Assessment: Multiplying Fractions and Multiplying Mixed Numbers

Math Focus Points

- Multiplying a fraction by a fraction
- Multiplying a fraction or mixed number and a whole number
- Representing a fractional part of a fractional quantity

Today's Plan		Materials
1 ACTIVITY **Review of Multiplying with Fractions and Mixed Numbers**	30 MIN, INDIVIDUALS	• *Student Activity Book,* pp. 90–91 or **C40–C41, Multiplying Fractions and Mixed Numbers Practice** Make copies. (as needed)
2 DISCUSSION **Strategies for Multiplication with Fractions**	15 MIN, CLASS	• *Student Activity Book,* pp. 90–91 or C40–C41 (completed)
3 ASSESSMENT ACTIVITY **Multiplying with Fractions, Mixed Numbers, and Whole Numbers**	15 MIN, INDIVIDUALS	• **C42, Assessment: Multiplication with Fractions, Mixed Numbers, and Whole Numbers** Make copies. (1 per student)
4 SESSION FOLLOW-UP **Daily Practice**		• *Student Activity Book,* p. 92 or **C43, Practicing Multiplication of Fractions** Make copies. (as needed)

Ten-Minute Math

Estimation and Number Sense: Closest Estimate **Write each of the following problems on the board, one at a time:**

1. $360 \times 3\frac{4}{5} \approx$ 700 1,000 1,300
2. $1{,}042 \times \frac{3}{10} \approx$ 100 300 500

Give students approximately 30 seconds to look at the three possible estimates and determine which is the closest to the actual answer. Ask several students to explain how they chose an estimate, including how they thought about each of the numbers.

ACTIVITY

30 MIN INDIVIDUALS

1 Review of Multiplying with Fractions and Mixed Numbers

Today you are going to continue to solve some problems that involve multiplying two fractions, but you are also going to solve some problems that involve multiplying whole numbers and mixed numbers or fractions, which you worked on a few sessions ago. What are some strategies you can use to solve a problem involving multiplication of a whole number and a mixed number?

Students might say:

"You can use fraction bars to solve the problem."

"You can just think about the numbers, too. Like if it's $\frac{1}{2}$ of 40, that's easy; it's 20. Or if it's $2\frac{1}{2}$ of 40, you know 2 × 40 is 80, and $\frac{1}{2}$ of 40 is 20, so it's 100."

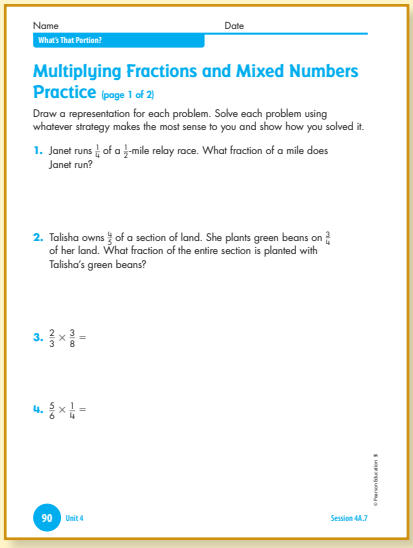
Students solve the problems on *Student Activity Book* pages 90–91 or C40–C41. Point out that for the problems that involve multiplication of two fractions (*Student Activity Book* page 90 or C40), students need to make a representation for each.

As students work, look for one student who uses a fraction bar in Problem 4 and one who uses an array. Ask them to share their representations and strategies during the discussion.

ONGOING ASSESSMENT: Observing Students at Work

Students solve problems involving multiplication of two fractions and problems involving multiplication of whole numbers and fractions or mixed numbers.

- **What representations do students use for problems involving multiplication of two fractions?** Do they use fraction bars or arrays?
- **How do students solve the problems involving multiplication of two fractions?** Do they use an array and count the total amount of pieces in the whole square and then count the shaded/striped pieces? Do they use fraction bars to solve the problem? Do they multiply the numerators and the denominators?



Name Date

What's That Portion?

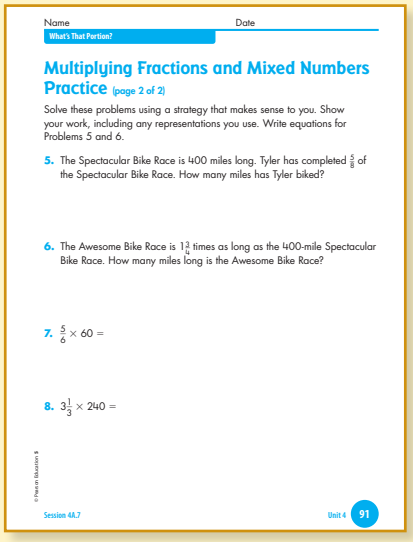
Multiplying Fractions and Mixed Numbers Practice (page 1 of 2)

Draw a representation for each problem. Solve each problem using whatever strategy makes the most sense to you and show how you solved it.

