

The Bakery Recipe Mystery

Adding, Subtracting & Multiplying Fractions: Add and subtract fractions and mixed numbers with unlike denominators, use visual fraction models to multiply a fraction by a fraction or a whole number, and solve real-world problems involving adding, subtracting, and multiplying fractions and mixed numbers.

Learning target: I can add, subtract, and multiply fractions with unlike denominators and use them to solve real-world problems.

Success looks like: Students use the vocabulary correctly, complete the mystery case, and score 80% or higher on the evidence-based exit ticket.

Materials: Student devices, the printed lesson worksheet (one per student), projector for the mini-lesson presenter.

LESSON AT A GLANCE

60 minutes

Time	Part	Teacher does	Students do
0:00-0:08	Warm-up	Project the warm-up. Circulate, then call on 2-3 students. Save question 3 for the debrief.	Answer Part 2 of the lesson worksheet; share with a partner.
0:08-0:20	Mini-lesson	Teach with the 4-step presenter. Run each quick check with the whole class.	Complete worksheet Parts 4-11 as each slide appears; answer checks with fingers.
0:20-0:48	Mystery Case	Launch The Bakery Recipe Mystery. Assign mission levels; circulate with the answer key.	Play solo or in pairs; record code pieces; complete any written evidence task.
0:48-0:52	Debrief	Ask 2 debrief questions and revisit warm-up question 3.	Finish worksheet Part 13 (prediction check + one thing learned).
0:52-1:00	Exit ticket	Hand out the exit ticket. Collect and sort with the mastery guide.	Answer with evidence independently.

Key vocabulary

Word	Student-friendly definition
Denominator	The bottom number: how many equal parts make a whole.
Numerator	The top number: how many parts we have.
Common denominator	A shared multiple of the denominators, used to add or subtract.
Equivalent fractions	Fractions that name the same amount ($\frac{1}{2} = \frac{3}{6}$).
Mixed number	A whole number and a fraction ($2 \frac{1}{4}$).
Simplest form	A fraction whose numerator and denominator share no common factor except 1.

1. WARM-UP

0:00–0:08 · 8 min

Warm-up expectations (post these): Answer in Part 2 of the lesson worksheet (or on this sheet). Number each answer to match the question. Answer in complete sentences. For math, show your work. Work silently for 5 minutes, then share with a partner for 2 minutes. Be ready to share one answer with the class.

#	Question	Look for
1	Write two fractions equivalent to $\frac{1}{2}$.	Examples: $\frac{2}{4}$, $\frac{3}{6}$, $\frac{4}{8}$.
2	Which is greater, $\frac{2}{3}$ or $\frac{3}{5}$? Show how you know.	$\frac{2}{3}$ ($\frac{10}{15}$ vs. $\frac{9}{15}$), or $\frac{2}{3} \sim 0.67 > 0.6$.
3	What is 3×4 , and what is $\frac{1}{2}$ of 12?	12 and 6.

2. MINI-LESSON

0:08–0:20 · 12 min

Project the Lesson presenter from the room page. It runs the whole hour: target and agenda, warm-up with timer, hook vote, 4 teaching steps (key idea, interactive tool, turn and talk, check for understanding), I do / we do / you do, a work-time screen with a timer and expectations, debrief, and the exit ticket. Press N for teacher notes, T to pause the timer, and P to pick a student.

Hook (1 min): You ate $\frac{1}{2}$ of a pizza and your friend ate $\frac{1}{3}$. Did you eat $\frac{2}{5}$ together? Class vote: Yes, $\frac{2}{5}$ / No, more than $\frac{2}{5}$ / No, less than $\frac{2}{5}$

Step 1 (3 min): Same-size pieces

Teach	To add or subtract fractions, the pieces must be the same size. Find a common denominator, often the least common multiple.
Interactive tool	Visual: $\frac{1}{2} + \frac{1}{4}$: rename $\frac{1}{2}$ as $\frac{2}{4}$, then add
Students do	Draw a bar, shade $\frac{1}{2}$ and $\frac{1}{4}$, and write the total as fourths.
Turn and talk	Why can't you just add the denominators: $\frac{1}{2} + \frac{1}{4} = \frac{2}{6}$? Use a picture to explain.
Worksheet Part 5A	To add fractions, I need a COMMON DENOMINATOR.
Check for understanding	What is a common denominator for $\frac{1}{3}$ and $\frac{1}{4}$? Answer: (C) 12

Step 2 (3 min): Rename, then add

Teach	Rewrite each fraction as an equivalent fraction, then add or subtract the numerators. The denominator stays the same.
Interactive tool	Board and notes
Students do	Solve $\frac{1}{3} + \frac{1}{4}$. Show the common denominator.
Turn and talk	How do you choose the best common denominator?

