

Fraction Fix

Student Workbook | Lessons 16-20

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

Lesson progression

16 Benchmark Comparisons

17 Flexible Comparison Strategies

18 Equivalent Points

19 Splitting Every Part

20 Grouping Parts

Working habits

Estimate before computing. Name the unit. Connect a representation to the equation. Check reasonableness.

Name: _____

Today's Mathematics Compare fractions to 0, $\frac{1}{2}$, 1, and nearby whole numbers.

Essential Question How can benchmarks reveal order without a full calculation?

Part I | Get Started

1. Place $\frac{5}{12}$ and $\frac{7}{12}$ relative to $\frac{1}{2}$.

2. State whether $\frac{11}{10}$ is below or above 1.

Notice and Predict

3. Sort $\frac{7}{15}$, $\frac{8}{15}$, $\frac{3}{4}$, and $\frac{14}{15}$ around $\frac{1}{2}$ and 1.

4. Which fraction is closest to $\frac{1}{2}$? Predict before computing.

Sketch, model, or estimate

Part II | Investigate

Sort fractions into benchmark intervals, then defend the fractions nearest each boundary.

Representation workspace | Benchmark number line



5. Mark 0, $\frac{1}{2}$, 1, $1\frac{1}{2}$, and 2 on the line.

6. Place $\frac{9}{20}$, $\frac{13}{12}$, and $\frac{7}{4}$ approximately.

7. Explain one placement using distance from a benchmark.

Conjecture, connection, or revised model

Part III | Make Sense and Practice

WORKED CONNECTION

Example: $7/15 < 1/2$ because $7/15 < 7.5/15$; $8/15 > 1/2$ because $8/15 > 7.5/15$.

8. Order $4/9$, $5/8$, and $7/9$.

9. Compare $11/12$ and $6/7$ using distance from 1.

10. Which is closer to 2: $15/8$ or $11/6$?

11. Write a fraction between $1/2$ and $3/4$.

Error Analysis

12. Mia finds denominator 84 before comparing $5/7$ and $11/14$. Give a faster benchmark or equivalence argument.

Exit Ticket

- A. Order $7/15$, $8/15$, and $3/4$.

- B. Explain how $1/2$ determined the first two positions.

Lesson 17 | Flexible Comparison Strategies

1 of 3

Today's Mathematics Select and justify an efficient strategy for any fraction pair.

Essential Question Which comparison strategy fits the numbers best?

Part I | Get Started

1. Compare $\frac{9}{13}$ and $\frac{12}{13}$.

2. Compare $\frac{5}{8}$ and $\frac{5}{12}$ without calculating.

Notice and Predict

3. Choose a strategy for $\frac{7}{12}$ versus $\frac{5}{8}$ before solving.

4. What feature of the pair made your strategy efficient?

Sketch, model, or estimate

Lesson 17 | Flexible Comparison Strategies

2 of 3

Part II | Investigate

Sort comparison cards by strategy: same unit, same numerator, benchmark, distance from one, or equivalence.

Representation workspace | Number lines, benchmarks, equivalence



5. Compare $\frac{3}{4}$ and $\frac{11}{16}$ by equivalence.

6. Compare $\frac{8}{9}$ and $\frac{11}{12}$ by distance from 1.

7. Compare $\frac{13}{8}$ and $\frac{8}{5}$ using a benchmark.

Conjecture, connection, or revised model

Part III | Make Sense and Practice

WORKED CONNECTION

Example: $\frac{3}{4} = \frac{12}{16}$, so $\frac{3}{4} > \frac{11}{16}$. The equivalent form exposes the order immediately.

8. Compare $\frac{7}{10}$ and $\frac{5}{7}$.

9. Compare $\frac{17}{18}$ and $\frac{14}{15}$.

10. Compare $\frac{9}{8}$ and $\frac{7}{6}$.

11. Name the most efficient strategy for $\frac{4}{11}$ and $\frac{5}{12}$.

Error Analysis

12. A student cross-multiplies $\frac{2}{3}$ and $\frac{17}{24}$ but cannot say whether either is above $\frac{1}{2}$. Repair the reasoning.

Exit Ticket

- A. Compare $\frac{7}{12}$ and $\frac{5}{8}$ in two ways.

- B. Which method shows magnitude more clearly?

Today's Mathematics Recognize equivalent fractions as the same point and the same magnitude.

Essential Question How can different fraction names identify one number?

