CHAPTER RESOURCES • Chapter 8
Multiply Fractions by Whole Numbers

GO MATH!

INCLUDES
• School-Home Letter
• Vocabulary Game Directions
• Daily Enrichment Activities
• Reteach Intervention for every lesson
• Chapter 8 Test
• Chapter 8 Performance Task
• Answer Keys and
  Individual Record Forms
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Dear Family,

During the next few weeks, our math class will be learning how to multiply fractions and mixed numbers by whole numbers. We will learn to write a fraction as a product of a whole number and a unit fraction, and to find multiples of unit fractions.

You can expect to see homework that provides practice multiplying fractions and whole numbers with and without using models.

Here is a sample of how your child will be taught to use a number line to find multiples of a fraction.

**MODEL** Use a Number Line to Write Multiples of Fractions

Write $3 \times \frac{3}{4}$ as the product of a whole number and a unit fraction.

**STEP 1**

Start at 0. Draw jumps to find multiples of $\frac{3}{4}, \frac{6}{4}, \frac{9}{4}$. 

```
0 1 2 3 4 5 6 7 8 9 10
\frac{4}{4} \frac{4}{4} \frac{4}{4} \frac{4}{4} \frac{4}{4} \frac{4}{4} \frac{4}{4} \frac{4}{4} \frac{4}{4} \frac{4}{4}
```

**STEP 2**

Write the multiple as a product of a whole number and a unit fraction.

So, $3 \times \frac{3}{4} = \frac{9}{4} = 9 \times \frac{1}{4}$

**Activity**

Use everyday situations, such as cooking and measures to help your child practice fraction multiplication.

**Tips**

**Renaming as a Mixed Number**

When the numerator is greater than the denominator, the fraction can be renamed as a mixed number.

\[
\frac{9}{4} = \frac{4}{4} + \frac{4}{4} + \frac{1}{4} = 2 + \frac{1}{4} = 2\frac{1}{4}
\]
Querida familia,

Durante las próximas semanas, en la clase de matemáticas aprenderemos a multiplicar fracciones y números mixtos por números enteros. También aprenderemos a escribir fracciones como el producto de un número entero y una fracción unitaria y a hallar múltiplos de fracciones unitarias.

Llevaré a casa tareas para practicar la multiplicación de fracciones y números enteros usando modelos y sin modelos.

Este es un ejemplo de cómo vamos a usar una recta numérica para hallar los múltiplos de una fracción.

**MODELO** Usar una recta numérica para escribir múltiplos de fracciones

Escribe $3 \times \frac{3}{4}$ como el producto de un número entero y una fracción unitaria.

**PASO 1**

Comienza en 0. Dibuja saltos para hallar los múltiplos de $\frac{3}{4}$: $\frac{3}{4}, \frac{6}{4}, \frac{9}{4}$

**PASO 2**

Escribe el múltiplo como el producto de un número entero y una fracción unitaria.

Por lo tanto, $3 \times \frac{3}{4} = \frac{9}{4} = 9 \times \frac{1}{4}$.

**Vocabulario**

**fracción unitaria** Una fracción que tiene al 1 como numerador, es decir, arriba de la barra

**múltiplo** Un número que es el producto de cierto número y un número positivo distinto de cero

**número mixto** Un número que se representa por un número entero y una fracción

**Actividad**

Use situaciones de la vida diaria, como cocinar y medir para ayudar a su hijo o hija a practicar la multiplicación con fracciones.
Pick It

For 3 players

Materials
- 4 sets of word cards

How to Play
1. Each player is dealt 5 cards. The remaining cards are a draw pile.
2. To take a turn, ask any player if he or she has a word that matches one of your word cards.
3. If the player has the word, he or she gives you the word card, and you must give the definition of the word.
   - If you are correct, keep the card and put the matching pair in front of you. Take another turn.
   - If you are wrong, return the card. Your turn is over.
4. If the player does not have the word, he or she answers, “Pick it.” Then you take a card from the draw pile.
5. If the card you draw matches one of your word cards, follow the directions for Step 3 above.
   - If it does not, your turn is over.
6. The game is over when one player has no cards left. The player with the most matches wins.
A unit fraction is a fraction with a numerator of 1. You can write a fraction as the product of a whole number and a unit fraction.

Write $\frac{7}{10}$ as the product of a whole number and a unit fraction.

Write $\frac{7}{10}$ as the sum of unit fractions.

$$\frac{7}{10} = \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10}$$

Use multiplication to show repeated addition.

$$\frac{7}{10} = \frac{7}{10} \times 1$$

So, $\frac{7}{10} = \frac{7}{10} \times \frac{1}{10}$.

The product of a number and a counting number is a multiple of the number. You can find multiples of unit fractions.

List the next 4 multiples of $\frac{1}{8}$.

Make a table and use repeated addition.

<table>
<thead>
<tr>
<th>$1 \times \frac{1}{8}$</th>
<th>$2 \times \frac{1}{8}$</th>
<th>$3 \times \frac{1}{8}$</th>
<th>$4 \times \frac{1}{8}$</th>
<th>$5 \times \frac{1}{8}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\frac{1}{8}$</td>
<td>$\frac{2}{8}$</td>
<td>$\frac{3}{8}$</td>
<td>$\frac{4}{8}$</td>
<td>$\frac{5}{8}$</td>
</tr>
<tr>
<td>$\frac{1}{8}$</td>
<td>$\frac{2}{8}$</td>
<td>$\frac{3}{8}$</td>
<td>$\frac{4}{8}$</td>
<td>$\frac{5}{8}$</td>
</tr>
</tbody>
</table>

The next 4 multiples of $\frac{1}{8}$ are $\frac{2}{8}$, $\frac{3}{8}$, $\frac{4}{8}$, and $\frac{5}{8}$.

Write the fraction as the product of a whole number and a unit fraction.

