1. **A.** Alberta used fraction circle pieces to solve $4 \times \frac{3}{4}$. Show how to use fraction circle pieces to solve $\frac{3}{4} \times 4$. Do you get the same answer?

   B. Is the product of $\frac{3}{4}$ and 4 greater or less than 4? Why?

2. Imagine you are making this recipe for a party. The recipe serves 4 people and you need to serve 12 people.

   A. How does the recipe need to change?

   B. Use any strategy you like to change the amount of each ingredient to make a recipe that serves 12 people. Write a number sentence to show how you found the amount of each ingredient.

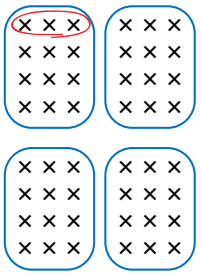
Spicy Cheese Dip
Serves 4

- $\frac{1}{8}$ cup of flour
- $\frac{1}{4}$ teaspoon of garlic powder
- $\frac{3}{4}$ cup of milk
- $\frac{1}{2}$ cup of chicken broth
- $1\frac{1}{4}$ cups of shredded cheese
- $\frac{2}{3}$ cup of salsa

3. One serving of Alberta's peanut butter cookies is $\frac{1}{4}$ dozen or $\frac{1}{4} \times 12$. Alberta used a diagram to determine how many cookies are in each serving.

   A. Copy and complete the table. Look for patterns.

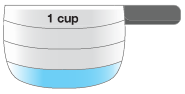
Number of Servings	Number of Cookies
1	$\frac{1}{4} \times 12 =$
2	$\frac{2}{4} \times 12 =$
3	$\frac{3}{4} \times 12 =$
4	$\frac{4}{4} \times 12 =$
5	$\frac{5}{4} \times 12 =$
6	$\frac{6}{4} \times 12 =$
7	$\frac{7}{4} \times 12 =$
8	$\frac{8}{4} \times 12 =$



***Student Guide* - Page 493**

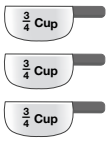
B. How many people can she serve with one dozen cookies?
C. How many people can she serve with two dozen cookies?
D. How many people can she serve with four dozen cookies?
E. What does $\frac{8}{4}$ mean in this problem?
F. What does $\frac{20}{4}$ mean in this problem?
G. Which products are greater than 12?
H. Which products are less than 12?
I. Which products are equal to 12?

4. Show or tell how you know the difference in meaning between $\frac{1}{4}$ and $\frac{4}{1}$.



5. Complete the recipe conversion table. Find the amount of milk needed for 4, 8, 12, 16, 20, and 24 servings. Look for patterns.

Cups of Milk in Spicy Cheese Dip	
A. Serves 4	$1 \times \frac{3}{4} =$
B. Serves 8	$2 \times \frac{3}{4} =$
C. Serves 12	$3 \times \frac{3}{4} =$
D. Serves 16	$4 \times \frac{3}{4} =$
E. Serves 20	$5 \times \frac{3}{4} =$
F. Serves 24	$6 \times \frac{3}{4} =$



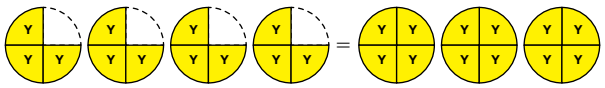
***Student Guide* - Page 494**

***Answers and/or discussion are included in the lesson.**

Student Guide

Multiply Fractions by a Whole (SG pp. 493–496) Questions 1–16

1. **A.*** Yes; $\frac{3}{4} \times 4$:



B.* The product of $\frac{3}{4}$ and 4 is less than 4 because you are only finding a part of 4.

2. **A.*** The amount of each ingredient needs to be multiplied by 3.