1. Janet runs $\frac{1}{4}$ of a $\frac{1}{2}$-mile relay race. What fraction of a mile does Janet run?
2. Talisha owns $\frac{3}{4}$ of a section of land. She plants green beans on $\frac{2}{3}$ of her land. What fraction of the entire section is planted with Talisha's green beans?
3. $\frac{2}{3} \times \frac{3}{8} =$
4. $\frac{5}{6} \times \frac{1}{4} =$

90 Unit 4 Session 4A.7

▲ Student Activity Book, Unit 4, p. 90; Resource Masters, C40



Name Date

What's That Portion?

Multiplying Fractions and Mixed Numbers Practice (page 2 of 2)

Solve these problems using a strategy that makes sense to you. Show your work, including any representations you use. Write equations for Problems 5 and 6.

5. The Spectacular Bike Race is 400 miles long. Tyler has completed $\frac{5}{8}$ of the Spectacular Bike Race. How many miles has Tyler biked?
6. The Awesome Bike Race is $1\frac{3}{4}$ times as long as the 400-mile Spectacular Bike Race. How many miles long is the Awesome Bike Race?
7. $\frac{5}{6} \times 60 =$
8. $3\frac{1}{3} \times 240 =$

Session 4A.7 Unit 4 91

▲ Student Activity Book, Unit 4, p. 91; Resource Masters, C41

- **How do students solve the problems involving multiplication of a whole number and a mixed number or a fraction?** Do they use fraction bars to divide the whole number into fractional pieces? Are they using reasoning about the numbers and multiplication? For the mixed numbers, do they multiply the whole number by the whole number in the mixed number, then multiply the whole number by the fraction in the mixed number, and add the products together?

DIFFERENTIATION: Supporting the Range of Learners

Intervention This is the first time that students solve fraction multiplication problems that are not in a context. If students are not sure how to approach the problems that are not story problems, help them make up a context for each one.

ELL Some English Language Learners may have difficulty making sense of the idea of $1\frac{3}{4}$ times the length (Problem 6 on *Student Activity Book* page 91 or C41). Discuss similar situations using objects or drawings. First explore a whole-number problem, then a mixed-number problem. For example, draw a tree that is 3 times as tall as a person, or show a pencil that is $1\frac{1}{2}$ times as long as another pencil.

Extension Give students who easily solve these problems some problems that involve multiplying two mixed numbers.

DISCUSSION

2 Strategies for Multiplication with Fractions

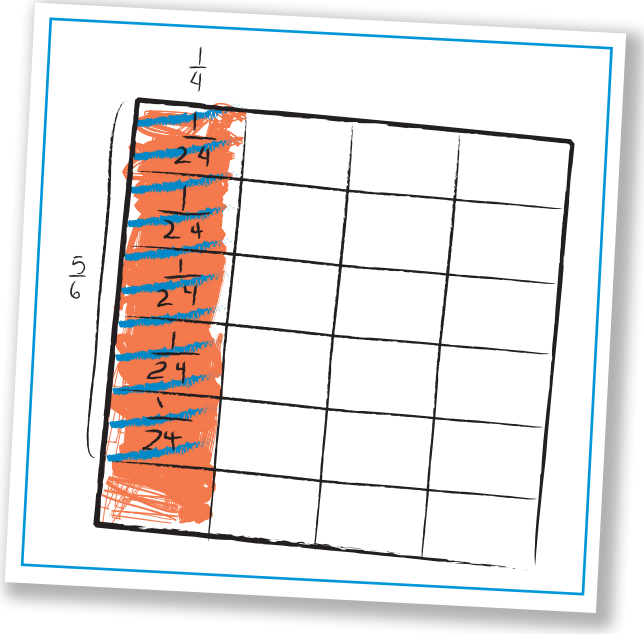
Math Focus Points for Discussion

- Multiplying a fraction by a fraction
- Multiplying a fraction or mixed number and a whole number
- Representing a fractional part of a fractional quantity

