

Fractions are numbers: placing unit fractions on the number line

Learning intention: We are learning that fractions are numbers with their own places on the number line.

I can divide a number line from 0 to 1 into equal parts.

I can place $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{3}$ and $\frac{1}{8}$ on a number line.

I can explain why $\frac{1}{8}$ is smaller than $\frac{1}{4}$, even though 8 is bigger than 4.

DAILY REVIEW

6 min

Quick retrieval, whole class on whiteboards. Say the answer together after each item.

From yesterday: this strip is cut into 4 equal parts and 1 part is shaded. What fraction is shaded?

Expected: One quarter — $\frac{1}{4}$.

From last week: I cut a sandwich into 3 parts, but one part is much bigger. Have I cut thirds?

Expected: No — thirds must be 3 equal parts.

From three weeks ago: 4×6 ? 4×8 ?

Expected: 24; 32.

From last term: what is the value of the 7 in 374?

Expected: 70 — seven tens.

EXPLICIT TEACHING

12 min

Until today, fractions have been parts of things — strips, sandwiches, collections. Today we learn that a fraction is also a number, and every number has a place on the number line.

- Draw a line from 0 to 1 on the board. Ask: are there any numbers hiding between 0 and 1? Establish that there are — and fractions are their names.
- Worked example: place $\frac{1}{4}$. Step 1 — the denominator says cut the space between 0 and 1 into 4 equal jumps. Step 2 — halve the line, then halve each half; check the 4 parts are equal. Step 3 — count one jump from 0. That point is the number $\frac{1}{4}$.
- Repeat for $\frac{1}{8}$ on the same line, thinking aloud: 8 equal jumps means smaller jumps. $\frac{1}{8}$ lands closer to 0 than $\frac{1}{4}$.
- Name the misconception directly: many people think $\frac{1}{8}$ must be bigger than $\frac{1}{4}$ because 8 is bigger than 4. The line shows the opposite — more equal parts means each part is smaller.

The denominator is 4. What does it tell us to do to the number line?

Expected: Cut the space from 0 to 1 into 4 equal jumps.

Will $\frac{1}{3}$ sit closer to 0 than $\frac{1}{2}$, or further away? How do you know?

Expected: Closer to 0 — cutting into 3 parts makes each part smaller than cutting into 2.

GUIDED PRACTICE

12 min

In pairs. Each pair folds a paper strip and uses it to mark a number line.

- Fold strip 1 in half: mark $\frac{1}{2}$ on your worksheet line.
- Fold strip 2 in half, then half again: mark $\frac{1}{4}$, then count on to mark $\frac{2}{4}$ and $\frac{3}{4}$. Notice $\frac{2}{4}$ lands exactly on $\frac{1}{2}$.
- Fold strip 3 into eighths: mark $\frac{1}{8}$. Check with your partner: is your $\frac{1}{8}$ closer to 0 than your $\frac{1}{4}$?

Two of your marks landed in the same place. Which ones, and why?

Expected: $\frac{1}{2}$ and $\frac{2}{4}$ — two quarter-jumps reach the same point as one half-jump.

INDEPENDENT PRACTICE

10 min

Worksheet, on your own. The last two items revisit earlier work.

- Place $\frac{1}{2}$, $\frac{1}{4}$ and $\frac{3}{4}$ on a blank 0–1 line.
- Place $\frac{1}{3}$ on a second line, then circle the larger number: $\frac{1}{3}$ or $\frac{1}{4}$.
- Mia ran $\frac{1}{4}$ of the track. Ali ran $\frac{1}{8}$ of the track. Who ran further? Show your thinking on a number line.
- Review: 6×4 , 8×4 .
- Review: draw hands on the clock to show quarter past 9.

EXIT CHECK

5 min

Three questions on a slip, collected as students leave.

Mark $\frac{1}{3}$ on this number line.

Expected: One jump of three equal jumps from 0.

Circle the larger number: $\frac{1}{5}$ or $\frac{1}{3}$.

Expected: $\frac{1}{3}$.

Sam says $\frac{1}{8}$ is bigger than $\frac{1}{4}$ because 8 is bigger than 4. Explain why Sam is wrong.

Expected: Eight equal parts are smaller than four equal parts, so $\frac{1}{8}$ sits closer to 0 than $\frac{1}{4}$.

ENABLING — SAME TASK, MORE SUPPORT

Same task on pre-folded strips and pre-marked lines showing the fold points — students place halves and quarters only, then explain the $\frac{1}{8}$ versus $\frac{1}{4}$ comparison using the strips.

EXTENDING — SAME TASK, FURTHER DEPTH

Same lines, further questions: place $\frac{5}{4}$ on a line that runs past 1, and explain where $\frac{1}{100}$ would sit and why it will never reach 0.

MATERIALS

Per pair: 3 paper strips (30 cm)

Per student: number line worksheet, ruler

Teacher: board number line, 0 to 2

NEW VOCABULARY

denominator — The bottom number of a fraction. It tells us how many equal parts the whole is cut into.

unit fraction — A fraction with 1 on top — one of the equal parts, like $\frac{1}{4}$.