Lesson 33 NUMBER

Converting fractions to decimals

CURRICULUM ALIGNMENT

NUM.FRC.4a explore (model, compare and convert) the relationships between fractions, decimals and percentages.

INTERACTIVES Function Machine · challenge, display, explore

WHAT THIS LESSON TEACHES

A fraction is a division waiting to happen: the top number divided by the bottom number. So 3/4 means 3 divided by 4.

→ 3/4 = 3 divided by 4 = 0.75

→ 1/8 = 0.125 (stops after three places)

MODEL THIS ON THE BOARD

CONVERT 3/4 TO A DECIMAL

1. Divide the top number by the bottom number: 3 divided by 4.
2. 00 divided by 4 gives 0.75 exactly.

LESSON ARC

Open by asking which two numbers hide inside 3/4 as a division. On the function-machine interactive, work 3 ÷ 4 by hand on the board first, then let the machine confirm 0.75. Build through 1/8, 2/5, 1/3 — 1/3 is the payoff where the remainder 1 keeps returning and the 3 repeats. Pupils set out four divisions in their copy, then the Class Challenge bank consolidates with 1/6 as the recurring surprise.

TEACHING MOVES

1. **Getting Started.** Give five seconds of quiet think-time, then take three hands-up answers only — no open call-outs. Listen for 'divide 3 by 4'; if nobody offers it, park it rather than supplying it, because the next step reveals it.
2. **Watch and Notice.** Work each division on the board by hand first, then let the machine confirm — pupils need to see the working, not just the answer. On 1/3, point at the remainder 1 coming back again and again, then hand-draw the dot over the 3 (0.3̇) so they see the exact mark they'll copy. Contrast 5/8 stopping against 1/3 running on.
3. **Try It Together.** Before each reveal, ask the whole class to predict 'stops or runs on?' Reset the machine for each fraction — rule to the bottom number, top number through. Save 1/6 = 0.1666... for last as the planned pause, and re-voice a strong answer: 'so we always divide the top by the bottom.'
4. **Set It Out in Your Copy.** Walk the room glancing at the division layout and the aligned decimal point — this is practice, not marking. Watch specifically for pupils dividing bottom by top, and check that 1/3 is the one underlined as running on.
5. **Class Challenge.** Keep it brisk — pupils take turns at the board, state the division aloud ('seven divided by ten'), predict stops-or-runs-on, then Check confirms. Don't re-explain each one; the class confirms and you move on. Catch the divide-bottom-by-top slip fast.
6. **What Did We Notice?.** With the factors on the board, re-voice the pattern in pupils' words: 'when the bottom is made of 2s and 5s, the decimal stops.' Head off the idea that a bigger bottom number means a longer decimal — 1/8 stops but 1/3 runs on.

COMMON MISCONCEPTIONS

⚠ Pupils divide the bottom by the top — for 3/4 they set out 4 ÷ 3 and get 1.33... instead of 0.75.

Catch it at the board the moment a pupil states the division backwards. Chant the rule as they set it out — 'top first, always' — and rebuild 3 ÷ 4 alongside their 4 ÷ 3 so they see the two answers are different amounts.

⚠ Pupils assume a bigger bottom number always makes a longer or messier decimal, so they expect 1/8 to run on and 1/3 to stop.

Put 1/8 = 0.125 (stops) and 1/3 = 0.333... (runs on) side by side on the board. It's not the size of the bottom number — it's whether it's built only from 2s and 5s. Break 8 and 3 into factors to show why.

⚠ Pupils stop a recurring division early and write 1/3 = 0.333 as if it terminates.

Point at the remainder 1 returning at each step on the board — 'the same leftover keeps coming back, so the 3 never stops.' Model the dotted notation by hand so they mark it as recurring rather than truncating.

DIFFERENTIATION

EMERGING

- Stay with one-place stoppers on the machine (7/10, 3/5) while the class moves to 1/8 — pupils see one division digit, not a long chain.
- In the copybook set, pre-write the division layout (3 ÷ 4 =) so pupils only carry out the dividing, not build the structure.

DEVELOPING

- After the copybook set, ask pupils to sort 1/2, 1/5, 1/9, 3/8 into 'stops' or 'runs on' by looking at the bottom number's factors before dividing to check.
- Give a missing-decimal chain: if 1/4 = 0.25, what is 3/4 without dividing again?

PROFICIENT

- Pose at the board: 'find a fraction whose decimal runs on, then a different one that stops, both with a bottom number bigger than 10 — and say how you knew before dividing.' Narrate the harder variant for fast finishers rather than routing them off-screen.
- Ask them to explain to a younger pupil, in one sentence, why 1/3 never stops but 1/4 does.

↗ **Cross-curricular:** Tie to the science strand — pupils record a fraction of a class survey (e.g. 3/8 chose apples) and convert it to a decimal to compare shares.

ANSWER KEY

Scaffold: visual check on the page

Q1: 0.5

Q2: 0.375

Q3: 0.7

Q4: 0.8

Q5: 0.333...

Q6: 0.625

a) Always — 3 divided by 4 gives exactly 0.75.

b) Always — 1 divided by 3 gives 0.333... which repeats.

c) Never — 1 divided by 8 gives 0.125 which stops.

d) Never — 2 divided by 5 gives 0.4 which stops after one place.

EXTENSION SHEET · STRETCH ANSWERS

S1: 75% = 3/4 = 0.75

S2: 0.75 = 3/4 = 75%

S3: 3/5 = 0.6 = 60%

S4: 75% = 3/4 = 0.75

S5: 20% = 1/5 = 0.2