B.* $\frac{1}{8} \times 3 = \frac{3}{8}$ cup of flour
$\frac{1}{4} \times 3 = \frac{3}{4}$ teaspoon of garlic powder
$\frac{3}{4} \times 3 = \frac{9}{4}$ or $2\frac{1}{4}$ cup of milk
$\frac{1}{2} \times 3 = \frac{3}{2}$ or $1\frac{1}{2}$ cup of chicken broth
$1\frac{1}{4} \times 3 = 3\frac{3}{4}$ cup of shredded cheese
$\frac{2}{3} \times 3 = \frac{6}{3}$ or 2 cups of salsa

3. **A.**

Number of Servings	Number of Cookies
1	$\frac{1}{4} \times 12 =$ 3
2	$\frac{2}{4} \times 12 =$ 6
3	$\frac{3}{4} \times 12 =$ 9
4	$\frac{4}{4} \times 12 =$ 12
5	$\frac{5}{4} \times 12 =$ 15
6	$\frac{6}{4} \times 12 =$ 18
7	$\frac{7}{4} \times 12 =$ 21
8	$\frac{8}{4} \times 12 =$ 24

B. 4

C. 8

D. 16

E. $\frac{8}{4}$ means $\frac{8}{4}$ of a dozen or 2 times a dozen

F. $\frac{20}{4}$ means $\frac{20}{4}$ of a dozen or 5 times a dozen

G.* $\frac{5}{4} \times 12$, $\frac{6}{4} \times 12$, $\frac{7}{4} \times 12$, and $\frac{8}{4} \times 12$

H.* $\frac{1}{4} \times 12$, $\frac{2}{4} \times 12$, $\frac{3}{4} \times 12$

I. $\frac{4}{4} \times 12$

4.* See Figure 4 in the lesson.

5.

Cups of Milk in Spicy Cheese Dip	
A. Serves 4	$1 \times \frac{3}{4} = \frac{3}{4}$
B. Serves 8	$2 \times \frac{3}{4} = \frac{6}{4}$
C. Serves 12	$3 \times \frac{3}{4} = \frac{9}{4}$
D. Serves 16	$4 \times \frac{3}{4} = \frac{12}{4}$
E. Serves 20	$5 \times \frac{3}{4} = \frac{15}{4}$
F. Serves 24	$6 \times \frac{3}{4} = \frac{18}{4}$

6. A. Yes, Ana is correct. $\frac{3}{4} = 3 \times \frac{1}{4}$

B. Yes, Ana is correct.

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

C. The answers are both 3.

7. A. They are both $3\frac{3}{4}$

B. $\frac{3 \times 6}{4} = \frac{16}{4} = 4$; our answers are the same.

8. A. Kim shows 6 rectangles.

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

C. Kim shaded 3 small squares to show $\frac{3}{4}$.

D. 18

E. $\frac{3}{4} \times 6 = \frac{18}{4}$

9. A. $\frac{2}{3} \times 6 = \frac{12}{4} = 4$

B. $5 \times \frac{4}{5} = \frac{20}{5} = 4$

C. $\frac{5}{6} \times 8 = \frac{40}{6} = 6\frac{4}{6} = 6\frac{2}{3}$

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

11. 15 cups. There are $18 \times \frac{1}{6} = 3$ cups. left. Therefore, the guests drank $18 - 3 = 15$ cups of lemonade.

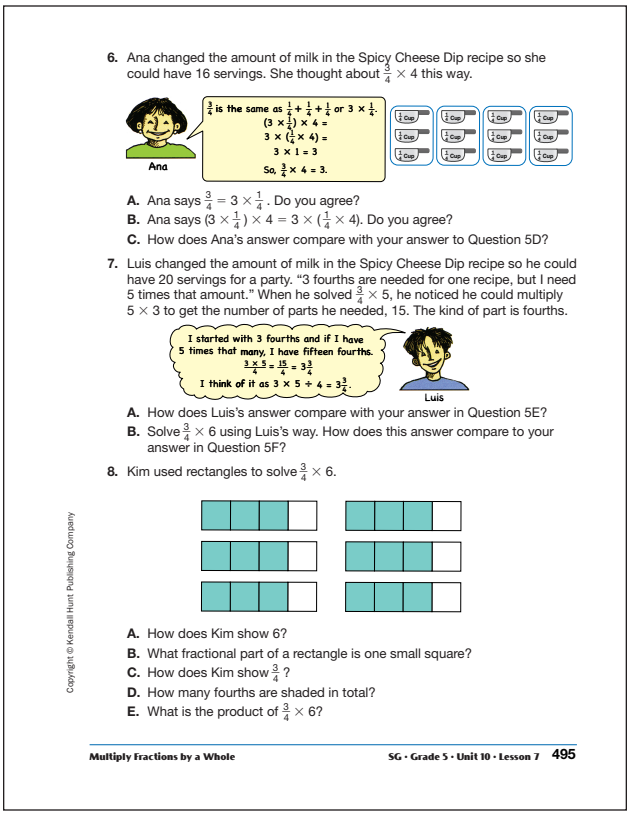
12. 10 balloons; I bag has 8 balloons: $\frac{1}{4}$ bag has $\frac{1}{4} \times 8 = 2$ balloons. So, $1\frac{1}{4}$ bags have $8 + 2 = 10$ balloons.