1. $\frac{2}{5} = \underline{\underline{}}$
2. $\frac{5}{12} = \underline{\underline{}}$
3. $\frac{7}{2} = \underline{\underline{}}$

List the next four multiples of the unit fraction.

4. $\frac{1}{4} \underline{\underline{\underline{\underline{}}}}$
5. $\frac{1}{6} \underline{\underline{\underline{\underline{}}}}$
Mixed Numbers and Unit Fractions

Write each mixed number as the product of a whole number and a unit fraction.

1. $1\frac{1}{3}$

2. $3\frac{1}{2}$

3. $1\frac{3}{5}$

4. $2\frac{3}{8}$

5. $3\frac{3}{4}$

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

7. $4\frac{2}{5}$

8. $5\frac{1}{5}$

9. **Write Math** Explain how you found the answer in Exercise 1.
Multiples of Fractions

You have learned to write multiples of unit fractions. You can also write multiples of other fractions.

Write the next 4 multiples of \( \frac{2}{5} \).

Make a table.

<table>
<thead>
<tr>
<th>( 1 \times \frac{2}{5} )</th>
<th>( 2 \times \frac{2}{5} )</th>
<th>( 3 \times \frac{2}{5} )</th>
<th>( 4 \times \frac{2}{5} )</th>
<th>( 5 \times \frac{2}{5} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \frac{2}{5} )</td>
<td>( \frac{2}{5} + \frac{2}{5} )</td>
<td>( \frac{2}{5} + \frac{2}{5} + \frac{2}{5} )</td>
<td>( \frac{2}{5} + \frac{2}{5} + \frac{2}{5} + \frac{2}{5} )</td>
<td>( \frac{2}{5} + \frac{2}{5} + \frac{2}{5} + \frac{2}{5} + \frac{2}{5} )</td>
</tr>
<tr>
<td>( \frac{2}{5} )</td>
<td>( \frac{4}{5} )</td>
<td>( \frac{6}{5} )</td>
<td>( \frac{8}{5} )</td>
<td>( \frac{10}{5} )</td>
</tr>
</tbody>
</table>

So, the next 4 multiples of \( \frac{2}{5} \) are \( \frac{4}{5} \), \( \frac{6}{5} \), \( \frac{8}{5} \), and \( \frac{10}{5} \).

Write \( 3 \times \frac{2}{5} \) as the product of a whole number and a unit fraction.

Use a number line. Make three jumps of \( \frac{2}{5} \).

\[
3 \times \frac{2}{5} = \frac{6}{5}
\]

So, \( 3 \times \frac{2}{5} = \frac{6}{5} \) or \( 6 \times \frac{1}{5} \).

List the next four multiples of the fraction.

1. \( \frac{3}{4} \), ___, ___, ___, ___

2. \( \frac{5}{6} \), ___, ___, ___, ___

Write as the product of a whole number and a unit fraction.

3. \( 3 \times \frac{3}{8} = \) __________

4. \( 4 \times \frac{2}{3} = \) __________
Multiples of Mixed Numbers

List the next three multiples of the mixed number. Write each multiple as a mixed number or as a whole number.

1. $1\frac{1}{8}$

2. $2\frac{1}{2}$

3. $1\frac{2}{3}$

4. $2\frac{1}{3}$

5. $3\frac{1}{5}$

6. $1\frac{1}{4}$

7. $1\frac{3}{5}$

8. $2\frac{3}{4}$

9. Write Math Describe a method other than multiplication that you can use to find the next three multiples of the mixed number in Exercise 7.
Multiply a Fraction by a Whole Number Using Models

You can use a model to multiply a fraction by a whole number.

Find the product of $4 \times \frac{3}{5}$.

Use fraction strips. Show 4 groups of $\frac{3}{5}$ each.

1 group of $\frac{3}{5} = \frac{3}{5}$
2 groups of $\frac{3}{5} = \frac{6}{5}$
3 groups of $\frac{3}{5} = \frac{9}{5}$
4 groups of $\frac{3}{5} = \frac{12}{5}$

So, $4 \times \frac{3}{5} = \frac{12}{5}$.

Multiply.

1. $2 \times \frac{5}{6} = ____$
2. $3 \times \frac{7}{8} = ____$

3. $6 \times \frac{2}{3} = ____$
4. $2 \times \frac{9}{10} = ____$
5. $5 \times \frac{3}{4} = ____$

6. $4 \times \frac{5}{8} = ____$
7. $7 \times \frac{2}{5} = ____$
8. $8 \times \frac{4}{6} = ____$
Fraction of a Whole Number

Find the product. Write the product as a whole number.

1. \(\frac{1}{8} \times 24 = \)

2. \(\frac{2}{3} \times 15 = \)

3. \(\frac{3}{5} \times 10 = \)

4. \(\frac{4}{7} \times 14 = \)

5. \(\frac{5}{6} \times 18 = \)

6. \(\frac{3}{4} \times 16 = \)

7. \(\frac{2}{9} \times 27 = \)

8. \(\frac{7}{8} \times 32 = \)

9. \(\frac{9}{10} \times 50 = \)

10. \(\frac{4}{5} \times 45 = \)

11. \(\frac{5}{12} \times 60 = \)

12. \(\frac{8}{9} \times 54 = \)

13. Write Math: Explain how you can tell if the product of a fraction and a whole number will be a whole number.

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Chapter Resources
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Multiply a Fraction or Mixed Number by a Whole Number

To multiply a fraction by a whole number, multiply the numerators. Then multiply the denominators.

A recipe for one loaf of bread calls for \(2\frac{1}{4}\) cups of flour. How many cups of flour will you need for 2 loaves of bread?

