

Equivalent fractions: a first look ($\frac{1}{2} = \frac{2}{4}$)

CURRICULUM ALIGNMENT

NUM.FRC.3a compare and express in equivalent terms; and order fractions.

INTERACTIVES Fraction Strips · challenge, display, explore

WHAT THIS LESSON TEACHES

Two fractions are equivalent if they name exactly the same amount of a whole, even when the top and bottom numbers look different.

→ $\frac{1}{2} = \frac{2}{4}$ on equal chocolate bars

→ $\frac{1}{2} = \frac{5}{10}$ on matching cake slices

MODEL THIS ON THE BOARD

FAIR SHARES OF CHOCOLATE

- 1 Draw two equal chocolate bars one above the other.
- 2 Shade 1 half of the top bar.
- 3 Shade 2 quarters of the bottom bar.
- 4 Line up the shaded ends: they stop at the same place so $\frac{1}{2} = \frac{2}{4}$.

DISCUSSION STARTER

REFLECT How can one half and two quarters name the very same amount?

LESSON ARC

Open with the chocolate-bar argument — did Katie ($\frac{1}{2}$) and Seán ($\frac{2}{4}$) get the same amount? Don't settle it. On the fraction-strips interactive, show $\frac{1}{2}$ shaded, then line up $\frac{2}{4}$ underneath and trace both shaded ends stopping in the same place. Pupils shade a matching quarters strip in copybook and write $\frac{1}{2} = \frac{2}{4}$. The Class Challenge works four matches together, ending with $\frac{2}{4} = \frac{4}{8}$ with no half on the board.

TEACHING MOVES

1. **Getting Started.** Pose the chocolate-bar problem and give five seconds of silent think-time before hands go up. Take three hands-up answers only, and deliberately leave the argument unsettled — the strips will prove it, not you.
2. **Watch and Notice.** On the fraction-strips interactive, establish $\frac{1}{2}$ as one of two equal parts shaded, then line up $\frac{2}{4}$ underneath and trace a finger along both shaded ends — 'they stop in the same place.' Before revealing $\frac{4}{8}$, ask 'will it reach the same place?' and pause. Say 'equivalent' out loud each time — it's today's new word.
3. **Try It Together.** Keep the halves strip shaded to $\frac{1}{2}$ as the amount to match against. As pupils take turns shading the quarters strip at the board, ask the class 'does it stop in the same place as the half?' before accepting. Watch for pupils who stop one segment short or long — reset and count together from the left edge.
4. **Draw the Matching Bars in Your Copy.** Walk the room checking two things only: are the two bars the same length, and do the shaded ends line up? If a pupil's bars are different lengths, that's the one thing to prompt on — a shorter bottom bar makes the match look wrong even when the count is right.

5. **Class Challenge.** Brisk board turns — pupils shade, class confirms, move on. The first three matches lean on the halves strip; before the fourth ($\frac{2}{4}$ with $\frac{4}{8}$, no half shown) ask 'can two fractions be equal even when neither is a half?' Let them line the two strips up directly and see it holds.
6. **What Did We Notice?.** Steer the talk back to the strips: revoice any pupil who says 'the shaded parts were the same length.' Head off 'bigger bottom number means bigger fraction' — point out $\frac{2}{4}$ has bigger numbers than $\frac{1}{2}$ but names the same amount.

COMMON MISCONCEPTIONS

⚠ A pupil insists 'two fractions can only be equal if they have the same bottom number' — so $\frac{1}{2}$ and $\frac{2}{4}$ can't be equal because 2 and 4 are different.

Put $\frac{1}{2}$ and $\frac{2}{4}$ on the strips one above the other and trace both shaded ends stopping in the same place. Same length, different numbers. Land the word: the amount is the same, so they are equivalent.

⚠ A pupil thinks $\frac{2}{4}$ must be bigger than $\frac{1}{2}$ because 2 and 4 are bigger numbers than 1 and 2.

Line the two shaded strips up on the interactive and ask where each shading ends. The bigger numbers just mean more, smaller slices — the covered length is identical.

⚠ When shading the quarters strip, a pupil counts segments correctly but stops one segment short or long, so the ends don't line up.

Reset the strip and count the shaded segments together from the left edge, one at a time. Then check the end against the half before accepting the match.

DIFFERENTIATION

EMERGING

- For the copybook bars, give pupils a strip of A4 folded in half to trace round so both bars start the same length — the length-matching is the hard part, not the counting.
- Keep these pupils on the $\frac{1}{2} = \frac{2}{4}$ match with the halves strip always visible; leave the no-half fourth challenge as teacher-supported.

DEVELOPING

- After the tenths match, ask which fraction with a bottom number of twenty would also line up with one half, and have them predict before you shade it.
- Ask them to write all four of today's equivalents in one chain in the copybook — $\frac{1}{2} = \frac{2}{4} = \frac{4}{8} = \frac{5}{10}$ — and read it aloud.

PROFICIENT

- Once the fourth match lands, pose at the board: 'find a fraction that is NOT equivalent to one half but has an even bottom number — how do the strips prove it?' Have them explain the mismatch in their own words before the Student Activity Book.

✚ **Cross-curricular:** Tie to the chocolate-bar opener with SPHE — sharing fairly: 'same amount, different-looking pieces' is exactly how we split a treat evenly among friends.

ANSWER KEY

Scaffold: visual check on the page

Q1: Yes

Q2: Yes

Q3: Yes

Q4: Yes

Q5: Yes

Spot:

You must ****multiply**** top and bottom by the same number, not add. $\frac{1}{2} = \frac{2}{4} (\times 2)$ or $\frac{3}{6} (\times 3)$.

EXTENSION SHEET · STRETCH ANSWERS

S1: $15 (\frac{3}{4} = \frac{15}{20})$

S2: $6 (\frac{2}{3} = \frac{6}{9})$

S3: $2 (\frac{1}{6} = \frac{2}{12})$

Investigation: One half, three ways — open-ended; scan pupils' working for valid solution paths rather than a single answer.