Worksheet Part 6A	Add the NUMERATORS. The DENOMINATOR stays the same.
Check for understanding	$\frac{1}{3} + \frac{1}{4} = ?$ (write a fraction) Answer: $\frac{7}{12}$

Step 3 (3 min): Mixed numbers

Teach	Add or subtract wholes and fractions. Regroup if needed: 1 whole = $\frac{4}{4}$.
Interactive tool	Visual: Regroup: $3 \frac{1}{4} = 2 \frac{5}{4}$
Students do	Solve $3 \frac{1}{4} - 1 \frac{3}{4}$ by regrouping 1 whole as $\frac{4}{4}$.
Turn and talk	When do you need to regroup a whole when subtracting mixed numbers?
Worksheet Part 7A	When subtracting mixed numbers, I can REGROUP 1 whole as a fraction like $\frac{4}{4}$.
Check for understanding	$3 \frac{1}{4} - 1 \frac{3}{4} = ?$ (mixed number) Answer: $1 \frac{2}{4}$

Step 4 (3 min): Multiply fractions

Teach	Multiply numerators and multiply denominators: $\frac{2}{3} \times \frac{3}{4} = \frac{6}{12} = \frac{1}{2}$. "Of" often means multiply. Estimate with benchmarks first.
Interactive tool	Visual: $\frac{1}{2}$ of $\frac{3}{4} = \frac{3}{8}$
Students do	Solve $\frac{1}{2} \times \frac{3}{4}$ and draw it as an area model.
Turn and talk	Why does multiplying by a fraction less than 1 make a number smaller?
Worksheet Part 8A	To multiply fractions, multiply the NUMERATORS and the DENOMINATORS.
Check for understanding	$\frac{2}{3} \times \frac{3}{4} = ?$ (simplest form) Answer: $\frac{1}{2}$

I do: worked example (shown one step at a time)

1. Problem: $\frac{1}{2} + \frac{1}{3}$.
2. Step 1: Halves and thirds are different sizes. Both fit into sixths.
3. Step 2: $\frac{1}{2} = \frac{3}{6}$ and $\frac{1}{3} = \frac{2}{6}$.
4. Step 3: $\frac{3}{6} + \frac{2}{6} = \frac{5}{6}$.
5. Check: $\frac{5}{6}$ is close to 1, and half a pizza plus a third is almost a whole. $\frac{2}{5}$ was wrong.

What to say on every slide is in the presenter script PDF.

We do: guided practice

Solve: $2 \frac{1}{3} + 1 \frac{3}{4}$.

1. Common denominator for 3 and 4 is 12.
2. $2 \frac{1}{3} = 2 \frac{4}{12}$ and $1 \frac{3}{4} = 1 \frac{9}{12}$.
3. Add wholes and fractions: $3 \frac{13}{12}$.
4. $\frac{13}{12} = 1 \frac{1}{12}$, so the answer is $4 \frac{1}{12}$.

Answer: $4 \frac{1}{12}$

You do: independent check (2 min)

Solve: $\frac{3}{4} - \frac{1}{3}$ (write a fraction)

Answer: $\frac{5}{12}$. Students who miss it: 3-minute reteach at the teacher table, then start the room at the Explorer level.

Misconception: "Add the tops and add the bottoms." $\frac{1}{2} + \frac{1}{3}$ is not $\frac{2}{5}$.

Misconception: "Multiplying always makes a number bigger." Multiplying by a fraction less than 1 makes it smaller.

Misconception: "You need a common denominator to multiply." Only for adding and subtracting.

3. MYSTERY CASE: THE BAKERY RECIPE MYSTERY

0:20–0:48 · 28 min

Launch: project the start screen, read the story aloud, and assign mission levels (Explorer = extra support, Agent = on level, Legend = challenge). Students can open Supports any time for read-aloud, bigger text, a word bank, and a scratch pad.

