

Measuring mass and volume accurately

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

Name: _____ Date: _____ Class: _____

These twenty problems train you to measure and convert mass and volume. You will read a graduated cylinder, use a balance, change units and find the volume of an irregular solid by displacement.

The problems start with recall and one-step conversions and finish with multi-step data tasks. They suit Grade 6 science, Year 7 and Class 6 students working on measurement skills.

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

Problem 1 Units and instruments (easy)

Aarav is helping in the school lab in Pune.

1. State the SI base unit of mass.
2. Name two units used to measure the volume of a liquid.
3. Name the instrument used to measure mass.

Problem 2 Bag of rice (easy)

A bag of rice at a market in Pune has a mass of 2.5 kg, and a pinch of spice has a mass of 450 mg.

1. Convert 2.5 kg to grams.
2. Convert 450 mg to grams.

Problem 3 Water bottle volumes (easy)

Wanjiru fills bottles in Nairobi.

1. Convert 1.5 L to millilitres.
2. Convert 250 mL to litres.
3. A small block has a volume of 40 cm^3 . What is its volume in millilitres?

Problem 4 Pick the instrument (easy)

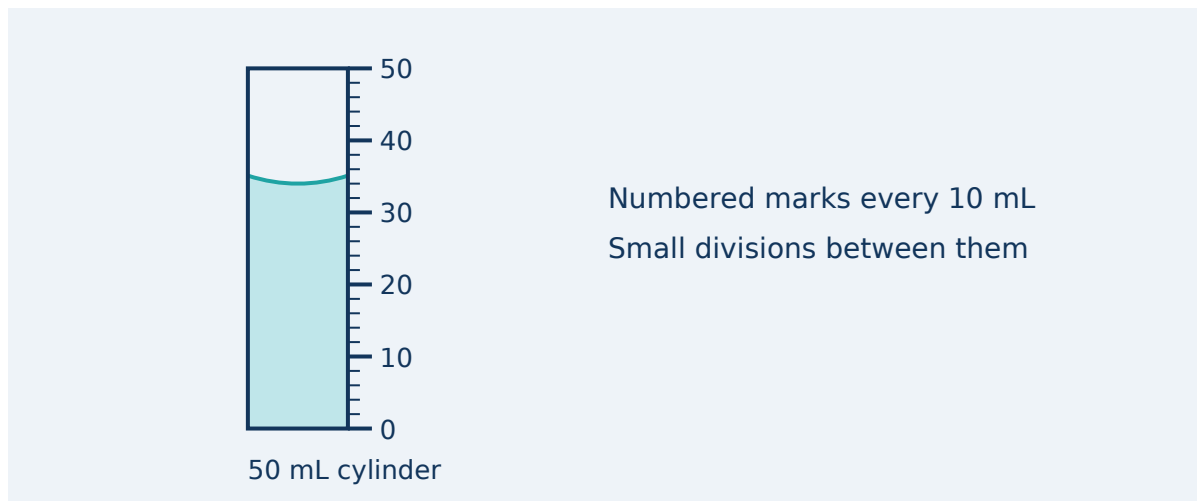
For each job, choose *balance* or *graduated cylinder*.

1. Finding the mass of an apple.
2. Measuring 80 mL of juice.
3. Finding the mass of 12 coins together.
4. Measuring the volume of a liquid medicine.

Problem 5 Reading a small scale (easy)

Look at the cylinder below.

1. Calculate the value of one small division.
2. Read the volume of water.
3. Say where your eye should be when you read it.



The cylinder for Problem 5.

Problem 6 Diego reads the top (easy)

In Texas, Diego reads the top edge of the meniscus instead of the bottom.