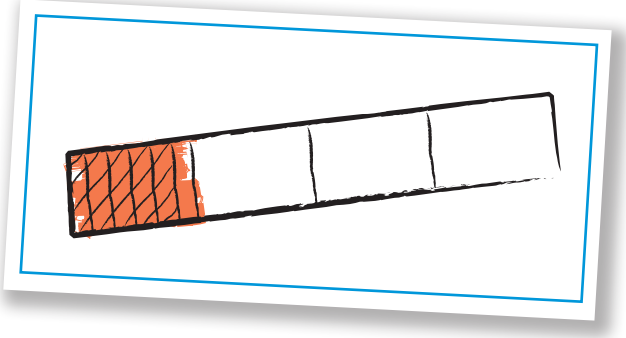
Ask all students to look at their representations and strategies for Problem 4 on *Student Activity Book* page 90 or C40. Ask the students you identified earlier to share their representations and strategies. Then ask if other students have additional strategies to add or questions to ask. Possible representations and strategies include the following.

Students might say:

"I thought about planting vegetables on $\frac{5}{6}$ of $\frac{1}{4}$ of a section. First I shaded $\frac{1}{4}$ of my square. Then I divided the $\frac{1}{4}$ into sixths, and put stripes on 5 of them. That's $\frac{5}{24}$ because there are 24 pieces in all. So $\frac{5}{6} \times \frac{1}{4}$ is $\frac{5}{24}$."



"I shaded $\frac{1}{4}$ of a fraction bar. I put stripes on $\frac{5}{6}$ of the $\frac{1}{4}$. Four times those six pieces is 24, so each piece is $\frac{1}{24}$, and 5 of them are striped, so the answer is $\frac{5}{24}$."

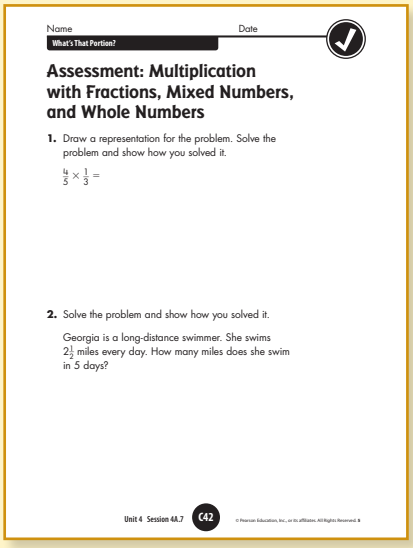


If students share that they just multiplied the numerators and multiplied the denominators, ask them to show their strategy in one of the representations.

Ask students to share their solutions for Problem 6 on *Student Activity Book* page 91 or C41.

Professional Development

1 **Teacher Note:** Assessment: Multiplication with Fractions, Mixed Numbers, and Whole Numbers, CC67



Name Date

What's That Portion?

Assessment: Multiplication with Fractions, Mixed Numbers, and Whole Numbers

1. Draw a representation for the problem. Solve the problem and show how you solved it.

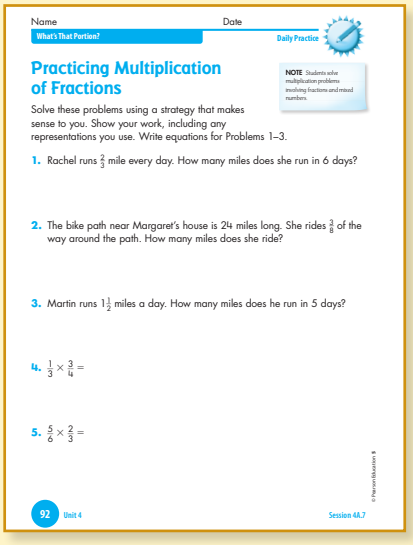
$\frac{4}{5} \times \frac{1}{3} =$

2. Solve the problem and show how you solved it.

Georgia is a long-distance swimmer. She swims $2\frac{1}{2}$ miles every day. How many miles does she swim in 5 days?

Unit 4 Session 4A.7 C42

▲ Resource Masters, C42



Name Date

What's That Portion? Daily Practice

Practicing Multiplication of Fractions

NOTE Students solve multiplication problems involving fractions and mixed numbers.

Solve these problems using a strategy that makes sense to you. Show your work, including any representations you use. Write equations for Problems 1–3.

1. Rachel runs $\frac{2}{3}$ mile every day. How many miles does she run in 6 days?

2. The bike path near Margaret's house is 24 miles long. She rides $\frac{3}{8}$ of the way around the path. How many miles does she ride?

