

From crude oil to plastics and fibres

Grade 8 science (Year 9 · Class 8) · Lab answers

Model answers follow, with calculated results in bold. Small differences in your own values are normal, so check that your method and units match the model before comparing numbers.

Level: Grade 8 science (Year 9 · Class 8) · **Curriculum:** MS-PS1-3

Question 1 Volumes

A: $25.1 - 20.0 = 5.1$; B: 5.0; C: 5.0; D: 5.5; E: 5.1. **5.1, 5.0, 5.0, 5.5 and 5.1 cm³.**

Question 2 Densities

A: $4.9 \div 5.1 = 0.96$; B: $6.9 \div 5.0 = 1.38$; C: $4.5 \div 5.0 = 0.90$; D: $7.7 \div 5.5 = 1.40$; E: $5.3 \div 5.1 = 1.04$. **0.96, 1.38, 0.90, 1.40, 1.04 g/cm³.**

Question 3 Prediction

Pieces with a density below 1.00 g/cm³ float: **A and C float; B, D and E sink.**

Question 4 Air bubbles

A bubble adds volume, so the water level rises too much. A larger volume gives a smaller density, so the value is **too low**.

Question 5 Uncertainty

Both readings can be wrong by 0.5 mL, so the volume is uncertain by ± 1.0 mL. $1.0 \div 5.0 \times 100 = \mathbf{20\%}$.

Question 6 PET and PVC

Their densities (1.38 and 1.40) differ by only 0.02 g/cm³, which is about 1.4 %. The 20 % uncertainty is much larger, so **the difference is not significant**.

Question 7 Improving the method

Use larger pieces and a narrower cylinder with finer divisions, so the reading error is smaller compared with the volume. **Bigger sample, finer scale.**