**Step 1** Write and solve an equation.

\[
2 \times 2\frac{1}{4} \quad \text{Write 2 as } \frac{2}{1}. \quad \text{Write } 2\frac{1}{4} \text{ as a fraction.}
\]

\[
= 2 \times \frac{9}{4} \quad \text{Multiply the numerators.} \quad \text{Then multiply the denominators.}
\]

\[
= \frac{18}{4} \quad \text{Simplify.}
\]

**Step 2** Write the product as a mixed number.

\[
\frac{18}{4} = \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} \quad \text{Combine the wholes. Then combine the remaining parts.}
\]

\[
= \frac{4}{4} + \frac{1}{4} \quad \text{Add. Write the sum as a mixed number.}
\]

So, you will need \(4\frac{1}{2}\) cups of flour.

Multiply. Write the product as a mixed number.

1. \(3 \times \frac{2}{5} = \) _____
2. \(4 \times \frac{3}{8} = \) _____
3. \(5 \times \frac{1}{3} = \) _____
4. \(2 \times 1\frac{3}{10} = \) _____
5. \(4 \times 1\frac{2}{3} = \) _____
6. \(7 \times 1\frac{1}{6} = \) _____
Unknown Numbers

Find the unknown number that makes each equation true.

1. $\square \times \frac{3}{4} = 2\frac{1}{4}$
2. $4 \times \square = 1\frac{3}{5}$
3. $7 \times \square = 1\frac{5}{9}$
4. $2 \times \square = 6\frac{2}{3}$
5. $\square \times 1\frac{5}{6} = 9\frac{1}{6}$
6. $\square \times 2\frac{2}{7} = 13\frac{5}{7}$

7. **Write Math** Explain how you found the unknown number in Exercise 3.
Problem Solving • Comparison
Problems with Fractions

The Great Salt Lake in Utah is about \(\frac{4}{5}\) mile above sea level. Lake Titicaca in South America is about 3 times as high above sea level as the Great Salt Lake. About how high above sea level is Lake Titicaca?

<table>
<thead>
<tr>
<th>Read the Problem</th>
<th>Solve the Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What do I need to find?</strong></td>
<td>Draw a comparison model. Compare the heights above sea level of the Great Salt Lake and Lake Titicaca, in miles.</td>
</tr>
<tr>
<td>I need to find about how high above sea level Lake Titicaca is.</td>
<td>Great Salt Lake (\frac{4}{5})</td>
</tr>
<tr>
<td><strong>What information do I need to use?</strong></td>
<td>Lake Titicaca (\frac{4}{5}) (\frac{4}{5}) (\frac{4}{5})</td>
</tr>
<tr>
<td>The Great Salt Lake is about (\frac{4}{5}) mile above sea level. Lake Titicaca is about (3) times as high above sea level.</td>
<td>(t)</td>
</tr>
<tr>
<td><strong>How will I use the information?</strong></td>
<td>Write an equation and solve.</td>
</tr>
<tr>
<td>I can draw a diagram to compare the heights.</td>
<td>(t = \frac{3}{5} \times \frac{4}{5}) Write an equation.</td>
</tr>
<tr>
<td>(t = \frac{12}{5}) Multiply.</td>
<td>(t = \frac{22}{5}) Write the fraction as a mixed number.</td>
</tr>
<tr>
<td>So, Lake Titicaca is about (\frac{22}{5}) miles above sea level.</td>
<td></td>
</tr>
</tbody>
</table>

1. Amelia is training for a triathlon. She swims \(\frac{3}{5}\) mile. Then she runs about 6 times farther than she swims. About how far does Amelia run?

2. Last week, Meg bought \(1\frac{3}{5}\) pounds of fruit at the market. This week, she buys 4 times as many pounds of fruit as last week. In pounds, how much fruit does Meg buy this week?
Heights and Depths

Solve each problem. You may find it helpful to draw a diagram.

1. The depth of Lake Carl is about $1 \frac{1}{8}$ miles. Lake Susan is 3 times as deep as Lake Carl. Lake Wayne is 2 times as deep as Lake Susan. How much deeper is Lake Wayne than Lake Susan?

2. Mount Rogers rises $\frac{1}{4}$ mile above sea level. Mount Taylor rises 6 times as high as Mount Rogers. Mount Sullivan rises 2 times as high as Mount Rogers. What is the difference in the elevation of Mount Taylor and the elevation of Mount Sullivan?

3. A certain tree was $5 \frac{1}{3}$ feet tall when it was first planted. A few years later, the tree is 4 times as tall as it was when it was first planted. How much has the tree grown since it was first planted?

1. What are the next four multiples of \( \frac{1}{7} \)?

2. Sarah is making 4 batches of granola bars. She adds \( \frac{7}{8} \) cup peanuts to each batch. Her measuring cup holds \( \frac{1}{8} \) cup. How many times must Sarah measure \( \frac{1}{8} \) cup of peanuts to have enough for the granola bars? Shade the models to show your answer.

\[
\begin{array}{cccccccc}
\frac{1}{8} & \frac{1}{8} & \frac{1}{8} & \frac{1}{8} & \frac{1}{8} & \frac{1}{8} & \frac{1}{8} & \frac{1}{8} \\
\frac{1}{8} & \frac{1}{8} & \frac{1}{8} & \frac{1}{8} & \frac{1}{8} & \frac{1}{8} & \frac{1}{8} & \frac{1}{8} \\
\frac{1}{8} & \frac{1}{8} & \frac{1}{8} & \frac{1}{8} & \frac{1}{8} & \frac{1}{8} & \frac{1}{8} & \frac{1}{8} \\
\frac{1}{8} & \frac{1}{8} & \frac{1}{8} & \frac{1}{8} & \frac{1}{8} & \frac{1}{8} & \frac{1}{8} & \frac{1}{8} \\
\frac{1}{8} & \frac{1}{8} & \frac{1}{8} & \frac{1}{8} & \frac{1}{8} & \frac{1}{8} & \frac{1}{8} & \frac{1}{8} \\
\end{array}
\]

Sarah must measure \( \frac{1}{8} \) cup _______ times.

