

Measuring mass and volume accurately

Grade 6 science (Year 7 · Class 6) · Worksheet answers

Check each answer against your own working. Method marks matter: write the formula or unit conversion, substitute the numbers, then give the result with its unit. Re-read any problem where your answer differs.

Level: Grade 6 science (Year 7 · Class 6) · **Curriculum:** SEP measurement

Problem 1 Units and instruments

1. The base unit of mass is the **kilogram (kg)**.
2. Litres (L) and millilitres (mL) are common; cm^3 is also correct.
3. Mass is measured with a **balance**.

Problem 2 Bag of rice

1. $2.5 \text{ kg} \times 1000 = \mathbf{2500 \text{ g}}$.
2. $450 \text{ mg} \div 1000 = \mathbf{0.450 \text{ g}}$.

Problem 3 Water bottle volumes

1. $1.5 \times 1000 = \mathbf{1500 \text{ mL}}$.
2. $250 \div 1000 = \mathbf{0.25 \text{ L}}$.
3. $1 \text{ cm}^3 = 1 \text{ mL}$, so the volume is **40 mL**.

Problem 4 Pick the instrument

1. **Balance**.
2. **Graduated cylinder**.
3. **Balance**.
4. **Graduated cylinder**. Mass uses a balance; volume of a liquid uses a cylinder.

Problem 5 Reading a small scale

1. Between 0 and 10 mL there are 5 spaces, so one division is $10 \div 5 = \mathbf{2 \text{ mL}}$.
2. The surface is 2 divisions above 30 mL: $30 + 2 \times 2 = \mathbf{34 \text{ mL}}$.
3. Eye level with the bottom of the meniscus.

Problem 6 Diego reads the top

1. The agreed reading point is the lowest point of the curve, not its top edge.
2. The top edge lies higher on the scale, so his reading is **too high**.

Problem 7 Tare the beaker

1. $112.7 - 48.2 = \mathbf{64.5\text{ g}}$.
2. Tare removes the beaker's mass from the display, so it shows **64.5 g**.

Problem 8 Metal key

1. Start **40 mL**, final **58 mL**.
2. $58 - 40 = \mathbf{18\text{ mL}}$.
3. $1\text{ mL} = 1\text{ cm}^3$, so **18 cm³**.

Problem 9 Rainwater tank

1. $1\text{ m}^3 = 1000\text{ L}$, so $0.35 \times 1000 = \mathbf{350\text{ L}}$.
2. $350 \times 1000 = \mathbf{350\,000\text{ mL}}$.

Problem 10 Baking day

1. Eggs: $3 \times 55 = 165\text{ g}$. Total = $450 + 120 + 250 + 165 = \mathbf{985\text{ g}}$.
2. $985 \div 1000 = \mathbf{0.985\text{ kg}}$.

Problem 11 Pouring glasses

1. $2 \times 1000 = \mathbf{2000\text{ mL}}$.
2. $2000 \div 250 = \mathbf{8\text{ glasses}}$.
3. $5 \times 250 = 1250\text{ mL}$ poured; $2000 - 1250 = \mathbf{750\text{ mL}}$ left.

Problem 12 Which cylinder?

1. The **10 mL cylinder**.
2. Its divisions are smaller, so the reading is more precise, and the narrow tube makes the level easier to judge.

Problem 13 Marbles in a cylinder

1. Each marble raises the level by **2 mL**, so 2 cm^3 .
2. $50 + 12 \times 2 = \mathbf{74\text{ mL}}$.
3. A floating marble would not sink, so it would displace less water and the pattern would break.

Problem 14 Coin on two scales

1. $6 - 5.87 = \mathbf{0.13\text{ g}}$.
2. The **laboratory balance**, because its smallest step is 100 times smaller than that of the kitchen scale.

Problem 15 Aquarium volume

1. $40 \times 25 \times 30 = \mathbf{30\,000\,cm^3}$.
2. $30\,000\,cm^3 = 30\,000\,mL = \mathbf{30\,L}$.
3. $0.80 \times 30 = \mathbf{24\,L}$.

Problem 16 Cork and sinker

1. A: **30 mL**; B: **38 mL**; C: **50 mL**.
2. Sinker = $38 - 30 = \mathbf{8\,cm^3}$.
3. Cork = $50 - 38 = \mathbf{12\,cm^3}$.
4. The combined reading includes the sinker, so its volume must be known and subtracted.

Problem 17 Forgotten tare

1. $139.8 - 85.4 = \mathbf{54.4\,g}$.
2. $139.8 - 54.4 = \mathbf{85.4\,g}$ too high.
3. $85.4 \div 54.4 \times 100 = \mathbf{157\, \%}$.

Problem 18 Uncertainty in volume

1. $0.5 \div 25 \times 100 = \mathbf{2\, \%}$.
2. $0.5 \div 5 \times 100 = \mathbf{10\, \%}$.
3. The same absolute uncertainty is a much larger fraction of a small reading, so use a smaller cylinder for small volumes.

Problem 19 Potato too big

1. **142 cm³**, since $1\,mL = 1\,cm^3$.
2. The potato pushes aside its own volume of water, and that water leaves through the spout.
3. Some water may stay in the spout or be left on the can, so less is collected.

Problem 20 Syrup bottle

1. $0.15 \times 1000 = \mathbf{150\,mL}$.
2. $3 \times 5 = \mathbf{15\,mL}$ per day.
3. $150 \div 15 = \mathbf{10\,days}$.
4. $150 - 7 \times 15 = 150 - 105 = \mathbf{45\,mL}$.