

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 a pencil lying between 16 and 17 cm and bank three estimates on the IWB. Walk the worked example slowly — finger from 0 to 12, then count on four millimetres to land at 12.4 cm — and show the decimal-slide to 124 mm. Pupils rotate at the board on fresh values, then measure their own pencil, eraser and copy at their desks. Copybook moment captures one reading written two ways. Class Challenge runs five real objects with the parallax check.

TEACHING MOVES

1. **Getting Started.** Take three hands-up estimates only — no open call-outs. Note each guess on the IWB beside the ruler image and say 'we'll come back to these at the end.' Don't reveal the true reading yet; the suspense pulls the lesson forward.
2. **Watch and Notice.** Run your finger from 0 up to 12, then count aloud 'one, two, three, four millimetres' to land at 12.4. Say it both ways in one breath: 'twelve point four centimetres OR one hundred and twenty-four millimetres — same length, two ways.' Then hold a real ruler up and look across it from a slant on purpose so pupils see the tip shift — name that as parallax.
3. **Try It Together.** Use fresh values on the board — 15.3, 7.8, 11.6 — not the 12.4 from the previous step. Rotate three pupils through. While the class measures their own pencil, eraser and copy, circulate watching for two slips: end of object against the ruler's edge instead of zero, and eyes slanted over the mark. Cue 'lift to eye level, look straight down' and let pupils self-correct.
4. **Write the reading in your copy.** Walk the row glancing at the two forms. The decimal point must be in the right place in the cm form, and the mm form must have no decimal point at all. If you spot '12.4 mm' written for what should be '124 mm', tap the page beside it as a quiet prompt rather than calling it out.
5. **Class Challenge.** Keep the rhythm brisk — about two minutes per object. The marker at 15.2 cm is the trap; pupils tend to read 15.3. Pause there and ask 'eye square — what do you actually see?' before the class confirms. Pupil reads aloud, take a couple of answers, Check, move on.
6. **What Did We Notice?.** Listen for pupils naming between-the-marks readings as harder. Revoice: 'so when the tip lands between 15 and 16, we count millimetres — five is halfway, eight is most of the way.' If a pupil mentions 'looking from the side', name it as parallax explicitly.

COMMON MISCONCEPTIONS

⚠ Pupils write '12.4 mm' when they mean 124 mm — they keep the decimal point when they swap units instead of sliding it.

Stop and rebuild on the ruler: 12.4 cm is more than twelve whole centimetres — that's already over a hundred millimetres, so 12.4 mm cannot be right. Write the digits 1-2-4 on the IWB and physically rub out the decimal point as you swap to mm.

⚠ Pupils line up the end of the object against the ruler's edge instead of against the zero mark, and read a length one or two millimetres short.

Crouch beside the pupil with their ruler and slide it so the object's end sits exactly on zero. 'The numbers don't start at the edge — they start at zero. The edge is just plastic.' Have them retake the reading themselves.

⚠ Pupils read with their eye slanted over the ruler and call 15.2 cm as 15.3 cm (or vice versa).

Demonstrate the parallax slip at the front — hold a ruler up and look across it on purpose so the class sees the tip seem to shift. Then say 'lift to eye level, look straight down' and have the pupil retake the reading from directly above.

DIFFERENTIATION

EMERGING

- Pair the pupil with their own pencil only — drop the eraser and copy. One object, read twice with you watching the eye-level check.
- Pre-write the cm form on a sticky and let the pupil produce only the mm form by sliding the decimal — chunks the task into one move.

DEVELOPING

- After the copybook moment, ask pupils to measure a fourth object of their choice and predict the mm form before checking on the ruler.
- Pose: 'if a pencil is 87 mm, where would the tip sit on the ruler — between which two centimetre marks?' Reverses the slide.

PROFICIENT

- Ask pupils to measure the longer side of their copybook in cm to one decimal, then the shorter side, then write both lengths in mm. Which is the more useful unit to describe a copybook, and why?

↗ **Cross-curricular:** Tie to visual arts — when pupils next cut card for a 3D net, ask them to measure and mark each edge to the nearest millimetre before cutting.

ANSWER KEY

W1: 36 mm

Q2: 12.4 cm

W2: 84 mm

Q3: 28.4 cm

Q1: 7.8 cm

Q4: 14.8 cm

EXTENSION SHEET · STRETCH ANSWERS

S1: 14.6 cm

S3: 14.4 cm

S2: 7.6 cm