3. Alice walks \( \frac{6}{10} \) mile every day. How many miles does she walk in 5 days?

_______ miles
4. Hannah is baking 3 batches of health bars. She needs \(1 \frac{2}{3}\) cups of carob chips for each batch of bars.

**Part A**

Hannah completed the multiplication below and said she needed 6 cups of carob chips for 3 batches of bars. What is Hannah’s error?

\[
3 \times 1 \frac{2}{3} = 3 \times \frac{6}{3} = \frac{18}{3} = 6
\]

**Part B**

What is the correct number of cups Hannah needs for 3 batches of bars? Explain how you found your answer.

5. Which fraction is a multiple of \(\frac{1}{8}\)? Mark all that apply.

- A \(\frac{3}{8}\)
- B \(\frac{8}{12}\)
- C \(\frac{2}{8}\)
- D \(\frac{4}{8}\)
- E \(\frac{8}{10}\)
- F \(\frac{8}{8}\)

6. Bo recorded a basketball game that lasted \(2 \frac{1}{2}\) hours. Bo watched the game 4 times last week. How many hours did Bo spend watching the game? Show your work.

7. Rudi is comparing shark lengths. She reads that a sandbar shark is \(4\frac{1}{2}\) feet long. A thresher shark is 3 times as long as a sandbar shark. Complete the model. Then find the length of a thresher shark.

A thresher shark is ________ feet long.
8. Phil made a number line showing the multiples of \( \frac{3}{6} \).

The product \( 2 \times \frac{3}{6} \) is shown by the fraction ______ on the number line.

9. Tara has softball practice Tuesday, Wednesday, Thursday, and Sunday. Each practice is \( 1 \frac{1}{3} \) hours. Tara says she will have practice for 3 hours this week.

**Part A**

Without multiplying, explain how you know Tara is incorrect.

**Part B**

How long will Tara have softball practice this week? Write your answer as a mixed number. Show your work.

10. Look at the number line. Write the missing fractions.

11. Trevor’s pet goat weighed \( 6\frac{3}{8} \) pounds when it was born. By age 3, the goat weighed 8 times as much. Fill each box with a number or symbol from the list to show how to find the weight of Trevor’s goat at age 3. Not all numbers and symbols may be used.

\[
\text{weight} = \boxed{} \boxed{} \boxed{\times} \boxed{+} \boxed{3} \boxed{8} \boxed{6} \boxed{8} \boxed{ \frac{3}{8} } \boxed{8} \boxed{6} \boxed{3} \]
12. Oleg made a fraction number line to help him find \(4 \times \frac{2}{5}\).

![Fraction Number Line]

Select a way to write \(4 \times \frac{2}{5}\) as the product of a whole number and a unit fraction.

\[
4 \times \frac{2}{5} = \begin{align*}
6 \times \frac{1}{5} \\
2 \times \frac{4}{5} \\
8 \times \frac{1}{5}
\end{align*}
\]

13. Malik wanted to give \(\frac{1}{5}\) of his bag of balloons to each of 3 of his friends. How many of his balloons will he give away?

\[
\text{Number of balloons given away} = 3 \times \frac{1}{5} 
\]

14. Select the correct product for the equation.

\[
\begin{align*}
4 \times \frac{6}{8} &= \frac{8}{12} \\
4 \times \frac{3}{8} &= \frac{24}{8}
\end{align*}
\]

\[
\begin{align*}
\frac{8}{12} \\
\frac{48}{8} \\
\frac{12}{8} \\
\frac{24}{8}
\end{align*}
\]
15. The lengths of different types of snakes at a zoo are shown in the table.

<table>
<thead>
<tr>
<th>Snake's Name</th>
<th>Type of Snake</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sherman</td>
<td>Kenyan Sand Boa</td>
<td>$1 \frac{1}{4}$ feet</td>
</tr>
<tr>
<td>Thomas</td>
<td>Ball Python</td>
<td>$3 \frac{3}{4}$ feet</td>
</tr>
<tr>
<td>Sam</td>
<td>Blood Python</td>
<td>$6 \frac{1}{4}$ feet</td>
</tr>
</tbody>
</table>

For numbers 15a–15d, select True or False for the statement.

15a. Thomas is 3 times as long as Sherman.  ○ True  ○ False
15b. Thomas is 2 times as long as Sherman.  ○ True  ○ False
15c. Sam is 5 times as long as Sherman.    ○ True  ○ False
15d. Sam is 2 times as long as Thomas.     ○ True  ○ False

16. Violet used $1 \frac{3}{4}$ gallons of paint on her kitchen walls. She used 4 times as much paint for her living room and bedroom walls. How much paint did Violet use for the living room and bedroom walls?

_______ gallons

17. Maddie made a batch of popcorn balls. She used $1 \frac{1}{4}$ cups of raisins. She used 5 times as much popcorn.

**Part A**

Draw a model to show the problem.

**Part B**

Use your model to write an equation. Then solve the equation to find the amount of popcorn Maddie needs.
18. Mrs. McGlashan is making paint for her class. She needs \( \frac{3}{4} \) cup of warm water for each batch.

**Part A**

Mrs. McGlashan has a 1-cup measure that has no other markings. Can she make 8 batches of paint using only the 1-cup measure? Describe two ways you can find the answer.

**Part B**

The paint recipe also calls for \( \frac{1}{4} \) cup of food coloring. Tyler says Mrs. McGlashan will also need 6 cups of food coloring. Do you agree or disagree? Explain.

