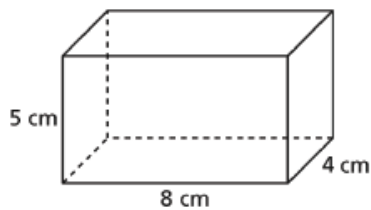
Activate Prior Learning: Volumes of Right Prisms and Cylinders



Volume =
Base area \times height



Which object below has the greater volume?



1.5 Volumes of Right Pyramids and Right Cones

$$\begin{aligned} V &= lwh \\ &= (8)(4)(5) \\ &= 160 \text{ cm}^3 \end{aligned}$$

$$\begin{aligned} V &= \pi r^2 h \\ &= \pi (2)^2 (5) \\ &= 20\pi \\ &= 62.83 \text{ cm}^3 \end{aligned}$$

FIGURE 4.2**Imperial Units of Volume and Capacity**

<i>Unit</i>	<i>Abbreviation</i>
ounce	oz
fluid ounce	fl oz
pint	pt
quart	qt
gallon	gal

**SI Units of Volume and Capacity**

<i>Unit</i>	<i>Abbreviation</i>
liter	L
cubic meter	m ³

TABLE 1.5 Selected Prefixes Used in the Metric System

Prefix	Abbreviation	Meaning	Example
Giga	G	10 ⁹	1 gigameter (Gm) = 1 × 10 ⁹ m
Mega	M	10 ⁶	1 megameter (Mm) = 1 × 10 ⁶ m
Kilo	k	10 ³	1 kilometer (km) = 1 × 10 ³ m
Deci	d	10 ⁻¹	1 decimeter (dm) = 0.1 m
Centi	c	10 ⁻²	1 centimeter (cm) = 0.01 m
Milli	m	10 ⁻³	1 millimeter (mm) = 0.001 m
Micro	μ ^a	10 ⁻⁶	1 micrometer (μm) = 1 × 10 ⁻⁶ m
Nano	n	10 ⁻⁹	1 nanometer (nm) = 1 × 10 ⁻⁹ m
Pico	p	10 ⁻¹²	1 picometer (pm) = 1 × 10 ⁻¹² m
Femto	f	10 ⁻¹⁵	1 femtometer (fm) = 1 × 10 ⁻¹⁵ m

^aThis is the Greek letter mu (pronounced "mew").

Conversions in Volume: SI vs Metric

Ex #1: Convert 89 250 cm³ to m³.

$$89\,250\text{ cm}^3 \times \left(\frac{1\text{ m}}{100\text{ cm}}\right)^3 = 0.089\text{ m}^3$$

Ex #2: Convert 12 m³ to yd³.

$$12\text{ m}^3 \times \left(\frac{1.0936\text{ yd}}{\text{m}}\right)^3 = 15.69\text{ yd}^3$$

Ex #3: Convert 2000 ft³ to m³.

$$2000\text{ ft}^3 \times \left(\frac{1\text{ yd}}{3\text{ ft}}\right)^3 \times \left(\frac{\text{m}}{1.0936\text{ yd}}\right)^3 = 56.64\text{ m}^3$$

HOMEWORK...

 Worksheet - Converting Volumes Imp_Metric.docx

Attachments

Worksheet - Converting Areas Imp_Metric.docx

Worksheet - Converting Volumes Imp_Metric.docx

Worksheet - Converting Capacity in Imp.docx

Review Worksheet - Converting Imp_Metric.docx

Review - Chapter 4 Sample Test.pdf