13. 6 sandwiches: $9 \times \frac{2}{3} = 6$

14. 24 times

15.* $20 \times 3 \div 4 = 15$ guests were male. 5 guests were female. See Figure 5 in the lesson.

16.* $\frac{2}{3} + \frac{2}{3} + \frac{2}{3} = \frac{6}{3} = 2$ miles. See Figure 6 in the lesson.



6. Ana changed the amount of milk in the Spicy Cheese Dip recipe so she could have 16 servings. She thought about $\frac{3}{4} \times 4$ this way.

Ana

$\frac{3}{4}$ is the same as $\frac{1}{4} + \frac{1}{4} + \frac{1}{4}$ or $3 \times \frac{1}{4}$.
$(3 \times \frac{1}{4}) \times 4 =$
$3 \times (\frac{1}{4} \times 4) =$
$3 \times 1 = 3$
So, $\frac{3}{4} \times 4 = 3$.

A. Ana says $\frac{3}{4} = 3 \times \frac{1}{4}$. Do you agree?
B. Ana says $(3 \times \frac{1}{4}) \times 4 = 3 \times (\frac{1}{4} \times 4)$. Do you agree?
C. How does Ana's answer compare with your answer to Question 5D?

7. Luis changed the amount of milk in the Spicy Cheese Dip recipe so he could have 20 servings for a party. "3 fourths are needed for one recipe, but I need 5 times that amount." When he solved $\frac{3}{4} \times 5$, he noticed he could multiply 5×3 to get the number of parts he needed, 15. The kind of part is fourths.

I started with 3 fourths and if I have 5 times that many, I have fifteen fourths.
$\frac{3 \times 5}{4} = \frac{15}{4} = 3\frac{3}{4}$
I think of it as $3 \times 5 \div 4 = 3\frac{3}{4}$.

Luis

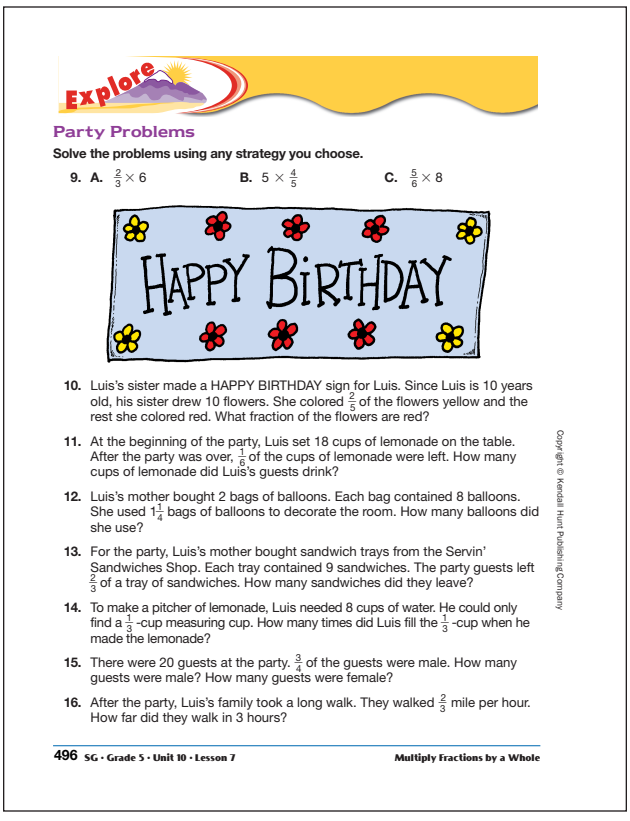
A. How does Luis's answer compare with your answer in Question 5E?
B. Solve $\frac{3}{4} \times 6$ using Luis's way. How does this answer compare to your answer in Question 5F?

8. Kim used rectangles to solve $\frac{3}{4} \times 6$.

A. How does Kim show 6?
B. What fractional part of a rectangle is one small square?
C. How does Kim show $\frac{3}{4}$?
D. How many fourths are shaded in total?
E. What is the product of $\frac{3}{4} \times 6$?

