

Grade 3 • Unit 5 • Assessment Guide

Fractions as Numbers

For the Parent or Teacher — What to look for

Unit 5 builds the foundational idea that fractions are NUMBERS — they have a location on the number line, a size, and can be compared. The key diagnostic: does the student understand that the denominator names the SIZE of each part, while the numerator counts HOW MANY of those parts? Confusion between these two is the most common misconception in this unit.

Problem 1 — Strip divided into 6 parts

- 6 parts. Each is a 'sixth' ($1/6$). Four parts shaded = $4/6$.
- ★ Strong: uses the language 'sixth' (not just 'six'). Diagnostic: do they say 'one sixth' or 'one out of six' — both acceptable, but the former is more precise.
- Watch: confusion between '6 parts total' and 'one part out of 6.'

Problem 2 — Strip with 3 of 4 shaded

- Shaded: $3/4$. Not shaded: $1/4$. Together: $4/4 = 1$ whole.
- ★ Strong: realizes the two fractions together make the whole — sees fractions as parts of a unit.
- Weak: writes 'three' for shaded (no denominator) or doesn't see the sum to 1.

Problem 3 — Number line 0 to 1 in fourths

- Tick marks at $1/4$, $2/4$, $3/4$. Dot at $3/4$ (third tick from 0).
- ★ Strong: 'I count 3 parts of size $1/4$ from 0, so the dot is at the third tick.' This is the DISTANCE interpretation of fractions.
- Weak: places $3/4$ by guessing; OR places it AT 3 (the numerator) and not as a fraction-from-0.
- ★ This is one of the unit's biggest conceptual moves: fractions are LOCATIONS, not just 'parts of a shape.'

Problem 4 — $8/8$ and $16/8$ on number line to 2

- $8/8 = 1$. $16/8 = 2$. Fraction at 1 = $8/8$ (or $4/4$, $2/2$...). At 2 = $16/8$ (or $8/4$, $4/2$...).
- ★ THE diagnostic question for fractions ≥ 1 . If they say $8/8$ is some 'small' fraction or doesn't know where it goes, they're stuck on 'fractions are less than 1.'
- Strong: sees that going '8 of size $1/8$ ' lands exactly at 1.

Problem 5 — $1/2$ and $2/4$ equivalent

- Both are $1/2$ of the whole. Strong: 'The shaded parts have the same length — they cover the same amount.'
- ★ This is the visual definition of equivalent fractions. If they say 'no, because the strips are cut differently,' they're focused on the parts and not the totals.
- Strong: explicitly notes that two of the smaller fourth-parts equal one half-part.

Problem 6 — Equivalent fractions for $1/2$ and $2/3$

- $1/2 = 2/4 = 3/6 = 4/8 = 5/10$...
- $2/3 = 4/6 = 6/9 = 8/12$...
- For $1/2$ with denominator 8: it's $4/8$ (because $8 \div 2 = 4 \rightarrow$ numerator becomes 4).

- ★ Strong explanation: 'Each fourth got cut into 2 eighths, so 1 half = 4 eighths.' Or: 'Multiply top and bottom by the same number.'
- Weak: just lists fractions without articulating the pattern.

Problem 7 — Compare fractions

- (a) $2/4 < 3/4$ — same denominator, compare numerators.
- (b) $1/3 > 1/6$ — same numerator, larger denominator means smaller pieces.
- (c) $3/8 < 3/4$ — same numerator, eighths are smaller than fourths.
- (d) $4/4 = 1$ — fraction equals a whole.
- ★ The (b) and (c) comparisons (same numerator) are the deepest. Watch: students often think 'bigger number on the bottom = bigger fraction.' This is the biggest misconception in the unit.

Problem 8 — Lin: $1/8 > 1/4$ because $8 > 4$

- Lin is WRONG. $1/8 < 1/4$. When the denominator gets bigger, the parts get SMALLER.
- ★ Strong: 'If you cut a pizza into 8 slices, each slice is smaller than if you cut it into 4 slices. So $1/8$ is smaller than $1/4$.'
- ★ Bonus: 'The same whole is being cut into more pieces, so each piece is smaller.'
- Weak: agrees with Lin OR says she's wrong but can't explain why. This question is THE key diagnostic for the unit's central idea.

Problem 9 — $2/4$ vs $4/8$ pizza

- Han ate $2/4 = 1/2$ pizza. Mai ate $4/8 = 1/2$ pizza. They ate the SAME amount!
- ★ Strong: 'They ate the same amount because $2/4$ and $4/8$ are equivalent fractions — both equal $1/2$.'
- Visual: a clear drawing showing both as half of the pizza.
- Weak: says one ate more because of bigger numerator ($4 > 2$) — confuses numerator with amount.

Problem 10 — Diego: $1/3$ between $1/2$ and 1

- Diego is wrong. $1/3$ is between 0 and $1/2$ (specifically, between $1/4$ and $1/2$ — slightly bigger than $1/4$).
- ★ Strong: 'If you cut [0 to 1] into 3 parts, the first tick ($1/3$) comes BEFORE the middle ($1/2$). $1/3$ is less than $1/2$.'
- ★ Common misconception: thinking $1/3$ is 'in the middle' because the 3 is a small number. Reveals shaky understanding of fraction locations.

Problem 11 — Draw $5/6$ and a fraction less than it

- $5/6$ strip: 6 equal parts, 5 shaded.
- Anything less: $4/6$, $3/6$, $2/6$, $1/6$, etc. Strong students may also draw smaller-denominator fractions like $2/3$ ($= 4/6$, NOT less) or $1/2$ ($= 3/6$, less).
- ★ Watch: do their two strips end at the SAME total length? If their second strip is a different length, they don't yet see fractions as parts of the SAME whole.

Problem 12 — Fractions between 0 and 1 with denom 6

- Possibilities: $1/6$, $2/6$, $3/6$, $4/6$, $5/6$. (NOT $0/6$ — that's 0; NOT $6/6$ — that's 1.)
- ★ Strong: lists all 5 and recognizes the boundary cases.
- Weak: lists only some; OR includes $0/6$ or $6/6$ (forgetting 'between' is exclusive).