Lesson 47 NUMBER

Reading scales — to the nearest mm

CURRICULUM ALIGNMENT

MEA.MSR.4b find, interpret and deduce measures experimentally with increasing precision.

MEA.MSR.4a determine and calculate units of measurement in fractional and/or decimal form to solve practical problems.

MODEL THIS ON THE BOARD

READING A 5.7 CM PENCIL ON A RULER

1. Find the **whole-cm mark** the pencil reaches — here, **5 cm**.
2. Count the small **mm divisions** beyond the 5: **7 mm**.
3. Combine: **5 cm 7 mm**, which is also **5.7 cm** or **57 mm**.

LESSON ARC

Open with the ruler-and-pencil photo and take three hands-up readings of the tip sitting between 16 and 17 cm. At the front, lay a real 12.4 cm pencil against the demonstration ruler, count the four small marks aloud, and lean deliberately to show parallax. Pupils then measure their own pencil, eraser and copy at their desks, saying each length two ways. The copybook moment captures one reading; the Class Challenge runs six objects as front rotation stations.

TEACHING MOVES

1. **Getting Started.** Display the ruler-and-pencil photo as pupils settle and take exactly three hands-up answers, not call-outs. Listen for anyone reading the tiny marks between 16 and 17 — that's today's target — but don't confirm the length yet; the demonstration ruler settles it.
2. **Watch and Notice.** Use the real demonstration ruler, not a screen. Count the four small marks past the 12 line aloud and name both versions: 'twelve point four centimetres, or one hundred and twenty-four millimetres.' Then lean hard to one side so the class sees the line appear to slip, come back square-on, and say 'eye square over the mark.'
3. **Try It Together.** Send pupils to their own rulers to measure pencil, eraser and copy. Circulate and watch the left edge: the most common slip is starting the object at the ruler's edge, not the 0 mark. If a pupil gives only centimetres, ask 'and in millimetres?' Reconcile any disagreement by re-measuring one object at the front.
4. **Write the Reading Two Ways in Your Copy.** Glance as you walk that the circled millimetre digit lands on the decimal digit in the cm version and the units digit in the mm version — those are the same millimetre count. This is copybook practice, not marking; keep moving.
5. **Class Challenge.** Run the six objects as front rotation stations and keep the turns brisk so as many pupils as possible read with their own ruler. Pupils record straight into the three-column Object/cm/mm table they ruled. Confirm each reading aloud at the end against your known lengths; if you have a second set of objects, run parallel stations so more read at once.
6. **What Did We Notice?.** Steer the talk toward the between-the-marks ends as the genuinely hard reads. Revoice a strong answer: 'so when the end sits between two marks we take the nearest one — we can't read half a millimetre on this ruler.' Draw out anyone who names the eye-square lean as what wobbled their reading.

COMMON MISCONCEPTIONS

⚠ Pupils line the end of the object up against the left edge of the ruler instead of the 0 mark, so every reading runs a few millimetres long.

Catch it as you circulate — slide the object back so its end sits exactly on the 0 mark, and point out the gap of plastic before the 0. Re-read together and show how much shorter the true length is.

⚠ A pupil reads an object that ends between two millimetre marks as 'twelve and a half' or invents a half-millimetre.

Hold the demonstration ruler up and show there is no mark to land on between the two — the ruler only reads whole millimetres. 'We take the nearest mark.' Have the pupil decide which of the two marks the end is closer to.

⚠ Pupils write the two unit versions as different lengths, e.g. recording 12.4 cm but 12 mm, treating the centimetre number as the millimetre number.

Stop and rebuild on the demonstration ruler: ten millimetres in every centimetre, so 12.4 cm is 124 mm — the whole number of centimetres becomes hundreds and tens of millimetres. Circle the matching millimetre digit in both versions.

DIFFERENTIATION

EMERGING

- Pre-measure two of the desk objects and tell the pupil the answer, so they practise lining up the 0 mark and reading toward a known length first.
- Stay on whole and half-centimetre objects in the copybook moment; come back to between-the-marks reads once the 0-mark alignment is secure.

DEVELOPING

- After the desk round, ask the pupil to predict an object's millimetre reading before measuring, then check how close they were.
- Give a length only in millimetres (e.g. 138 mm) and ask them to write it in centimetres before they reach that object's station.

PROFICIENT

- At the stations, ask: which object would be hardest to measure to the nearest millimetre and why? Have them write a one-line rule for what makes a reading uncertain, ready to read aloud in What Did We Notice?
- Pose a stretch at the front: if our ruler only showed centimetres, how far off could a reading be? Let them reason it to the nearest half-centimetre.

↗ **Cross-curricular:** Tie to the science strand — pupils measure leaf or twig lengths from the school yard to the nearest millimetre and record each one both ways.

ANSWER KEY

W1: 36 mm

W2: 84 mm

Q1: 7.8 cm

Q2: 12.4 cm

Q3: 28.4 cm

Q4: 14.8 cm

EXTENSION SHEET · STRETCH ANSWERS

S1: 14.6 cm

S2: 7.6 cm

S3: 14.4 cm