

Fraction Fix

Teacher Guide | Lessons 41-45

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

Lesson progression

41 Fraction Divided by Fraction

42 Why Multiply by the Reciprocal

43 Tenths, Hundredths, and Decimal Fractions

44 Fraction to Decimal

45 Percent as a Rate per Hundred

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

Lesson 41 | Fraction Divided by Fraction

Teacher Guide

Instructional focus

Use common units to measure one fractional quantity with another.

Primary representation: Common-unit 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: A non-whole quotient can include a partial group.

Answer key and look-fors

1. $\frac{8}{12}$ and $\frac{3}{12}$. 2. Above 2.

5. $\frac{5}{2}=2\frac{1}{2}$. 6. $\frac{7}{2}=3\frac{1}{2}$.

7. $\frac{2}{3}$. 8. 6 pieces.

Error: $\frac{2}{12}$ is $\frac{2}{3}$ of a $\frac{3}{12}$ group, so quotient $2\frac{2}{3}$.

Exit: $\frac{15}{20}$ divided by $\frac{8}{20} = \frac{15}{8} = 1\frac{7}{8}$.

MISCONCEPTION TO WATCH

A non-whole quotient can include a partial group.

EVIDENCE TO COLLECT

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

Lesson 42 | Why Multiply by the Reciprocal

Teacher Guide

Instructional focus

Derive the general division procedure from multiplication and missing-factor reasoning.

Primary representation: Equations and measurement model

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 reciprocal procedure works because division asks for a missing factor.

Answer key and look-fors

1. $x(2/5)=3/4$. 2. $9/7$.
5. $20/9=2\ 2/9$. 6. $3/4$.
7. $15/4=3\ 3/4$. 8. The reciprocal undoes multiplication by the divisor.
Error: quotient is below 1 because dividend is smaller; exact value $2/5$.
Exit: $20/9$; $(20/9)(3/8)=5/6$.

MISCONCEPTION TO WATCH

The reciprocal procedure works because division asks for a missing factor.

EVIDENCE TO COLLECT

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

Instructional focus

Connect base-ten fractions to decimal place value.

Primary representation: Hundred grid 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: More decimal digits do not automatically mean a larger value.

Answer key and look-fors

1. $30/100$. 2. 0.37 .

5. $0.63=63/100$. 6. 0.7 .

7. $0.08<0.8$. 8. $47/100<0.5<6/10$.

Error: compare 37 hundredths with 40 hundredths.

Exit: $0.4=40/100>37/100=0.37$.

MISCONCEPTION TO WATCH

More decimal digits do not automatically mean a larger value.

EVIDENCE TO COLLECT

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

Instructional focus

Convert fractions by division and predict terminating behavior in common cases.

Primary representation: Division 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: A repeating decimal is an exact value, not a failed division.

Answer key and look-fors

1. $75/100$. 2. 5 divided by 8.
5. $5/16=0.3125$. 6. $11/25=0.44$.
7. $0.333\ldots$. 8. Powers of 10 contain only factors 2 and 5.
Error: $0.33=33/100$, while $0.333\ldots=1/3$ exactly.
Exit: 0.375; it is between 0.3 and 0.4.

MISCONCEPTION TO WATCH

A repeating decimal is an exact value, not a failed division.

EVIDENCE TO COLLECT

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

Lesson 45 | Percent as a Rate per Hundred

Teacher Guide

Instructional focus

Interpret percent as a fraction with denominator 100 and as a multiplicative rate.

Primary representation: Hundred grid and double 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: Percent values can be greater than 100 percent.

Answer key and look-fors

1. $35/100$ and 0.35. 2. 75%.

5. 36%. 6. 12.

7. \$15 discount. 8. 1.4 times the quantity.

Error: percents are rates and may describe more than one whole.

Exit: 0.35 and 35%.

MISCONCEPTION TO WATCH

Percent values can be greater than 100 percent.

EVIDENCE TO COLLECT

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