

Support Coach

۲

6 TARGET Foundational Mathematics

Dear Educator,

We are pleased to provide for you the new edition of *Support Coach*. This program has been built to meet the new, higher standards for Mathematics and contains the rigor that your students will need. We believe you will find it to be an excellent resource for targeted instruction, practice, and assessment.

The Triumph Learning Team

۲

Support Coach, Target: Foundational Mathematics, First Edition, Teacher's Manual, Grade 6 548NATE ISBN-13: 978-1-62928-528-3

Triumph Learning® 136 Madison Avenue, 7th Floor, New York, NY 10016

© 2014 Triumph Learning, LLC. All rights reserved. No part of this publication may be reproduced in whole or in part, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without written permission from the publisher.

۲

Printed in the United States of America. 10 9 8 7 6 5 4 3 2 1

Contents

Student Edit	ion Contents
Instructiona	I Overview
Student Edit	ion Overview
Teacher's Ma	anual: An Annotated Guidexi
Lesson 1	GCF and LCM
Lesson 2	 Operations with Decimals
Lesson 3	 Dividing Fractions by Fractions
Lesson 4	 Ratios
Lesson 5	 Solving Problems with Unit Rates
Lesson 6	 Percents
Lesson 7	 Locating Rational Numbers on a Number Line
Lesson 8	 Absolute Value

۲

Duplicating this page is prohibited by law. © 2014 Triumph Learning, LLC

۲

۲

Lesson 9	Ordering Rational Numbers
Lesson 10	 Numerical Expressions
Lesson 11	 Evaluating Expressions using Order of Operations
Lesson 12	 Evaluating Algebraic Expressions
Lesson 13	 Solving Equations
Lesson 14	Inequalities
Lesson 15	 Independent and Dependent Variables
Lesson 16	 Surface Area
Lesson 17	Volume

Volume

iv contents

M_548NA_TM_6.indd 4

۲

8/12/14 9:06 AM

۲

Lesson 18	 Drawing Polygons on the Coordinate Plane
Lesson 19	Box Plots
Lesson 20	 Histograms
White Paper Build Mathe	: Instructional Strategies that matical Proficiency163
Appendix: M	lath Tools
Appendix: C	orrelations Charts

۲

۲

Student Edition Contents

۲

Contents

Lesson 1	GCF and LCM	
Lesson 2	Operations with Decimals	
Lesson 3	Dividing Fractions by Fractions	
Lesson 4	Ratios 34	
Lesson 5	Solving Problems with Unit Rates	
Lesson 6	Percents	
Lesson 7	Locating Rational Numbers on a Number Line	
Lesson 8	Absolute Value	
Lesson 9	Ordering Rational Numbers 84	
Lesson 10	Numerical Expressions	
Lesson 11	Evaluating Expressions using Order of Operations104	
Lesson 12	Evaluating Algebraic Expressions114	
		,

<text><text><text><text><image><image>

vi STUDENT EDITION CONTENTS

© 2014 Triumph Learning, LLC

M_548NA_TM_6.indd 6

۲

۲

Lesson 13	Solving Equations 124
Lesson 14	Inequalities
Lesson 15	Independent and Dependent Variables 144
Lesson 16	Surface Area154
Lesson 17	Volume
Lesson 18	Drawing Polygons on the Coordinate Plane \dots 174
Lesson 19	Box Plots
Lesson 20	Histograms
Glossary	
Math Tools	

Duplicating any part of this book is prohibited by law. © 2014 Triumph Learning, LLC

۲



۲

© 2014 Triumph Learning, LLC

۲

Instructional Overview

This mathematics skills and concepts program provides scaffolded instruction and support for students struggling with grade-level content. Aimed at students requiring strategic intervention—specifically, those students missing a critical foundation for grade-level understandings—*Support Coach* reflects a careful analysis of the prerequisites of key gradelevel skills. This means that students will be able to rehearse and review prior skills that will ensure competency at a specific grade.