1. Explain what he did wrong.
2. Will his reading be too high or too low? Give a reason.

Problem 7 Tare the beaker (medium)

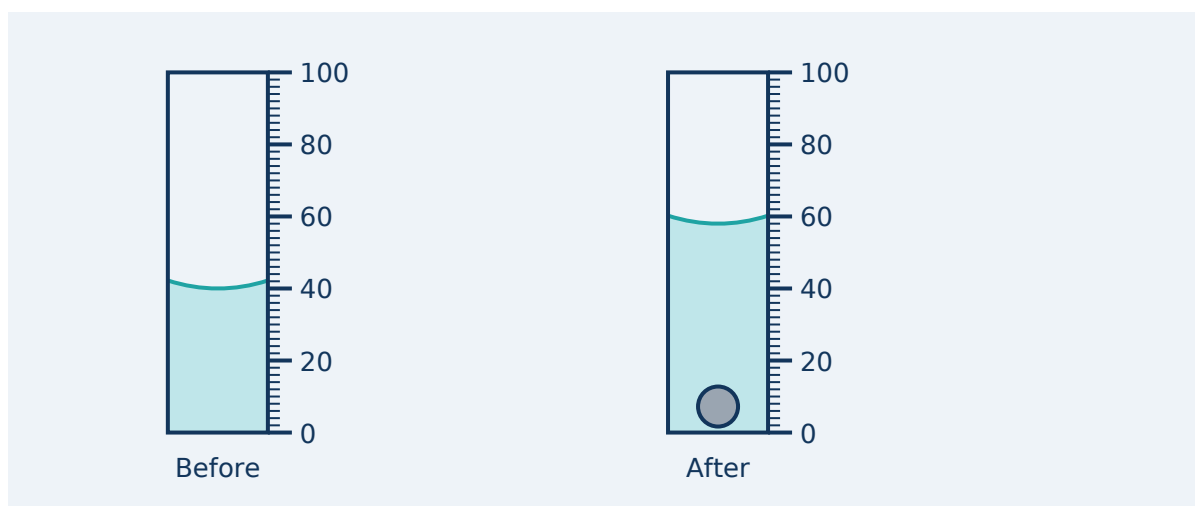
Chiamaka in Lagos puts an empty beaker on a balance and reads 48.2 g. After adding sand she reads 112.7 g.

1. Calculate the mass of the sand.
2. She now empties the beaker, presses tare with it still on the pan, and adds the same sand. What will the display show?

Problem 8 Metal key (medium)

A metal key is lowered into water.

1. Read the starting and final levels.
2. Calculate the volume of the key in mL.
3. Write the volume in cm^3 .



Before and after for Problem 8.

Problem 9 Rainwater tank (medium)

Bilal in Lahore has a small tank holding 0.35 m^3 of water.

1. Convert 0.35 m^3 to litres.
2. Convert your answer to millilitres.

Problem 10 Baking day (medium)

Emma in Leeds bakes a cake with 0.45 kg of flour, 120 g of sugar, 250 g of butter and 3 eggs of 55 g each.

1. Calculate the total mass in grams.
2. Give the total in kilograms.

Problem 11 Pouring glasses (medium)

Kofi in Accra has a 2 L jug of juice and pours glasses of 250 mL .

1. Convert 2 L to mL .
2. How many full glasses can he fill?
3. How much juice is left after 5 glasses?

Problem 12 Which cylinder? (medium)

Mei in Singapore must measure 8 mL of liquid. She can use a 10 mL cylinder with 0.2 mL divisions or a 100 mL cylinder with 1 mL divisions.

1. Which should she choose?
2. Explain your choice.

Problem 13 Marbles in a cylinder (medium)

Aarav drops marbles one at a time into a cylinder. The level was 50 mL at the start, 52 mL after 1 marble, 54 mL after 2 marbles and 56 mL after 3 marbles.

1. State the volume of one marble.
2. Predict the level after 12 marbles.
3. Explain whether the level would be a reliable pattern if the marbles floated.

Problem 14 Coin on two scales (medium)

Wanjiru weighs a coin. A kitchen scale (steps of 1 g) shows 6 g. A laboratory balance (steps of 0.01 g) shows 5.87 g.