- Evidence files can be opened in any order. Tell students detectives always read the whole file before answering.
- Pairs can be "lead detective" and "note taker." The note taker records the code pieces as they are found.
- For the debrief, ask students which piece of evidence was most convincing and why.

Students turn in: the completion code plus their copied "turn in your work" block (Canvas Text Entry).

4. DEBRIEF

0:48–0:52 · 4 min

1. Why do we need a common denominator to add but not to multiply?
2. When is multiplying by a fraction like finding part of a group?
3. How did estimating help you catch a mistake today?

Close the loop: return to warm-up question 3. Answer: 12 and 6.

5. EXIT TICKET

0:52–1:00 · 8 min

Print the exit ticket PDF (page 2 is the key and mastery guide). Every item requires evidence: Part A asks students to justify each choice, Part B asks for an explanation, and Part C applies the standard to a new situation using Solve-Show-Explain. Sort results into Mastered, Approaching, and Beginning to plan tomorrow's groups.

LESSON RESOURCES

Resource	How it fits the lesson
Warm-up worksheet (PDF)	Optional standalone warm-up (also Part 2 of the lesson worksheet), with a key.
Mini-lesson presenter	Projectable, step-by-step interactive lesson with tools and quick checks (room page).

Resource	How it fits the lesson
Lesson worksheet (PDF + key)	One printable packet students complete during the whole lesson: short fill-ins and quick checks in 13 small parts that match the presenter slides.
The Bakery Recipe Mystery (.html)	The mystery case for Canvas, with differentiated levels, supports, and a turn-in.
Exit ticket (PDF + key)	Evidence-based check with a rubric and a mastery sorting guide.
Illustrative Mathematics (extra)	Free Grade 5 units on fraction operations. https://im.kendallhunt.com/
Khan Academy: 5th Grade Math (extra)	Videos and practice on adding and multiplying fractions. https://www.khanacademy.org/math/cc-fifth-grade-math
Math Learning Center: Fractions App (extra)	Free virtual fraction bars. https://www.mathlearningcenter.org/apps
Open Middle (extra)	Challenging fraction puzzles for early finishers. https://www.openmiddle.com/

ANSWER KEY: THE BAKERY RECIPE MYSTERY

Evidence File #1: The Original Recipe (code piece: F)

1. How many cups of sugar and butter are in the recipe altogether? -> $5/4$
2. How many cups of flour and milk altogether? -> $35/12$

Evidence File #2: The Double Batch (code piece: L)

1. What is the correct amount of milk for a double batch? ($2 \times 2/3$) -> $4/3$
2. What mistake did the assistant make with the milk? -> Multiplied both the numerator and the denominator by 2
3. True or false: $4 \frac{1}{2}$ cups of flour is correct for a double batch. -> True

Evidence File #3: The Half Batch (code piece: O)

1. What is the correct amount of flour for a half batch? ($1/2 \times 2 \frac{1}{4}$) -> $9/8$
2. Which of Tuesday's amounts was wrong? -> Flour

Evidence File #4: The Suspicious Cocoa (code piece: U)

1. What mistake was made on the cocoa note? -> Added the numerators and added the denominators
2. What is the correct answer to $1/3 + 1/6$? -> $1/2$
3. What is the correct answer to $3/5 - 1/2$? -> $1/10$
4. Measuring cup check: this cup is marked in sixths. Shade how full it is after adding $1/3$ cup and then $1/6$ cup of cocoa. -> Shade $3/6$ of the model

Evidence File #5: The Final Count (code piece: R)

1. How much flour should be left in the bag? -> $5/4$
2. How many of the 12 party cookies were chocolate chip? -> 8
3. Catch the saboteur: Ms. Bell started with a 5-cup bag of flour. She used $2 \frac{1}{4}$ cups on Monday and $1 \frac{1}{2}$ cups on Wednesday. How much flour should be left? -> Written response (solve, show, explain). Answer: $1 \frac{1}{4}$ cups. Model: $2 \frac{1}{4} + 1 \frac{2}{4} = 3 \frac{3}{4}$ cups used. $5 - 3 \frac{3}{4} = 4 \frac{4}{4} - 3 \frac{3}{4} = 1 \frac{1}{4}$ cups left. First I added the flour she used, so I renamed $1/2$ as $2/4$ to get a common denominator. Then I subtracted from 5 cups by regrouping 5 as $4 \frac{4}{4}$, because you need fourths to subtract $3/4$.

Final code: FLOUR