

Lesson 39 **NUMBER**

Decimals and fractions: they're the same thing

CURRICULUM ALIGNMENT

NUM.FRC.4a

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

NUM.PVT.4

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

INTERACTIVES Phone Battery · challenge, display, explore

WHAT THIS LESSON TEACHES

Every fraction has a decimal that equals exactly the same amount. You find it by dividing the top number by the bottom number.

→ $1/2$ is the same amount as 0.5

→ $2/5$ means $2 \div 5 = 0.4$

MODEL THIS ON THE BOARD

MATCHING $3/8$ TO ITS DECIMAL

- 1 Write the fraction as a division: top $\div$ bottom so $3 \div 8$.
- 2 Work out $3 \div 8 = 0.375$.
- 3 So the twin pair is $3/8 = 0.375$.

LESSON ARC

Open with the phone-battery equivalence slider showing $1/2 = 0.5 = 50\%$ and ask which is bigger — settle that they're the same amount. Model 'divide top by bottom' by pointing at the fraction line every time, walking $1 \div 4$ as tenths-and-hundredths on screen. Pupils try $1/8$, $3/8$, $1/5$, then $1/3$ together on the battery, hitting the recurring surprise. They build a three-column fraction-decimal-percent table in their copybook, starring recurring rows.

TEACHING MOVES

1. **Getting Started.** Give five seconds of silent think-time before hands. Take two or three answers to 'is $1/2$ bigger, smaller, or the same as 0.5', then confirm they're the same amount two ways. Hold the method back — that's the next step.
2. **Watch and Notice.** Say 'divide top by bottom' every single time, pointing at the fraction line as you do. On $1/4$, pause and let the class predict $1 \div 4$ before you walk the on-screen division: one whole becomes ten tenths, share, carry the leftover as hundredths to reach 0.25. On $2/5$, say aloud 'notice every decimal so far stops' — that plants the recurring surprise.
3. **Try It Together.** Pupils take turns at the board saying the division sentence (' $1/8$ means $1 \div 8$ ') before you set the battery. Flag that eighths land between whole per-cent marks — $1/8$ is 12.5%, halfway between 12 and 13. On $1/3$, ask for a prediction; the battery can't print 0.333..., so name it aloud and show one or two long-division steps so the class sees the leftover of 1 repeat. Leave the 'why' for the maths-talk.
4. **Build Your Equivalence Table in Your Copy.** Walk the room glancing at the third column and the star — this is practice, not marking. Watch specifically for 0.34 written for three quarters, and for the $1/3$ row written as 0.3 instead of 0.333... with a star.

5. **Class Challenge.** Brisk board turns — a pupil says the division sentence, sets the slider, class confirms, move on. Don't re-explain each one. For the $\frac{1}{8}$ stretch, 0.125 sits halfway between 12 and 13 per cent; remind pupils half a per cent is fine and the Check accepts it.
6. **What Did We Notice?.** Listen for pupils spotting that 3 doesn't divide evenly into 10, 100 or 1000 — there's always a remainder of 1 to carry. Revoice a strong answer: 'the same leftover gives the same digit, so the threes never stop.' Don't push toward the general factors-of-ten rule.

COMMON MISCONCEPTIONS

⚠ Pupils read $\frac{3}{4}$ straight off as '0.34' — they glue the digits together instead of dividing 3 by 4. Stop and set the battery to $\frac{3}{4}$ to show it lands at 0.75, not 0.34. Point at the fraction line and re-run $3 \div 4$ aloud. Contrast: 0.34 would be roughly a third full, but three quarters is clearly most of the battery.

⚠ Pupils write $\frac{1}{3}$ as '0.3' and treat it as finished, missing that it recurs. On the board, run $1 \div 3$ for two or three steps so the class watches the leftover of 1 come back every time. Have them add the star to that copybook row and read it as 'nought point three three three, keeps going'.

⚠ Pupils expect the battery to print the exact decimal for $\frac{1}{8}$ and get thrown when the mark sits between 12 and 13 per cent. Name it before it bites: eighths give half a per cent (12.5%), so the mark sits halfway between two whole marks. Show $\frac{1}{8} = 0.125$ written in full alongside the slider so pupils trust the three decimal places.

DIFFERENTIATION

EMERGING

- Stay with the friendly twins — $\frac{1}{2}$, $\frac{1}{4}$, $\frac{3}{4}$, $\frac{1}{10}$ — while the class moves to eighths; pupils build just those rows of the copybook table with you.
- Pre-rule the three columns (fraction, decimal, percent) in the copy so pupils fill values rather than draw the structure.

DEVELOPING

- After the table, give $\frac{1}{6}$ and ask: will this one stop or keep going? Set the battery and check the prediction.
- Ask pupils to write the division sentence beside each row so the 'top $\div$ bottom' link is visible, not just remembered.

PROFICIENT

- Challenge: which unit fractions between $\frac{1}{2}$ and $\frac{1}{10}$ give recurring decimals? Let pupils test $\frac{1}{3}$, $\frac{1}{6}$, $\frac{1}{7}$, $\frac{1}{9}$ on the battery and long division, then say what the recurring ones have in common — no need to reach the formal rule.
- Pull ahead into the next beat: ask them to explain to a neighbour-band pupil why the line in a fraction has meant 'divide' all along, using $\frac{3}{4}$ as their worked case.

✓ **Cross-curricular:** Tie to everyday tech — pupils read their own phone or tablet battery percentage and write it as both a fraction and a decimal of a full charge.

ANSWER KEY

Scaffold: visual check on the page

Q1: 0.2

Q2: 0.6

Q3: 0.8

Q4: 0.75

Q5: 0.125

a) Always : Dividing 1 by 2 gives exactly 0.5.

b) Always : $2 \div 5 = 0.4$.

c) Never : 1 divided by 3 gives 0.333... with threes that keep going.

d) Never : 1 divided by 8 gives 0.125 which stops cleanly.