

Density

- quantitative physical property
- density can not be measured directly but is calculated using an object's mass and volume (which are quantitative)

Mass and Volume

Mass

- the amount of matter in a sample
- measured in grams (g)
- $1000\text{g} = 1\text{kg}$

Volume

- the amount of space a material takes up.
- measured in litres (L)
for liquids or (mL)
 $1000\text{mL} = 1\text{L}$

• for solids the measurement is cm^3 or m^3

(cm^3)
cubic cm is from
the volume of a cube

$$\begin{aligned} V &= lwh \\ &= 2\text{cm} \times 2\text{cm} \times 2\text{cm} \\ &= \underline{8\text{cm}^3} \end{aligned}$$

• the denser the object
the heavier it is and
if it is a liquid it sinks to
the bottom. Sg/L vs Lg/L
 $\uparrow$
denser

Ex1 If a sample of jet fuel
has a mass of 8.3g and a
volume of 10.3L. What is its
density?

$$D = \frac{m}{V} \quad (1)$$

$$= \frac{8.3}{10.3} \quad (1)$$

$$= 0.805$$

round to
2 decimal
places

$$(1) = 0.81 \text{ g/mL}$$

Practice 1

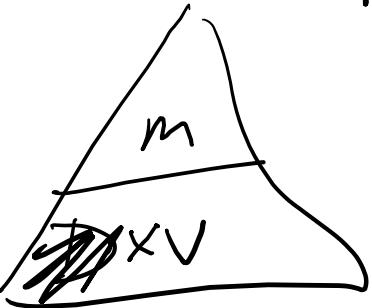
Milk has a density of $\frac{1.03 \text{ g/L}}{450 \text{ L}}$.
If a tank holds 450 L, what
is its mass?

$$\begin{aligned} M &= D \times V \\ &= 1.03 \times 450 \\ &= 463.5 \text{ g} \end{aligned}$$



Ex 2

A block of steel has the following dimensions ($10\text{cm} \times 4\text{cm} \times 8\text{cm}$)
If the block of steel has a mass of 2250g . What is its density?



$$D = \frac{m}{V}$$

$$V = lwh$$
$$= 10 \times 4 \times 8$$
$$= 320 \text{ cm}^3$$

$$= \frac{2250}{320}$$

$$= \underline{7.03 \text{ g/cm}^3}$$