Multiply Fractions by a Whole SG • Grade 5 • Unit 10 • Lesson 7 495

***Student Guide* - Page 495**



Explore

Party Problems

Solve the problems using any strategy you choose.

9. A. $\frac{2}{3} \times 6$ B. $5 \times \frac{4}{5}$ C. $\frac{5}{6} \times 8$

HAPPY BIRTHDAY

10. Luis's sister made a HAPPY BIRTHDAY sign for Luis. Since Luis is 10 years old, his sister drew 10 flowers. She colored $\frac{2}{5}$ of the flowers yellow and the rest she colored red. What fraction of the flowers are red?

11. At the beginning of the party, Luis set 18 cups of lemonade on the table. After the party was over, $\frac{1}{6}$ of the cups of lemonade were left. How many cups of lemonade did Luis's guests drink?

12. Luis's mother bought 2 bags of balloons. Each bag contained 8 balloons. She used $1\frac{1}{4}$ bags of balloons to decorate the room. How many balloons did she use?

13. For the party, Luis's mother bought sandwich trays from the Servin' Sandwiches Shop. Each tray contained 9 sandwiches. The party guests left $\frac{2}{3}$ of a tray of sandwiches. How many sandwiches did they leave?

14. To make a pitcher of lemonade, Luis needed 8 cups of water. He could only find a $\frac{1}{3}$-cup measuring cup. How many times did Luis fill the $\frac{1}{3}$-cup when he made the lemonade?

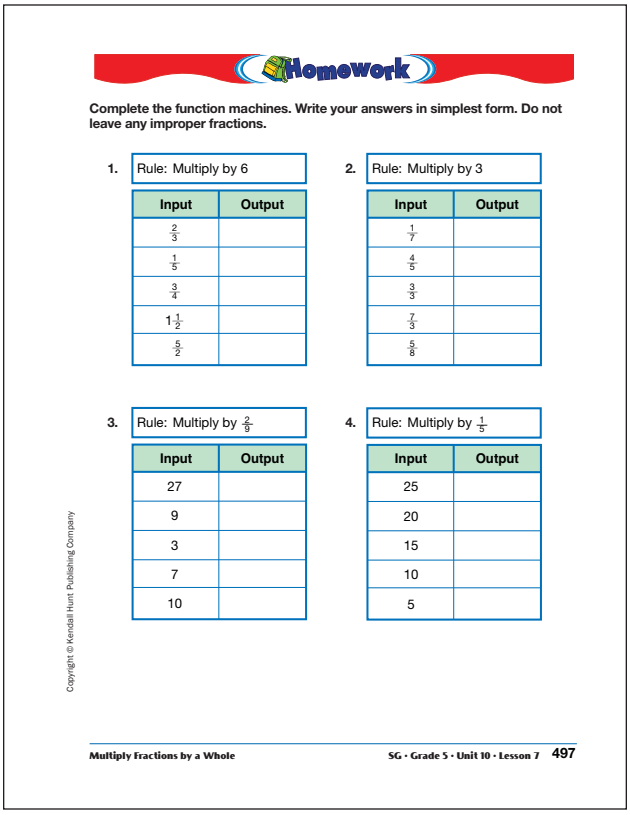
15. There were 20 guests at the party. $\frac{3}{4}$ of the guests were male. How many guests were male? How many guests were female?

16. After the party, Luis's family took a long walk. They walked $\frac{2}{3}$ mile per hour. How far did they walk in 3 hours?

496 SG • Grade 5 • Unit 10 • Lesson 7 Multiply Fractions by a Whole

***Student Guide* - Page 496**

***Answers and/or discussion are included in the lesson.**



Homework

Complete the function machines. Write your answers in simplest form. Do not leave any improper fractions.