۲

The program consists of three components:

- Student Edition Worktext
- Comprehensive Teacher's Manual with reduced, annotated Student Edition pages
- Assessment Booklet containing lesson quizzes, two performance tasks for each of the five domains, and two practice tests

Student Edition Overview

The Student Edition features 20 key lessons. While each lesson connects to prior foundational skills and concepts, it can be viewed as an independent unit of instruction. In this way, the 20 lessons allow teachers to differentiate instructions according to the requirements of each student.

Key to the philosophy behind *Support Coach* is the recognition that math skills and concepts are part of a progression that begins early in students' lives and continues beyond their current grade level with increased complexity and depth.

For students, achieving true understanding at any grade level means mastery of prior content that connects to this grade and mastery of content that connects within the grade. Often, students who cannot cope with a specific part of their grade's curriculum are missing one or more understandings that would allow mastery. *Support Coach* supplies the missing pieces.

VIII INSTRUCTIONAL OVERVIEW

۲

۲

Lesson Structure

Each lesson is divided into three parts: **Plug In**, **Power Up**, and **Ready to Go**. The first two parts provide students with a review and practice of the prerequisite content necessary for success. The Plug In component reacquaints students with skills and concepts that are foundational to performing at grade level. Power Up picks up from Plug In to add another layer of prerequisite content that ensures a smooth transition to Ready to Go. This section affords an opportunity for instruction. Each part highlights key vocabulary and supplies sufficient practice to ensure mastery before moving forward. Ready to Go, the on-grade-level portion of the lesson, ends with an important emphasis on problem solving.

۲

PLUG IN	POWER UP	GO!
Foundational skill remediating specific content	Transitional skill connects Foundational skill to Target skill	Target skill on grade level

A Lesson Link is included to show both teachers and students how these skills connect!



۲

۲

Using Support in the Classroom

The broad outline of *Support Coach's* features suggests that the best way to use it in your classroom is to take advantage of its versatility. This means that even as *Support Coach* aims to help bring students to grade-level competency, there are many ways to implement it:

 $(\mathbf{0})$

- Support Coach can be used with any other set of materials you are using for Mathematics.
- The lessons do not have to be taught in a particular sequence.
- You can use *Support Coach* with one or many students at any given time.
- Support Coach can be used in the classroom, at home, in after-school programs, and in summer programs.
- You can use several levels of *Support Coach* at any grade to assist students who have missed earlier skills.

The most important aspect of *Support Coach* is that it digs to uncover elements that are missing from the hierarchy of math skills and concepts and assists students who have forgotten or never mastered these elements. This applies to any student who struggles when encountering new content.



X INSTRUCTIONAL OVERVIEW

© 2014 Triumph Learning, LLC

۲

۲

Teacher's Manual: An Annotated Guide

Support Coach Teacher's Manual provides all the instructional support you need to help your students achieve mastery of key grade-level skills.

۲

Lessons in this Teacher's Manual include the following features:

- A Lesson Overview chart detailing objectives for each section, concepts and skills, and key vocabulary terms
- A list of required and suggested Materials
- **Spotlight on Mathematical Practice** notes that support teachers at point-of-use to develop strong mathematical behaviors in their students
- **Spotlight on Mathematical Language** provides a series of prompts using appropriate mathematical language and terms that are designed to elicit similar mathematical language from students
- **English Language Learner** notes included at point-of-use to prepare teachers for the diverse needs of the student population
- Common Error notes that provide insight into student misconceptions at point-of-use
- Robust **Discussion Support** that includes Prompts and Sentence Starters to facilitate mathematical discourse
- Observation-Action tables that outline how teachers can address specific student needs during independent practice
- A Lesson Link that outlines how each section of the lesson connects and works to bring the student to the on-level standard

۲

۲

Plug In Pages



A breakdown of the lesson's components helps you plan.

The Materials list details the required and suggested tools for each section.

Introduce and Model

outlines how to introduce a topic and model thinking and problem solving.

۲



mpt: How does the number of parts in the quotient compare to the number of parts in the unit fraction?

a Whole number. Ask: Why is the new denominator 10? a whole number. Ask, why is the new demonstration to:
 a Monitor that students write the whole-number divisor as a fraction before finding the reciprocal. Remind them to multiply numerators and then denominators when finding the product of two fractions.