3. Martin runs $1\frac{1}{2}$ miles a day. How many miles does he run in 5 days?

4. $\frac{1}{3} \times \frac{3}{4} =$

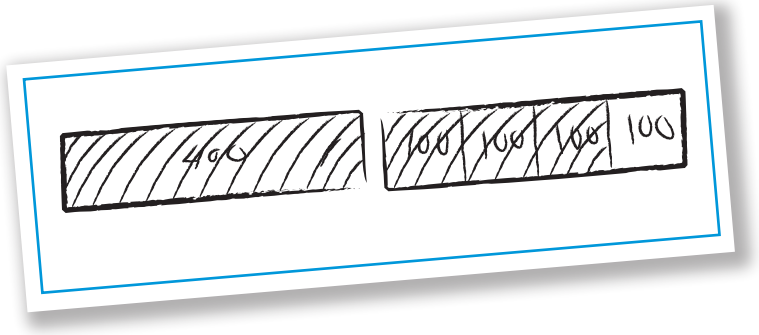
5. $\frac{5}{6} \times \frac{2}{3} =$

92 Unit 4 Session 4A.7

▲ Student Activity Book, Unit 4, p. 92; Resource Masters, C43

Students might say:

"The first bar shows the length of the Spectacular Race and the second bar shows $\frac{3}{4}$ of the Spectacular Race, that's $1\frac{3}{4}$ times the Spectacular Race. If you divide 400 into fourths, each fourth is 100, so $\frac{3}{4}$ is 300. 400 + 300 = 700."



"1 × 400 = 400. To figure out $\frac{3}{4}$ of 400, first I figured $\frac{1}{4}$ of 400 is 100, and 3 × 100 = 300. 300 plus 400 is 700."

3 ASSESSMENT ACTIVITY

15 MIN INDIVIDUALS

Multiplying with Fractions, Mixed Numbers, and Whole Numbers

On Assessment: Multiplication with Fractions, Mixed Numbers, and Whole Numbers (C42), students solve one problem that involves multiplying two fractions and one story problem that involves multiplying a mixed number and a whole number. 1

DIFFERENTIATION: Supporting the Range of Learners

ELL Some students may find it challenging to make sense of the story problem. Read through the problem with them and simplify it, if possible.

4 SESSION FOLLOW-UP

Daily Practice

Daily Practice: For reinforcement of this unit's content, have students complete *Student Activity Book* page 92 or C43.

Assessment: Multiplication with Fractions, Mixed Numbers, and Whole Numbers

Benchmarks addressed:

Multiply a fraction by a fraction using a representation.

Multiply a mixed number and a whole number.

In order to meet the benchmarks, students' work should show that they can:

- Draw a representation for, and accurately solve, a problem involving the multiplication of two fractions;
- Accurately solve a problem involving multiplication of a mixed number and a whole number.

Meeting the Benchmark

Students who meet the benchmark accurately solve both problems and clearly show how they solved each problem. For Problem 1, students draw an accurate representation of the problem. Students are most likely to represent the problem using a fraction bar, although some will use an array. Students might use their representation to solve the problem by figuring out the size of the fractional pieces and the number of fraction pieces in the product, or they may solve it by multiplying the numerators and the denominators of the factors. For Problem 2, students may draw a representation of the problem, but it is not required. To solve Problem 2, some students use rectangular bars, showing 5 bars with $2\frac{1}{2}$ in each, and then use that information to find the answer. Other students will reason about the numbers, multiplying 5×2 and $5 \times \frac{1}{2}$ and adding the products.

Partially Meeting the Benchmark

Students who partially meet the benchmark may make small computational errors in one of the problems. They may solve Problems 1 and 2 correctly but do not draw an accurate representation for Problem 1.

Not Meeting the Benchmark

Students do not meet the benchmark if they solve the first problem accurately but do not draw an accurate representation, and do not solve the second problem correctly. Students do not meet the benchmark if they do not solve either problem accurately.

Multiplying Fractions and Mixed Numbers Practice (page 1 of 2)

Draw a representation for each problem. Solve each problem using whatever strategy makes the most sense to you and show how you solved it.

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2. Talisha owns $\frac{4}{5}$ of a section of land. She plants green beans on $\frac{3}{4}$ of her land. What fraction of the entire section is planted with Talisha's green beans?

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Multiplying Fractions and Mixed Numbers Practice (page 2 of 2)

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