

Fraction Fix

Teacher Guide | Lessons 36-40

Meaning first. Efficient procedures from understanding. Durable fluency through retrieval.

Lesson progression

36 Scaling and Reasonableness

37 Mixed Numbers and Cross-Cancellation

38 Two Meanings of Division

39 Whole Number Divided by a Unit Fraction

40 Unit Fraction Divided by a Whole Number

Use each guide page to protect the conceptual throughline, anticipate misconceptions, and collect exit evidence.

Lesson 36 | Scaling and Reasonableness

Teacher Guide

Instructional focus

Predict the effect of multiplying by values below, equal to, or above one.

Primary representation: Number line and scale factors

Suggested 50-minute arc

5 min	Cumulative retrieval and estimate
8 min	Launch the central comparison or context
12 min	Student modeling and partner reasoning
10 min	Connect representation, language, and notation
10 min	Focused practice with immediate feedback
5 min	Exit evidence: computation plus explanation

Facilitation notes

- Ask students to estimate or predict before applying a procedure.
- Require the referent whole and the fractional unit to remain explicit.
- Use the listed misconception as evidence about the student's current model.
- Protect the central idea: A product can shrink even when both factors are positive.

Answer key and look-fors

1. Below 1. 2. Below 8.

5. Product is greater than $\frac{9}{10}$ because $\frac{7}{4} > 1$. 6. Equal.

7. $\frac{3}{8} < \frac{3}{4} < \frac{3}{2}$. 8. Factor 2.

Error: fractions must be compared by value; factor $\frac{3}{4}$ scales $\frac{2}{3}$ down.

Exit: product is less than $\frac{7}{8}$ because $\frac{5}{6} < 1$.

MISCONCEPTION TO WATCH

A product can shrink even when both factors are positive.

EVIDENCE TO COLLECT

A correct result, a reasonable magnitude check, and an explanation that connects the representation to the symbols.

Instructional focus

Multiply efficiently while preserving factor meaning.

Primary representation: Equations and area decomposition

Suggested 50-minute arc

5 min	Cumulative retrieval and estimate
8 min	Launch the central comparison or context
12 min	Student modeling and partner reasoning
10 min	Connect representation, language, and notation
10 min	Focused practice with immediate feedback
5 min	Exit evidence: computation plus explanation

Facilitation notes

- Ask students to estimate or predict before applying a procedure.
- Require the referent whole and the fractional unit to remain explicit.
- Use the listed misconception as evidence about the student's current model.
- Protect the central idea: Cross-cancellation is division by a shared factor, not digit removal.

Answer key and look-fors

1. $9/4$ and $5/3$. 2. About 4.

5. $7/2 \times 16/7 = 8$. 6. $4/15 \times 25/8 = 5/6$.

7. $8/5 \times 9/4 = 18/5 = 3 \frac{3}{5}$. 8. Cancellation applies only to factors.

Error: $3+5$ is not a product with factor 3; evaluate or factor the entire numerator.

Exit: $15/4 = 3 \frac{3}{4}$, consistent with estimate near 4.

MISCONCEPTION TO WATCH

Cross-cancellation is division by a shared factor, not digit removal.

EVIDENCE TO COLLECT

A correct result, a reasonable magnitude check, and an explanation that connects the representation to the symbols.

Lesson 38 | Two Meanings of Division

Teacher Guide

Instructional focus

Distinguish sharing division from measurement division.

Primary representation: Counters, strips, and equations

Suggested 50-minute arc

5 min	Cumulative retrieval and estimate
8 min	Launch the central comparison or context
12 min	Student modeling and partner reasoning
10 min	Connect representation, language, and notation
10 min	Focused practice with immediate feedback
5 min	Exit evidence: computation plus explanation

Facilitation notes

- Ask students to estimate or predict before applying a procedure.
- Require the referent whole and the fractional unit to remain explicit.
- Use the listed misconception as evidence about the student's current model.
- Protect the central idea: Division is not always sharing among a whole-number count.

Answer key and look-fors

1-2. Stories vary; quotients are 4. 3. It asks how many halves fit; answer 6.

5. Six $\frac{2}{3}$ -unit portions fit in 4. 6. Each share is $\frac{1}{6}$.

7. Measurement. 8. Sharing.

Error: fractional divisors often ask how many groups of that size fit.

Exit: e.g., six $\frac{2}{3}$ -cup servings fit in 4 cups.

MISCONCEPTION TO WATCH

Division is not always sharing among a whole-number count.

EVIDENCE TO COLLECT

A correct result, a reasonable magnitude check, and an explanation that connects the representation to the symbols.

Lesson 39 | Whole Number Divided by a Unit Fraction

Teacher Guide

Instructional focus

Interpret division as counting how many fractional units fit.

Primary representation: Measurement strips and number line

Suggested 50-minute arc

5 min	Cumulative retrieval and estimate
8 min	Launch the central comparison or context
12 min	Student modeling and partner reasoning
10 min	Connect representation, language, and notation
10 min	Focused practice with immediate feedback
5 min	Exit evidence: computation plus explanation

Facilitation notes

- Ask students to estimate or predict before applying a procedure.
- Require the referent whole and the fractional unit to remain explicit.
- Use the listed misconception as evidence about the student's current model.
- Protect the central idea: Dividing by a value below one can increase the result.

Answer key and look-fors

1. Four. 2. Twelve.

5. 14. 6. 20.

7. 18 batches. 8. Stories vary; quotient 16.

Error: the quotient counts small groups; fifteen thirds fit in five wholes.

Exit: 15 groups of size $\frac{1}{3}$.

MISCONCEPTION TO WATCH

Dividing by a value below one can increase the result.

EVIDENCE TO COLLECT

A correct result, a reasonable magnitude check, and an explanation that connects the representation to the symbols.

Instructional focus

Interpret equal sharing of a fractional amount.

Primary representation: Strips and sharing diagrams

Suggested 50-minute arc

5 min	Cumulative retrieval and estimate
8 min	Launch the central comparison or context
12 min	Student modeling and partner reasoning
10 min	Connect representation, language, and notation
10 min	Focused practice with immediate feedback
5 min	Exit evidence: computation plus explanation

Facilitation notes

- Ask students to estimate or predict before applying a procedure.
- Require the referent whole and the fractional unit to remain explicit.
- Use the listed misconception as evidence about the student's current model.
- Protect the central idea: The quotient is smaller because each person receives part of the original fraction.

Answer key and look-fors

1. Six equal parts. 2. Three sixths.

5. $\frac{1}{12}$. 6. $\frac{1}{20}$.

7. $\frac{1}{15}$ liter each. 8. They are equal.

Error: sharing one fourth among three creates twelfths; each share is $\frac{1}{12}$.

Exit: $\frac{1}{12}$ because each fourth is split into three equal pieces.

MISCONCEPTION TO WATCH

The quotient is smaller because each person receives part of the original fraction.

EVIDENCE TO COLLECT

A correct result, a reasonable magnitude check, and an explanation that connects the representation to the symbols.