19. Sandi buys some fabric to make a quilt. She needs \( \frac{1}{6} \) yard of each type of fabric. She has 7 different types of fabrics to make her design. Use the following equation. Write the number in the box to make the statement true.

\[
\frac{7}{6} = \square \times \frac{1}{6}
\]

20. Mrs. Tokala uses \( \frac{9}{10} \) of a can of coffee beans each week. How many cans of coffee beans does Mrs. Tokala use in 6 weeks? Write your answer two different ways.

Mrs. Tokala uses _______ or _______ cans of coffee beans.

21. Alma is making 3 batches of tortillas. Each batch needs \( \frac{3}{4} \) cup of water. She only has a \( \frac{1}{4} \)-cup measure. How many times must Alma measure \( \frac{1}{4} \) cup of water to have enough for all of the tortillas?

_______ times
Dollar Days

Mr. Asfour owns a small grocery store. The store is very popular for its fresh fruit and vegetables. On Tuesdays, he offers special deals for $1.00.

<table>
<thead>
<tr>
<th>Only $1.00</th>
<th>Tuesday DOLLAR DAYS!</th>
<th>Only $1.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples – ( \frac{3}{4} ) lb</td>
<td>Oranges – ( \frac{1}{4} ) lb</td>
<td>Peaches – ( \frac{2}{3} ) lb</td>
</tr>
<tr>
<td>Pears – ( \frac{3}{8} ) lb</td>
<td>Bananas – ( \frac{1}{5} ) lb</td>
<td>Peppers – ( \frac{4}{6} ) lb</td>
</tr>
<tr>
<td>Limes – ( \frac{4}{5} ) lb</td>
<td>Peanuts – ( \frac{3}{10} ) lb</td>
<td>Lemons – ( \frac{7}{8} ) lb</td>
</tr>
</tbody>
</table>

1. Elaine bought $4 worth of apples and $3 worth of lemons. Did her grocery bag weigh more than or less than \( 5\frac{1}{4} \) pounds? Use a model to support your answer.

2. Deshi paid $5.00 for two different fruits. His grocery bag weighed between \( 1\frac{1}{2} \) and \( 2\frac{1}{2} \) pounds. Which combinations of fruit could he have purchased? Show your work.

   ________ $3 worth of pears and $2 worth of apples
   ________ $4 worth of pears and $1 worth of apples
   ________ $2 worth of pears and $3 worth of apples
3. Mrs. Nazari bought $2\frac{1}{4}$ pounds of apples, $1\frac{3}{5}$ pounds of peaches, and $1\frac{1}{5}$ pounds of bananas. She paid with a $20$ bill. How much change did she receive? Show your work.

4. Ming paid $8$ for every item except peppers. Was her bag lighter than or heavier than $4$ pounds? Show the addition using as few steps as you can.
Multiply Fractions by Whole Numbers

Dollar Days

COMMON CORE STANDARDS

4.NF.B.4  Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.

4.NF.B.4a  Understand a fraction \( \frac{a}{b} \) as a multiple of \( \frac{1}{b} \).

4.NF.B.4b  Understand a multiple of \( \frac{a}{b} \) as a multiple of \( \frac{1}{b} \), and use this understanding to multiply a fraction by a whole number.

4.NF.B.4c  Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem.

Also MP2, MP7

PURPOSE

To assess the ability to multiply a fraction by a whole number

TIME

25–30 minutes

GROUPING

Individuals

MATERIALS

- Performance Task, paper, pencil
- Fraction circles (optional)

PREPARATION HINTS

- Review multiplication of fractions and whole numbers with students before assigning the task.
- Review multiplication of mixed numbers and whole numbers with students before assigning the task.
- Review vocabulary, including multiple, numerator, denominator, mixed number, and simplest form.

IMPLEMENTATION NOTES

- Read the task aloud to students and make sure that all students have a clear understanding of the task.
- Students may use manipulatives to complete the task.
- Allow students as much paper as they need to complete the task.
- Allow as much time as students need to complete the task.
- Students must complete the task individually, without collaboration.
- Collect all student work when the task is complete.
TASK SUMMARY
Students apply multiplication of a fraction by a whole number to solve word problems involving weight. Students compare fractional weights.

REPRESENTATION
In this task, teachers can…
- Assist students in listing what they know, what they don’t know, and what is being asked to help them determine how to arrive at the solution.
- Provide a word wall that features pertinent vocabulary words and symbols.

ACTION and EXPRESSION
In this task, teachers can…
- Provide fraction circles or fraction bars for kinesthetic learners, or those who need a visual reminder while completing the task.

ENGAGEMENT
In this task, teachers can…
- Engage interest by discussing personal experiences related to the task with students.
- Increase mastery by providing specific feedback that encourages perseverance.

EXPECTED STUDENT OUTCOMES
- Complete the task within the time allowed
- Reflect engagement in a productive struggle
- Multiply fractions by whole numbers

SCORING
Use the associated Rubric to evaluate each student’s work.
# Performance Task Rubric

<table>
<thead>
<tr>
<th>Response Level</th>
<th>Description</th>
</tr>
</thead>
</table>
| A level 3 response | • Demonstrates that the student has reasoned abstractly and qualitatively  
• Shows appropriate use of multiplication to solve word problems  
• Indicates a solid understanding of multiplying both fractions and mixed numbers  
• Shows a complete understanding of the relationship between addition and multiplication |
| A level 2 response | • Demonstrates that the student has reasoned abstractly and qualitatively  
• Shows appropriate use of multiplication to solve word problems  
• Indicates an understanding of multiplying both fractions and mixed numbers  
• Shows an understanding of the relationship between addition and multiplication  
• May include a computational error derived from a correct procedure |
| A level 1 response | • Demonstrates that the student has made an effort to reason abstractly and qualitatively  
• Shows some understanding of the use of multiplication in solving word problems  
• May show some confusion about multiplying fractions or mixed numbers  
• May indicate that the student has relied exclusively on repeated addition to solve problems  
• Errors may reflect a lack of understanding of the process or procedure |
| A level 0 response | • Shows little evidence that the student has reasoned abstractly or qualitatively  
• Reflects a lack of understanding of the process of multiplying fractions and mixed numbers  
• Shows little evidence of addressing the components of the task |
4. Hannah is baking 3 batches of health bars. She needs $1\frac{2}{3}$ cups of carob chips for each batch of bars.

