

Solving real measurement problems

CURRICULUM ALIGNMENT

MEA.MSR.4a

determine and calculate units of measurement in fractional and/or decimal form to solve practical problems.

NUM.OPS.4

build upon, select and make use of a range of operation strategies.

INTERACTIVES Measurement Rulers · challenge, display, explore

WHAT THIS LESSON TEACHES

Every real measurement problem starts by choosing what to measure and the right instrument (ruler or tape for length, scale for mass, jug for capacity). Match the units first, then calculate and write the answer with its unit.

→ 60 cm box and 24 cm books: $60 \div 24 = 2$ books stacked

→ 1 kg bag into 200 g batches: change to 1000 g, then $1000 \div 200 = 5$ batches

MODEL THIS ON THE BOARD

STACKING BOOKS IN A BOX

- 1 Choose the instrument: a ruler for the box height and book height.
- 2 Read the two lengths: box **60** cm, each book **24** cm.
- 3 Match units (both already cm) and divide: $60 \div 24 = 2$.
- 4 Write the full answer with unit: **2 books** stack in the box.

LESSON ARC

Open with the packing scenario on the IWB — 12 books at 24 cm, a 60 cm box — and hold back the answer while pupils name that both heights must be read first. Work three problems on the measurement-rulers interactive (books, flour, jug), each pivoting on read-match-calculate-keep-the-unit. Pupils talk through three more at the board, then set each out in their copies with units on every line. The Class Challenge is four brisk board problems ending on an exact-fit shelf.

TEACHING MOVES

1. **Getting Started.** Show the packing job and take three hands-up answers only — no open call-outs. Steer toward 'we need the two heights first' and deliberately withhold the $60 \div 24$ answer; the lesson needs the tension of the unanswered question.
2. **Watch and Notice.** Work all three on the measurement-rulers interactive, but slow right down on the flour problem — point at '1 kg = 1,000 g' and ask 'why do we change it first?' before dividing. On the books problem, press the leftover: 'we have 12 cm spare — is that enough for a third book?' Only add the fourth shoebox problem aloud if the class is clearly with you.
3. **Try It Together.** Pupils take turns at the board. Say up front that only the shelf is on the ruler — the pasta and bottle figures are given in the words — so nobody hunts for a scale that isn't there. Before accepting any answer, ask 'what number are we using, and how did we get it?'
4. **Set It Out in Your Copy.** Walk the room glancing for two things only: units written on every line, and the final answer carrying its unit (5 cups, not 5). This is whole-class copybook work alongside you, not a marking round.

5. **Class Challenge.** Brisk practice — pupils take turns at the board, class confirms each answer, keep moving. Before the shelf reveal, ask the class to predict whether there's a leftover; when 15 books fit exactly, set it against the books-in-a-box 12 cm spare so pupils see remainders aren't guaranteed.
6. **What Did We Notice?.** Listen for pupils naming 'read the right scale first' as the unlocking move, and revoice it: 'so you found both measurements before you divided.' Press the pupil who answers with a bare number — 'five what? five glasses?'

COMMON MISCONCEPTIONS

⚠ Pupils divide before matching units — they see '1 kg bag, 200 g batches' and write $1 \div 200$, or leave $1.5 \text{ l} \div 300 \text{ ml}$ untouched.

Stop and point at '1 kg = 1,000 g' on the board. Ask 'are these two numbers measuring in the same unit yet?' Rewrite the kilogram as 1,000 g first, then divide. Make matching-first a spoken checkpoint every time before any division line goes down.

⚠ Pupils round the books-in-a-box answer up to 3 because $60 \div 24$ 'is nearly 3', treating leftover space as another whole book.

On the measurement-rulers interactive, stack the two 24 cm books and show the 12 cm gap physically. Ask 'is 12 cm tall enough for a whole 24 cm book?' The leftover is real but it doesn't fit — 2 books, not 3.

⚠ Pupils give the answer as a bare number — '5', '8', '30' — dropping the unit the question actually asked for.

Refuse the number until it carries its unit: 'five what?' Point back to the copybook rule — the answer line always ends in cups, bowls, glasses, or folders, because the number alone doesn't answer the question.

DIFFERENTIATION

EMERGING

- Give these pupils only the same-unit problems (ribbon, folders, rice) so the division is the single challenge — hold the kg and litre conversions back until they're secure on read-then-divide.
- In the copybook step, write the unit labels on each line for them so they place the numbers into a ready-made frame rather than building the layout from scratch.

DEVELOPING

- After the shelf problem, ask them to find the leftover in the books-in-a-box case exactly — 2 books use 48 cm of 60, so how many cm spare, and could a 12 cm notebook fit?
- Pose a two-step version: a 1.5 l bottle poured into 250 ml cups — how many cups, and how much is left in the bottle?

PROFICIENT

- As a fast-finisher stretch at the board, hand them a problem that doesn't divide evenly — a 50 cm shelf, 8 cm books — and ask them to state both the answer and what to do with the remainder, justifying out loud.
- Pull them ahead into the Student Activity Book page and ask them to write one measurement problem of their own for a partner-free swap you check, showing which tool it needs.

✂ **Cross-curricular:** Tie to Home Economics / STE — pupils scale a real recipe, matching grams and millilitres before dividing a batch into portions.

ANSWER KEY

a) 6

b) 5

c) 10

Q1: 4 books

Q2: 10 lengths

Q3: 6 batches

Q4: 5 bowls

Q5: 8 pieces

a) **Always** : Choosing and using the length instrument is the first step for every length problem.

b) **Always** : Units must match before any division of mass.

c) **Never** : The unit is always needed so the answer makes sense (books, batches, pots).

d) **Never** : One unit must be changed first so both match.

EXTENSION SHEET · STRETCH ANSWERS

S1: 43.24 m²

S2: 18.6 m

S3: 25.2 m

S4: 500 cm³

S5: 112 m