

Decimals on a number line

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

A decimal point separates the whole-number part from the part smaller than one. On a number line from 0 to 1, tenths and hundredths sit at equal small steps so you can place any decimal exactly.

→ 0.7 means seven tenths, so it sits seven small steps along from 0 towards 1.

→ 0.34 sits between 0.3 and 0.4, four hundredths past the 0.3 mark.

MODEL THIS ON THE BOARD

PLACING 0.65 ON THE LINE

- 1 Sketch a line from **0** to **1** with a mark every **0.1**.
- 2 0.65 lies between the **0.6** mark and the **0.7** mark.
- 3 It is five hundredths past **0.6**, so halfway across that tenth.
- 4 Put a clear dot at that spot and label it **0.65**.

LESSON ARC

Open with a bare 0-to-1 line and have pupils finger-point where 0.5 lands — half is the anchor. Narrate 0.7 on a tenth mark, then the pivot: 0.34 sits between two marks, not on one. Try It Together escalates 0.2, 0.65, 0.9, 0.04 with a prediction before each drag. Pupils sketch their own line in copybook for four values, then the whole class works the Class Challenge bank before Student Activity Book practice.

TEACHING MOVES

1. **Getting Started.** Draw a bare 0-to-1 line with no other marks. Give five seconds of silent think-time, then take three hands-up (no call-outs). Most will point at the middle for 0.5 — name it: 'a decimal has a known place, and half is the easiest to see.'
2. **Watch and Notice.** Narrate each example on the number-line interactive one at a time. On 0.08, pose the prediction — more or less than halfway to 0.1? — and hold for two or three hands-up before revealing the marker; don't answer it yourself. Save 0.5/0.50/0.500 for last and say 'the zeros did not move it' — let it land silently.
3. **Try It Together.** Ask for a prediction before each drag, then let a pupil place the marker and the class read it off. When you reach 0.04, listen for pupils saying 'nearly a half' — stop and ask which two tenth-marks it lives between before anyone places it.
4. **Sketch the Line in Your Copy.** Walk the room checking tick spacing and whether 0.34 and 0.08 land between marks, not on them. 0.08 should sit close to the 0.1 mark but before it — that's the one to glance for. No marking, just spotting.

5. **Class Challenge.** Keep the board work brisk — pupils take turns, the class confirms, move on. For the open 'between 0.4 and 0.45', accept any of 0.41–0.44 but press one pupil on why it must sit just past 0.4 and before halfway to 0.5. Use the Check tick as part of the narration: 'yes — that's it.'
6. **What Did We Notice?.** Ask what sits between 0.3 and 0.4 — empty space, or something? Revoice a strong answer: 'so between any two decimals there is always room for more.' If someone says 'lots and lots', welcome it as the seed for hundredths without formalising.

COMMON MISCONCEPTIONS

⚠ Pupils read 0.04 as 'nearly a half' and place the marker near the middle of the line — they hear the digit 4 and reach for a familiar half.

Stop and ask which two tenth-marks 0.04 lives between. Drag the interactive to show it sits between 0 and 0.1, well under halfway to the first mark. Four hundredths, not four tenths.

⚠ Pupils think 0.500 is bigger than 0.5 because it 'has more numbers' (the longer-means-bigger trap). On the number-line interactive, place 0.5, then 0.50, then 0.500 in turn — the marker doesn't move. Say it plainly: 'the zeros did not move it.' Let the class watch the point stay put rather than explaining it away.

⚠ Pupils place 0.34 on a tenth mark (on 0.3 or 0.4) rather than in the gap between them. Point to the gap between 0.3 and 0.4 on the interactive and count hundredth steps into it. 0.34 is four hundredths past 0.3 — it can't sit on a mark because it isn't a whole number of tenths.

DIFFERENTIATION

EMERGING

- Keep these pupils on decimals that land on a tenth mark (0.2, 0.7, 0.9) while the class works the in-gap values; they place the marker on a labelled mark, no estimating.
- In the copybook sketch, hand them a line where you've already drawn and labelled the tenth marks, so they only place the four decimals rather than build the scale.

DEVELOPING

- After the copybook page, ask them to place 0.34 and 0.4 on the same line and say which sits further right and by how many hundredths.
- Give a missing-value line: 'the marker is halfway between 0.6 and 0.7 — what decimal is it?' before they reach the Class Challenge.

PROFICIENT

- During the Class Challenge, narrate a harder variant for fast finishers: 'name three different decimals that all sit between 0.42 and 0.43' — pushing them into thousandths without formalising it.
- Pull them ahead into the Student Activity Book page and ask them to write, in one sentence, why 0.5 and 0.50 land on the same point.

✚ **Cross-curricular:** Tie to PE — mark a 0-to-1 line along the hall floor and have pupils walk to 0.3, 0.75, 0.9 to feel where decimals sit.

ANSWER KEY

Scaffold: visual check on the page

Q1: halfway between 0 and 1

Q2: at the 2nd tenth (0.2)

Q3: at the 9th tenth (0.9)

Q4: 4 hundredths past 0.3

a) Always : 0.25 is a quarter of the way from 0 to 1, which is halfway to 0.5.

b) Always : Seven tenths leaves only three tenths to reach 1.

c) Never : 0.08 is only eight hundredths, far below 0.5.

d) Never : Numbers strictly between 0.3 and 0.4 sit on hundredths, not tenths.

EXTENSION SHEET · STRETCH ANSWERS

S1: $2.963 < 4.8 < 5.83 < 8.404$

S2: $7.15 < 9.44 < 9.66$

S3: $1.83 < 4.03 < 7.02$

S4: $4.88 < 6.89 < 9.4$

S5: $4.8 < 7.32 < 9.84$