1. Calculate the difference between the two readings.
2. Say which instrument is more precise and why.

Problem 15 Aquarium volume (hard)

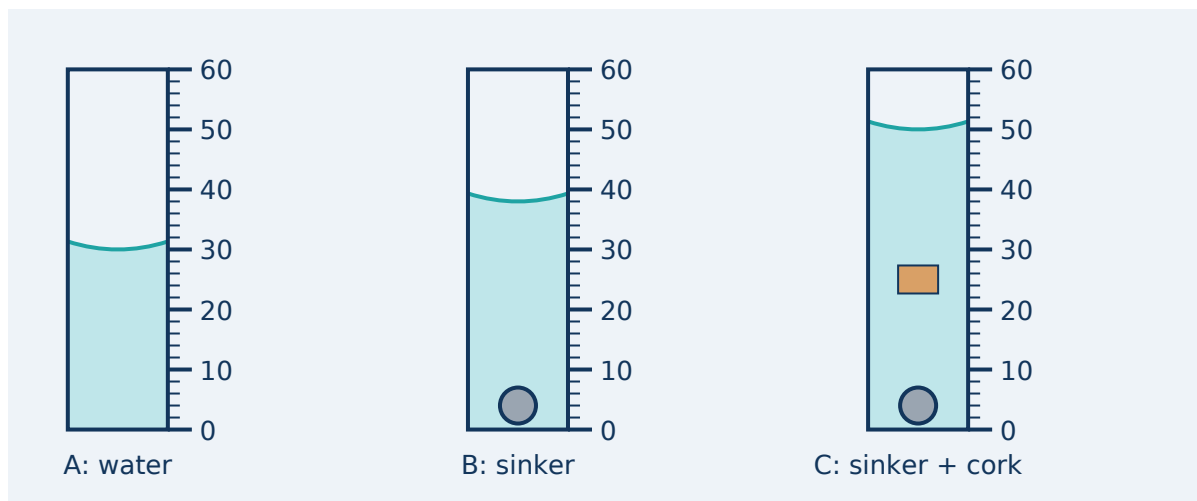
Diego's aquarium is a cuboid 40 cm long, 25 cm wide and 30 cm high.

1. Calculate its volume in cm^3 .
2. Convert the volume to litres.
3. He fills it to 80 % of its height. How many litres of water does it hold?

Problem 16 Cork and sinker (hard)

A cork floats, so Chiamaka ties it to a metal sinker. The levels are shown below.

1. Read the three levels.
2. Calculate the volume of the sinker.
3. Calculate the volume of the cork.
4. Explain why she measured the sinker alone first.



A cork needs a heavy sinker to stay under water.

Problem 17 Forgotten tare (hard)

Kofi weighs oil. The empty cylinder has a mass of 85.4 g. With oil in it the balance shows 139.8 g. He forgets to subtract and reports 139.8 g as the mass of oil.

1. Calculate the true mass of the oil.

2. Calculate his error in grams.
3. Express the error as a percentage of the true mass, to the nearest per cent.

Problem 18 Uncertainty in volume (hard)

Mei estimates that a reading in a 100 mL cylinder is correct to ± 0.5 mL.

1. Calculate the percentage uncertainty for a reading of 25 mL.
2. Calculate it for a reading of 5 mL.
3. Explain what this shows about measuring small volumes in a large cylinder.

Problem 19 Potato too big (hard)

Bilal's potato is too wide to fit into any cylinder. He fills an overflow can to its spout, lowers the potato in and collects 142 mL of water that spills out.

1. State the volume of the potato in cm^3 .
2. Explain why the spilled water gives the volume.
3. Suggest one reason why the result might be slightly too small.

Problem 20 Syrup bottle (hard)

A bottle of cough syrup is labelled 0.15 L. The dose is 5 mL three times a day.

1. Convert 0.15 L to mL.
2. Calculate the volume used per day.
3. Calculate how many full days the bottle lasts.
4. Calculate the volume left after 7 days.