1. Rule: Multiply by 6

Input	Output
$\frac{2}{3}$	
$\frac{1}{5}$	
$\frac{3}{4}$	
$1\frac{1}{2}$	
$\frac{5}{2}$	

2. Rule: Multiply by 3

Input	Output
$\frac{1}{7}$	
$\frac{4}{5}$	
$\frac{3}{3}$	
$\frac{7}{3}$	
$\frac{5}{8}$	

3. Rule: Multiply by $\frac{2}{9}$

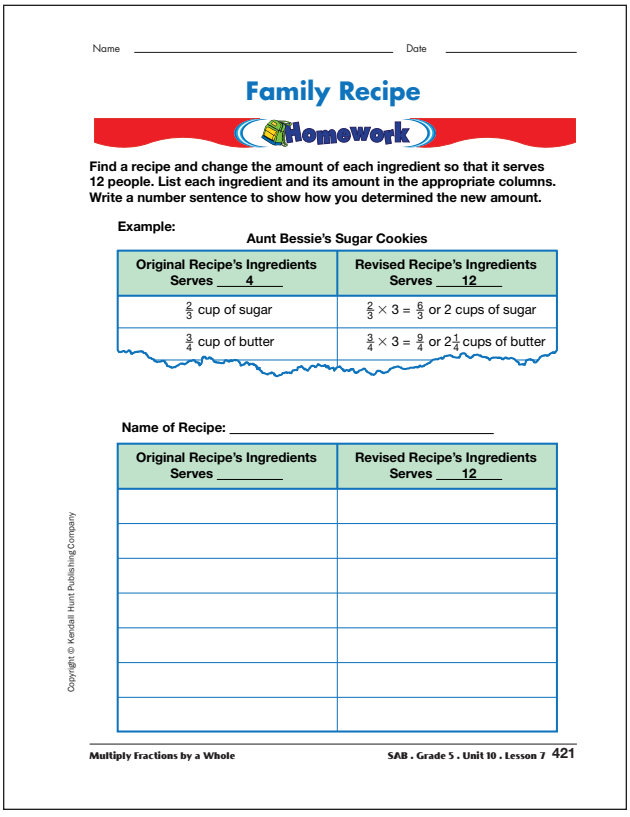
Input	Output
27	
9	
3	
7	
10	

4. Rule: Multiply by $\frac{1}{5}$

Input	Output
25	
20	
15	
10	
5	

Multiply Fractions by a Whole SG • Grade 5 • Unit 10 • Lesson 7 497

Student Guide - Page 497



Name _____ Date _____

Family Recipe

Homework

Find a recipe and change the amount of each ingredient so that it serves 12 people. List each ingredient and its amount in the appropriate columns. Write a number sentence to show how you determined the new amount.

Example:

Aunt Bessie's Sugar Cookies

Original Recipe's Ingredients Serves 4	Revised Recipe's Ingredients Serves 12
$\frac{2}{3}$ cup of sugar	$\frac{2}{3} \times 3 = \frac{6}{3}$ or 2 cups of sugar
$\frac{3}{4}$ cup of butter	$\frac{3}{4} \times 3 = \frac{9}{4}$ or $2\frac{1}{4}$ cups of butter

Name of Recipe: _____

Original Recipe's Ingredients Serves _____	Revised Recipe's Ingredients Serves 12

Multiply Fractions by a Whole SAB • Grade 5 • Unit 10 • Lesson 7 421

Student Activity Book - Page 421

Homework (SG p. 497) Questions 1–4

1. Rule: Multiply by 6

Input	Output
$\frac{2}{3}$	$\frac{12}{3} = 4$
$\frac{1}{5}$	$\frac{6}{5} = 1\frac{1}{5}$
$\frac{3}{4}$	$\frac{18}{4} = 4\frac{2}{4} = 4\frac{1}{2}$
$1\frac{1}{2}$	$\frac{18}{2} = 9$
$\frac{5}{2}$	$\frac{30}{2} = 15$

2. Rule: Multiply by 3

Input	Output
$\frac{1}{7}$	$\frac{3}{7}$
$\frac{4}{5}$	$\frac{12}{5} = 2\frac{2}{5}$
$\frac{3}{3}$	$\frac{9}{3} = 3$
$\frac{7}{3}$	$\frac{21}{3} = 7$
$\frac{5}{8}$	$\frac{15}{8} = 1\frac{7}{8}$

3. Rule: Multiply by $\frac{2}{9}$

Input	Output
27	$\frac{54}{9} = 6$
9	$\frac{18}{9} = 2$
3	$\frac{6}{9} = \frac{2}{3}$
7	$\frac{14}{9} = 1\frac{6}{9} = 1\frac{2}{3}$
10	$\frac{20}{9} = 2\frac{2}{9}$

4. Rule: Multiply by $\frac{1}{5}$

Input	Output
25	5
20	4
15	3
10	2
5	1

Student Activity Book

Family Recipe (SAB p. 421)

Homework

Recipe and ingredient amounts will vary.