**Part A**

Hannah completed the multiplication below and said she needed 6 cups of carob chips for 3 batches of bars. What is Hannah's error?

\[
3 \times 1\frac{2}{3} = 3 \times \frac{5}{3} = \frac{15}{3} = 6
\]

Possible explanation: Hannah did not write the mixed number, $1\frac{2}{3}$, as a fraction correctly. $1\frac{2}{3}$ is not equal to $\frac{6}{3}$.

**Part B**

What is the correct number of cups Hannah needs for 3 batches of bars? Explain how you found your answer.

5 cups; possible explanation: first I wrote $1\frac{2}{3}$ as a fraction. $1\frac{2}{3} = \frac{5}{3}$, then, I multiplied $3 \times \frac{5}{3} = \frac{15}{3} = 5$.

5. Which fraction is a multiple of $\frac{1}{8}$? Mark all that apply.

- $\frac{3}{8}$
- $\frac{2}{8}$
- $\frac{8}{10}$
- $\frac{8}{12}$
- $\frac{4}{8}$
- $\frac{8}{8}$

6. Bo recorded a basketball game that lasted $2\frac{1}{2}$ hours. Bo watched the game 4 times last week. How many hours did Bo spend watching the game? Show your work.

$10$ hours; $2\frac{1}{2} \times 4 = \frac{5}{2} \times 4 = \frac{20}{2} = 10$

7. Rudi is comparing shark lengths. She reads that a sandbar shark is $4\frac{1}{2}$ feet long. A thresher shark is 3 times as long as a sandbar shark. Complete the model. Then find the length of a thresher shark.

A thresher shark is $13\frac{1}{2}$ feet long.
8. Phil made a number line showing the multiples of \( \frac{3}{6} \).

The product \( 2 \times \frac{3}{6} \) is shown by the fraction \( \frac{6}{6} \) on the number line.

9. Tara has softball practice Tuesday, Wednesday, Thursday, and Sunday. Each practice is \( 1 \frac{1}{3} \) hours. Tara says she will have practice for 3 hours this week.

Part A
Without multiplying, explain how you know Tara is incorrect.

Possible explanation: Tara needs to find \( 4 \times 1 \frac{1}{3} \). If she estimates \( 4 \times 1 \) hour, she finds that practice is at least 4 hours; 4 is greater than 3, so Tara is incorrect.

Part B
How long will Tara have softball practice this week? Write your answer as a mixed number. Show your work.

\[ 5 \frac{1}{3} \text{ hours; } 4 \times 1 \frac{1}{3} = 4 \times \frac{4}{3} = \frac{16}{3} = 5 \frac{1}{3} \]

10. Look at the number line. Write the missing fractions.

11. Trevor’s pet goat weighed \( 6 \frac{3}{8} \) pounds when it was born. By age 3, the goat weighed 8 times as much. Fill each box with a number or symbol from the list to show how to find the weight of Trevor’s goat at age 3. Not all numbers and symbols may be used.

\[ \text{weight} = 8 \times \frac{63}{8} \]

12. Oleg made a fraction number line to help him find \( 4 \times \frac{2}{5} \).

Select a way to write \( 4 \times \frac{2}{5} \) as the product of a whole number and a unit fraction.

\[ 4 \times \frac{2}{5} = 8 \times \frac{1}{5} \]

13. Malik wanted to give \( \frac{1}{5} \) of his bag of balloons to each of 3 of his friends. How many of his balloons will he give away?

\[ \frac{3}{5} \]

14. Select the correct product for the equation.

\[ \frac{8}{12} \quad \frac{48}{8} \quad \frac{12}{8} \quad \frac{24}{8} \]

\[ 4 \times \frac{6}{8} = \frac{24}{8} \quad 4 \times \frac{3}{8} = \frac{12}{8} \]
18. Mrs. McGlashan is making paint for her class. She needs $\frac{3}{4}$ cup of warm water for each batch.

**Part A**

Mrs. McGlashan has a 1-cup measure that has no other markings. Can she make 8 batches of paint using only the 1-cup measure? Describe two ways you can find the answer.

Yes; possible explanation: she needs $8 \times \frac{3}{4}$ cups of water. I can use a number line to make 8 jumps of $\frac{3}{4}$. The last jump ends at $\frac{24}{4}$ or 6. I could also list the first 8 multiples of $\frac{3}{4}$: $\frac{3}{4}$, $\frac{6}{4}$, $\frac{9}{4}$, $\frac{12}{4}$, $\frac{15}{4}$, $\frac{18}{4}$, $\frac{21}{4}$, $\frac{24}{4}$. The sixth multiple is $\frac{24}{4}$, which is 6 whole cups. She can use the 1-cup measure 6 times to make 8 batches.

**Part B**

The paint recipe also calls for $\frac{1}{4}$ cup of food coloring. Tyler says Mrs. McGlashan will also need 6 cups of food coloring. Do you agree or disagree? Explain.

I disagree; possible explanation: $8 \times \frac{1}{4} = \frac{8}{4}$ or 2. She needs 2 cups of food coloring, not 6.

19. Sandi buys some fabric to make a quilt. She needs $\frac{1}{6}$ yard of each type of fabric. She has 7 different types of fabrics to make her design. Use the following equation. Write the number in the box to make the statement true.

$\frac{7}{6} = 7 \times \frac{1}{6}$

20. Mrs. Tokala uses $\frac{9}{10}$ of a can of coffee beans each week. How many cans of coffee beans does Mrs. Tokala use in 6 weeks? Write your answer two different ways.