Part I | Get Started

1. Write two names for $\frac{1}{2}$.

2. Place $\frac{2}{4}$ and $\frac{4}{8}$ on the same 0-to-1 line.

Notice and Predict

3. Predict which fourths will align with eighths.

4. What changes in an equivalent name, and what stays fixed?

Sketch, model, or estimate

Part II | Investigate

Overlay halves, fourths, and eighths, then connect endpoints that occupy the same location.

Representation workspace | Fraction strips and stacked number lines



5. Mark $\frac{1}{2}$, $\frac{2}{4}$, and $\frac{4}{8}$ on the workspace.

6. Build an equivalent family for $\frac{3}{4}$.

7. Explain why aligned points must represent equal values.

Conjecture, connection, or revised model

Part III | Make Sense and Practice

WORKED CONNECTION

Example: $\frac{3}{4}$ and $\frac{6}{8}$ occupy the same point because every fourth has been split into two eighths.

8. Complete $\frac{2}{3} = \frac{\quad}{12}$.

9. Decide whether $\frac{5}{6}$ and $\frac{10}{12}$ are equal.

10. Write three names for 2.

11. Find a fraction equivalent to $\frac{7}{5}$ with denominator 20.

Error Analysis

12. A student says $\frac{4}{8}$ is close to $\frac{1}{2}$ but not exactly equal because the numbers are different. Correct the claim.

Exit Ticket

- A. Explain why $\frac{3}{4}$ and $\frac{6}{8}$ name the same number.

- B. Use both a point and a partition argument.

Today's Mathematics Explain why multiplying numerator and denominator by the same number preserves value.

Essential Question Why does multiplying both numbers create a new name, not a new value?

Part I | Get Started

1. Complete $\frac{1}{2} = \frac{__}{8}$.

2. Name the factor used to change $\frac{3}{5}$ into $\frac{12}{20}$.

Notice and Predict

3. Split each fourth into three equal parts.

4. Predict the new name for $\frac{3}{4}$ before counting.

Sketch, model, or estimate

Part II | Investigate

Partition each fourth into three equal subparts and track what changes and what remains constant.

Representation workspace | Area and length models

5. Represent $\frac{3}{4}$, then split every part into thirds.

6. Record the factor of one used in $\frac{3}{4} \times \frac{3}{3}$.

7. Explain why the shaded amount did not change.

Conjecture, connection, or revised model

Part III | Make Sense and Practice

WORKED CONNECTION

Example: $\frac{3}{4} \times \frac{3}{3} = \frac{9}{12}$. Multiplying by $\frac{3}{3}$ means multiplying by one.

8. Complete $\frac{5}{7} = \frac{\quad}{28}$.

9. Complete $\frac{9}{12} = \frac{3}{\quad}$.

10. Generate an equivalent fraction for $\frac{11}{6}$ using factor 5.

11. Is $\frac{8}{10} = \frac{32}{40}$? Explain.

Error Analysis

12. A student changes $\frac{4}{9}$ to $\frac{12}{18}$ by multiplying the numerator by 3 and the denominator by 2. Diagnose the error.

Exit Ticket

- A. Complete $\frac{5}{7} = \frac{\quad}{28}$.

- B. Explain why the value remains $\frac{5}{7}$.

Today's Mathematics Explain simplification as renaming with larger unit fractions.

Essential Question How can grouping smaller parts reveal a simpler name?

Part I | Get Started

1. List two common factors of 12 and 18.

2. Is $\frac{6}{9}$ greater than, less than, or equal to $\frac{12}{18}$?

Notice and Predict

3. Group the 18 equal parts into bundles of 3.

4. How many bundles are shaded and how many make the whole?

Sketch, model, or estimate

Part II | Investigate

Regroup $12/18$ into equal bundles and identify the new numerator, denominator, and unit.

Representation workspace | Grids, strips, and factor structure

3ths

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4ths

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6ths

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5. Show $12/18$ as groups of 2, 3, and 6.

6. Record each equivalent name.

7. Which grouping produces the largest unit fraction?

Conjecture, connection, or revised model

Part III | Make Sense and Practice

WORKED CONNECTION

Example: $12/18 \div 6/6 = 2/3$. Six small eighteenth-parts form each larger third.

8. Simplify $18/24$.

9. Simplify $21/35$.

10. Rename $45/60$ in simplest form.

11. Explain why $8/12$ and $2/3$ are the same size.

Error Analysis

12. A student says $18/24$ becomes smaller when simplified to $3/4$ because both numbers decreased. Correct the reasoning.

Exit Ticket

- A. Simplify $18/24$.

- B. Name the common factor and the new unit.
