

Decimals on the number line to thousandths

CURRICULUM ALIGNMENT

NUM.PVT.4

investigate how decimals and percentages (and fractions) can be compared, ordered and expressed in related terms.

NUM.FRC.4a

explore (model, compare and convert) the relationships between fractions, decimals and percentages.

INTERACTIVES **Number Line · challenge, display, explore**

WHAT THIS LESSON TEACHES

To place a decimal like 0.342 exactly, zoom into a smaller stretch of the number line so the marks are close enough together.

→ To place 0.342 we zoom from the 0..1 line into the 0.3..0.4 line, where each small mark is 0.01.

→ 5, 0.50 and 0.500 all mark the same point - five tenths.

MODEL THIS ON THE BOARD

PLACING 0.342 ON THE NUMBER LINE

- 1 Start with the line from 0.3 to 0.4.
- 2 Each mark shows 0.01 so find the 0.34 mark.
- 3 The next small marks are thousandths: 0.341, 0.342, 0.343.
- 4 **0.342** sits three marks after 0.34.

LESSON ARC

Sketch a bare 0.4–0.5 line on the board and ask where 0.456 could possibly go — leave it unresolved. Then use the zoomable number-line interactive to place 0.7, zoom into 0.34, and zoom again to land 0.385, naming 'zoom in' every time. Pupils rule a 0.3–0.4 line in their copy and dot thousandths between hundredth marks. Class Challenge works placements plus a between-two-decimals task on the same line.

TEACHING MOVES

1. **Getting Started.** Sketch the short 0.4–0.5 line as pupils settle. Take two or three hands for 0.45, then pose 0.456 and stop — don't resolve it. Let the puzzle sit: how do we place three decimal places when the marks only go to tenths?
2. **Watch and Notice.** Walk the three examples on the interactive one at a time and say 'zoom in' out loud every single time — the zooming IS the idea. At the 0.34 slice, ask 'where would 0.385 go?', take two predictions, and revoice one ('so between 0.38 and 0.39') before you reveal 0.385 landing exactly where they said.
3. **Try It Together.** Build the trailing-zero point first: place 0.5, then 0.50, then 0.500 on the interactive and let the class watch all three hit one point. Then set the line to 0.3–0.4 in thousandths and call 0.305, 0.342, 0.388 in rising order — class points roughly first, one pupil drags and counts aloud by thousandths from the nearest tenth.
4. **Sketch the Line in Your Copy.** Circulate glancing for ten evenly spaced hundredth marks from 0.3 to 0.4 — this is copybook practice, not marking. Watch for the pupil who parks a thousandths dot ON a mark;

nudge them to place it BETWEEN two marks, because that's the whole point of thousandths sitting inside hundredths.

5. **Class Challenge.** Keep it brisk — pupils take turns, use the Check button as narration ('yes, that's it' on a green tick), and the class confirms each before moving on. On the final between-0.34-and-0.345 task, ask a second pupil for a DIFFERENT valid answer so the 'always room in between' idea lands.
6. **What Did We Notice?** Ask how many decimals fit between 0.34 and 0.35. Listen for 'no limit'. If a pupil names a fixed number like ten, zoom the earlier line one more step live so the tenth mark itself splits — then revoice: 'so between any two decimals we can always squeeze another one in.'

COMMON MISCONCEPTIONS

⚠ Pupils place 0.5, 0.50 and 0.500 at three different spots — they read the extra zeros as making the number bigger, so 0.500 goes further along than 0.5.

Place all three on the interactive so the class sees them land on one point. Say it plainly: five tenths, fifty hundredths, five hundred thousandths — same amount, three ways of writing it, because a trailing zero adds no value.

⚠ Asked to place 0.305, pupils treat it like 0.35 and drag the marker roughly halfway along the 0.3–0.4 line — they skip the zero in the hundredths column.

Have the pupil count aloud by thousandths from 0.30: 'three hundred, three hundred and five' — five thousandths, barely past the very start. The zero holds the hundredths place open; without reading it they've jumped ninety-five thousandths too far.

⚠ In the maths-talk, a pupil insists exactly ten decimals fit between 0.34 and 0.35 — they count the visible hundredth marks and stop there.

Zoom that stretch one more step live on the interactive so each of those ten marks splits into ten again. Ask 'and if we zoom again?' The visible marks are just where we stopped, not where the numbers stop.

DIFFERENTIATION

EMERGING

- Stay on the wide 0.3–0.4 line at hundredths only while the class moves to thousandths — pupils place 0.34 and 0.38 exactly on marks before any between-marks work.
- In the copy, hand these pupils the line pre-ruled with the ten hundredth marks so they only place dots, not build the scale.

DEVELOPING

- After the Class Challenge, ask them to place a decimal that rounds to 0.34 to the nearest hundredth but is not 0.34 exactly — where can it sit?
- Give a rising chain on the copy line: 0.341, 0.344, then predict where 0.347 lands and check by counting thousandths.

PROFICIENT

- During the Class Challenge, narrate a harder variant to fast finishers: find a decimal exactly halfway between 0.34 and 0.345, and justify why 0.3425 is that midpoint — then move them ahead into the Student Activity Book page.

✍ **Cross-curricular:** Tie to the science strand — pupils measure a classroom object to the nearest millimetre and write its length in metres as a decimal to thousandths (e.g. 0.145 m).

ANSWER KEY

Scaffold: visual check on the page

Q1: halfway between 0.4 and 0.5

Q2: at the right end (same as 0.5)

Q3: just after 0.34 (between 0.34 and 0.35)

Q4: just after 0.45 (between 0.45 and 0.46)

Q5: just before 0.39 (between 0.38 and 0.39)

a) **Always** : Trailing zeros do not change the value, so both mark the same point.

b) **Always** : A 0.01 stretch splits into ten thousandths, so each mark is exact.

c) **Sometimes** : True for 0.45; false for 0.405, which has three.

d) **Never** : Between any two decimals you can always find another decimal.

EXTENSION SHEET · STRETCH ANSWERS

S1: $6.26 < 6.89 < 7.753 < 9.4$

S2: $2.88 < 4.03 < 7.02 < 7.13$