Mrs. Tokala uses ____ or ____ cans of coffee beans.

21. Alma is making 3 batches of tortillas. Each batch needs $\frac{3}{4}$ cup of water. She only has a $\frac{1}{4}$-cup measure. How many times must Alma measure $\frac{1}{4}$ cup of water to have enough for all of the tortillas?

_____ times
Chapter 8

Dollar Days

Mr. Asfour owns a small grocery store. The store is very popular for its fresh fruit and vegetables. On Tuesdays, he offers special deals for $1.00.

<table>
<thead>
<tr>
<th></th>
<th>Only $1.00</th>
<th>Tuesday DOLLAR DAYS!</th>
<th>Only $1.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples</td>
<td>1 lb</td>
<td>Oranges – 1 lb</td>
<td>Peaches – 1 lb</td>
</tr>
<tr>
<td>Pears</td>
<td>1 lb</td>
<td>Bananas – 1 lb</td>
<td>Peppers – 1 lb</td>
</tr>
<tr>
<td>Limes</td>
<td>1 lb</td>
<td>Peanuts – 1 lb</td>
<td>Lemons – 1 lb</td>
</tr>
</tbody>
</table>

1. Elaine bought $4 worth of apples and $3 worth of lemons. Did her grocery bag weigh more than or less than 5 lb? Use a model to support your answer.

\[ \frac{3}{4} = 3 \text{ apples} \]
\[ \frac{3}{8} = \frac{1}{2} \text{ lb} = \text{lemons} \]

The bag weighed more than 5 lb.

2. Deshi paid $5.00 for two different fruits. His grocery bag weighed between 1 lb and 2 lb. Which combinations of fruit could he have purchased? Show your work.

\[ \square \] $3$ worth of pears and $2$ worth of apples
\[ \square \] $4$ worth of pears and $1$ worth of apples
\[ \square \] $2$ worth of pears and $3$ worth of apples

3. Mrs. Nazari bought \( \frac{3}{4} \) pounds of apples, \( \frac{1}{2} \) pounds of peaches, and \( \frac{1}{3} \) pounds of bananas. She paid with a $20 bill. How much change did she receive? Show your work.

\[ \frac{3}{4} = 2 \frac{1}{4} = 2 \frac{1}{2} = 1 \frac{1}{4} = \frac{5}{4} \text{ apples} \]
\[ \frac{1}{2} = 2 \frac{1}{2} = \frac{5}{2} = 2 \frac{1}{4} = \frac{5}{4} \text{ peaches} \]
\[ \frac{1}{3} = 2 \frac{1}{3} = \frac{5}{3} = 2 \frac{1}{10} = \frac{5}{6} \text{ bananas} \]

\[ \text{Change received} = 20 - \left( \frac{5}{4} + \frac{5}{2} + \frac{5}{6} \right) = 20 - 3 \frac{1}{4} = 16 \frac{3}{4} \]

4. Ming paid $8 for every item except peppers. Was her bag lighter than or heavier than 4 pounds? Show the addition using as few steps as you can.

\[ \frac{3}{4} = \frac{3}{4} + \frac{3}{4} = \frac{3}{2} \]
\[ \frac{3}{10} = \frac{3}{10} + \frac{3}{10} = \frac{3}{5} \]
\[ \frac{3}{8} = \frac{3}{8} + \frac{3}{8} = \frac{3}{4} \]
\[ \frac{1}{4} = \frac{1}{4} + \frac{1}{4} = \frac{1}{2} \]
\[ \frac{1}{10} = \frac{1}{10} + \frac{1}{10} = \frac{1}{5} \]

Ming's bag was lighter than 4 lbs.
**Dollar Days**

Mr. Asfour owns a small grocery store. The store is very popular for its fresh fruit and vegetables. On Tuesdays, he offers special deals for $1.00.

<table>
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</thead>
<tbody>
<tr>
<td>Apples — 1/2 lb</td>
<td>Oranges — 1/4 lb</td>
<td>Peaches — 1/2 lb</td>
</tr>
<tr>
<td>Pears — 1/3 lb</td>
<td>Bananas — 3/4 lb</td>
<td>Peppers — 1/6 lb</td>
</tr>
<tr>
<td>Limes — 1/8 lb</td>
<td>Peanuts — 1/3 lb</td>
<td>Lemons — 1/6 lb</td>
</tr>
</tbody>
</table>

1. Elaine bought $4 worth of apples and $3 worth of lemons. Did her grocery bag weigh more than or less than 5 1/4 pounds? Use a model to support your answer.

   Her bag weighed 3 1/2 pounds more than 5 1/4 pounds.

   \[
   \frac{2}{3} \times \frac{11}{4} = 3 \quad \text{or} \quad 3 \quad \text{or} \quad 3
   \]

2. Deshi paid $5.00 for two different fruits. His grocery bag weighed between 1 1/2 and 2 1/2 pounds. Which combinations of fruit could he have purchased? Show your work.

   - $3 worth of pears and $2 worth of apples
   - $4 worth of pears and $1 worth of apples
   - $2 worth of pears and $3 worth of apples

3. Mrs. Nazari bought 2 1/2 pounds of apples, 1 1/2 pounds of peaches, and 1 1/2 pounds of bananas. She paid with a $20 bill. How much change did she receive? Show your work.

4. Ming paid $8 for every item except peppers. Was her bag lighter than or heavier than 4 pounds? Show the addition using as few steps as you can.

   \[
   \frac{1}{6} + \frac{5}{6} + \frac{2}{3} + \frac{1}{5} = \frac{17}{30} = \frac{17}{30}
   \]

   \[
   \frac{3}{4} + (\frac{5}{6} + \frac{1}{20}) = \frac{3}{4} + \frac{17}{60} = \frac{3}{4}
   \]
Sample Level 1 Response

Chapter 8

Dollar Days

Mr. Asfour owns a small grocery store. The store is very popular for its fresh fruit and vegetables. On Tuesdays, he offers special deals for $1.00.