Teacher Guide

Turkey and Potatoes (TG pp. 1–2)
Questions 1–4

1. Use models, drawings, number lines, mental math, or paper and pencil to solve the problems.

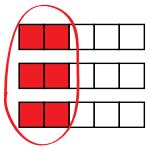
   A. $\frac{3}{5} \times 10 = 6$

   B. $\frac{4}{7} \times 5 = \frac{20}{7} = 2\frac{6}{7}$

   C. $9 \times \frac{2}{3} = 6$

2. $\frac{2}{5} \times 3 = \frac{6}{5} = 1\frac{1}{5}$. Strategies will vary.

   Possible strategy:



3. **Mashed Potatoes**

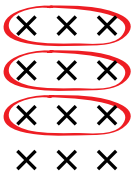
Original Recipe Serves ___4___	Revised Recipe Serves ___16___
$1\frac{1}{2}$ pounds of potatoes	$1\frac{1}{2} \times 4 = 6$ pounds of potatoes
$\frac{2}{3}$ teaspoon of salt	$\frac{2}{3} \times 4 = 2\frac{2}{3}$ teaspoon of salt
$\frac{1}{4}$ cup of cream	$\frac{1}{4} \times 4 = 1$ cup of cream
$\frac{1}{8}$ cup of butter	$\frac{1}{8} \times 4 = \frac{1}{2}$ cup of cream

4. **A.** **Turkey Cooking Times**

Number of Pounds	Number of Hours
10	$10 \times \frac{3}{4} = \frac{30}{4} = 7\frac{2}{4} = 7\frac{1}{2}$
11	$11 \times \frac{3}{4} = \frac{33}{4} = 8\frac{1}{4}$
12	$12 \times \frac{3}{4} = \frac{36}{4} = 9$
13	$13 \times \frac{3}{4} = \frac{39}{4} = 9\frac{3}{4}$
14	$14 \times \frac{3}{4} = \frac{42}{4} = 10\frac{2}{4} = 10\frac{1}{2}$
15	$15 \times \frac{3}{4} = \frac{45}{4} = 11\frac{1}{4}$

   B. 9 hours

   C. Solution strategies will vary. Possible strategy:



$$12 \times \frac{3}{4} = \frac{3}{4} \times 12$$
$$= 9$$

Name _____ Date _____

Turkey and Potatoes

1. Use models, drawings, number lines, mental math, or paper and pencil to solve the problems.

   A. $\frac{3}{5} \times 10 =$ _____

   B. $\frac{4}{7} \times 5 =$ _____

   C. $9 \times \frac{2}{3} =$ _____

2. Show or tell how to solve $\frac{2}{5} \times 3$ using fraction circle pieces, a drawing, or a number line. Include a number sentence.

3. This mashed potatoes recipe serves 4. Change it so that it will serve 16. Include number sentences. Write your answers in simplest form. Do not leave any improper fractions.

Mashed Potatoes

Original Recipe Serves ___4___	Revised Recipe Serves ___16___
$1\frac{1}{2}$ pounds of potatoes	
$\frac{2}{3}$ teaspoon of salt	
$\frac{1}{4}$ cup of cream	
$\frac{1}{8}$ cup of butter	

Assessment Master TG • Grade 5 • Unit 10 • Lesson 7 1

Teacher Guide - Page 1

Name _____ Date _____

4. Luis's mother is cooking a turkey. The turkey needs to cook $\frac{3}{4}$ of an hour for every pound it weighs.

   A. Complete the table.

Turkey Cooking Time

Number of Pounds	Number of Hours
10	$10 \times \frac{3}{4} =$
11	$11 \times \frac{3}{4} =$
12	$12 \times \frac{3}{4} =$
13	$13 \times \frac{3}{4} =$
14	$14 \times \frac{3}{4} =$
15	$15 \times \frac{3}{4} =$

   B. How long does Luis's mother need to cook a 12-pound turkey? Write your answer in simplest form. Do not leave any improper fractions.

   C. Solve $12 \times \frac{3}{4}$ another way to check your answer in Question 4B. Show your work. Include a number sentence.

2 TG • Grade 5 • Unit 10 • Lesson 7 Assessment Master

Teacher Guide - Page 2