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</thead>
<tbody>
<tr>
<td>Apples – 2 lb</td>
<td>Oranges – ½ lb</td>
<td>Peaches – 3 lb</td>
</tr>
<tr>
<td>Pears – 6 lb</td>
<td>Bananas – ½ lb</td>
<td>Peppers – 8 lb</td>
</tr>
<tr>
<td>Limes – ½ lb</td>
<td>Peanuts – 2 lb</td>
<td>Lemons – 3 lb</td>
</tr>
</tbody>
</table>

1. Elaine bought $4 worth of apples and $3 worth of lemons. Did her grocery bag weigh more than or less than 5½ pounds? Use a model to support your answer.

\[
\frac{2}{5} \times \frac{5}{8} = \frac{2}{8} + \frac{5}{8} = \frac{7}{8}
\]

Her bag weighed more.

2. Deshi paid $5.00 for two different fruits. His grocery bag weighed between 1½ and 2½ pounds. Which combinations of fruit could he have purchased? Show your work.

- $3 worth of pears and $2 worth of apples
- $4 worth of pears and $1 worth of apples
- $2 worth of pears and $3 worth of apples

\[
\frac{2}{8} \times \frac{3}{8} = \frac{6}{8} - \frac{1}{8} = \frac{5}{8}
\]

\[
\frac{3}{8} \times \frac{3}{8} = \frac{1}{8}
\]

\[
\frac{3}{8} \times \frac{2}{8} = \frac{6}{8}
\]

3. Mrs. Nazari bought \(\frac{2}{3}\) pounds of apples, \(\frac{2}{5}\) pounds of peaches, and \(\frac{3}{8}\) pounds of bananas. She paid with a $20 bill. How much change did she receive? Show your work.

\[
\frac{2}{3} + \frac{2}{5} + \frac{3}{8} \quad \text{and} \quad 1 + 1 + 1 + 1 = 4
\]

\[
\frac{20}{10} - 10 = 0
\]

4. Ming paid $8 for every item except peppers. Was her bag lighter than or heavier than 4 pounds? Show the addition using as few steps as you can.

Heavier, she bought alot.

\[
\frac{8}{4} = 2
\]
Mr. Arbour owns a small grocery store. The store is very popular for its fresh fruit and vegetables. On Tuesdays, he offers special deals for $1/lb.

### Dollar Days

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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tuesday DOLLAR DAYS</td>
<td>Tuesday DOLLAR DAYS</td>
</tr>
<tr>
<td>Apples - 3 lb</td>
<td>Prunes - 3 lb</td>
<td>Pears - 3 lb</td>
</tr>
<tr>
<td>Oranges - 1 lb</td>
<td>Bananas - 1 lb</td>
<td>Peaches - 1 lb</td>
</tr>
<tr>
<td>Limes - 1 lb</td>
<td>Pomegranate - 1 lb</td>
<td>Lemons - 1 lb</td>
</tr>
</tbody>
</table>

1. Elaine bought $4 worth of apples and $3 worth of bananas. Did her grocery bag weigh more than or less than 7 lb? Use a model to support your answer.

2. Doge paid $5.00 for two different fruits. His grocery bag weighed between 1\frac{1}{2} and 2\frac{1}{2} pounds. Which combinations of fruits could he have purchased? Show your work.

3. Mrs. Norris bought 2\frac{1}{2} pounds of apples, 1\frac{1}{2} pounds of peaches, and 1\frac{1}{4} pounds of bananas. She paid with a $20 bill. How much change should she receive? Show your work.

4. Ming paid $8 for a bag of apples. Was her bag lighter than or heavier than 4 pounds? Show the addition using as few steps as you can.

- 8 is heavier than 4.

- \( \frac{5}{7} \) more than \( \frac{3}{7} \)

- \( 7 \) more than \( \frac{3}{7} \)
## Chapter 8 Test

<table>
<thead>
<tr>
<th>Item</th>
<th>Lesson</th>
<th>Standard</th>
<th>Content Focus</th>
<th>Intervene with</th>
<th>Personal Math Trainer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 5, 10</td>
<td>8.1</td>
<td>4.NF.B.4a</td>
<td>Identify multiples of unit fractions.</td>
<td>R—8.1</td>
<td>4.NF.4a</td>
</tr>
<tr>
<td>19, 21</td>
<td>8.2</td>
<td>4.NF.B.4b</td>
<td>Understand a fraction $\frac{a}{b}$ as a multiple of $\frac{1}{b}$.</td>
<td>R—8.2</td>
<td>4.NF.4b</td>
</tr>
<tr>
<td>3, 4, 6, 9, 11, 14, 16, 18, 20</td>
<td>8.4</td>
<td>4.NF.B.4c</td>
<td>Multiply a fraction or mixed number by a whole number.</td>
<td>R—8.4</td>
<td>4.NF.4c</td>
</tr>
<tr>
<td>7, 17</td>
<td>8.5</td>
<td>4.NF.B.4c</td>
<td>Draw a diagram to solve comparison problems with fractions.</td>
<td>R—8.5</td>
<td>4.NF.4c</td>
</tr>
<tr>
<td>2, 8, 12</td>
<td>8.3</td>
<td>4.NF.B.4b</td>
<td>Use a visual model to multiply a fraction by a whole number.</td>
<td>R—8.3</td>
<td>4.NF.4b</td>
</tr>
<tr>
<td>13</td>
<td>8.4</td>
<td>4.NF.B.4c</td>
<td>Decompose a fraction into a sum of fractions.</td>
<td>R—8.4</td>
<td>4.NF.4c</td>
</tr>
</tbody>
</table>

**Key:** R—Reteach