Ask students to complete practice items 1–6 on page 25 independently or in pairs. Monitor ongoing work.

Observe whether students are able to divide a unit fraction by a whole number correctly using the reciprocal. Use the chart below, as needed, to address any difficulties.

Encourage students to draw a rectangular model and divide it into the number of equal parts shown by the whole-number divisor. Then have them rework the problem using the reciprocal. Have

ers and help the

Sentence Starter: The unit fraction is divided into smaller

Model Application

Practice and Assess

Students have difficulty using the reciprocal to divide a unit fraction by a whole number.

© 2014 Triumph Learning, LLC

۲

Support is included for guiding students through the gradual release of modeling to independent practice.

Each section of the student lesson culminates in an independent practice set.

DIVIDING FRACTIONS BY FRACTIONS 19

0 1-2- 1

0 i....

use the **unit**

The Observation-Action table offers suggestions for addressing certain behaviors students may exhibit during independent practice.

XII TEACHER'S MANUAL: AN ANNOTATED GUIDE

© 2014 Triumph Learning, LLC

۲

Power Up Pages

Each section of the lesson has specific objectives, concepts and skills, and key vocabulary.

Support for English
Language Learners is
embedded throughout
instruction.

۲

ONAL	Dividing Unit Fractions by Whole Numbers	 Divide unit fractions by whole numbers, using models and reciprocals to find the quotient. 	Inderstand division of a unit fraction by a whole number, and find the quotient.	 unit fraction reciprocal
FOUNDA''	POWER UP Dividing Whole Numbers by Unit Fractions Student Edition pp. 26–27	 Divide whole numbers by unit fractions, using models and reciprocals to find the quotient. 	Understand division of a whole number by a unit fraction, and find the quotient.	
ON-LEVEL TARGET	READY TO GO Dividing Fractions by Fractions	 Divide fractions by fractions, using models, equations, and reciprocals to find the quotient. 	Understand and find the quotients of fractions, and solve word problems involving division of a fraction by a fraction.	
MATT • Blai (sug • Indi • Tap	ERIALS Ink sheets of paper ggested) ex cands (suggested) e (suggested)	Build Backgr • Talk to students al fraction in real life student needs ½ of opape? Explain answer this questi • Have students they numbers by unit fi Introduce an • Introduce Conce dividing whole n.	Dund Sourt reasons to divide a whole num. For example, there are 10 sheets of heet. How many halves can be mac that dividing a whole number by a ion. cuss additional examples of real sit a whole number by a unit fraction. will use models and reciprocals to ractions. d Model pts Guide students through the inf mibers by unit fractions. Remind at found for any fractions, notizing for a found for any fractions, notiging for a	ber by a unit of paper. Each de from 10 sheets unit fraction can uations in which divide whole formation about udents that the whole number
ENG LEAR Help ident divisc probl DIVIS DIVIS Volun tape t each divid.	LISH LANGUAGE INERS ELL students with ifying the dividend and <i>x</i> . Write a few division lems on the board. Write OR on one card and DEND on the other. Have teers come forward and the index cards below problem to label the end and divisor. Repeat	written as a fractic unit fraction to sol in this problem. • Support Discussi discussion. Refer them identify the fraction. Prompt: In the quoti Sentence Star	on. Emphasize that students use the ve the problem because the unit fri- ion Have partners discuss briefly be students to the models in the introc whole number and the result of div model, which is greater, the divider nnt? ter: Each whole is divided into	reciprocal of the action is the diviso fore group luction and have iding by the unit

POWER UP

as necessary. 20 LESSON 3

Prompt: Into how many equal parts is the whole divided? Sentence Starter: The model is divided into...

 Ask students to complete practice items 1–5 on page 27 independently or in pairs. Monitor ongoing work. Observe whether students correctly divide a whole number by a unit fraction. Use the chart below, as needed, to address any difficulties. Action

Have students recopy the problem. In the copied problem, change the division symbol to the multiplication symbol, and write the reciprocal of the unit fraction before solving. Draw a model to check the answer.

Practice and Assess

s divide by ominator of ion, instead of e reciprocal of fraction.

© 2014 Triumph Learning, LLC

۲

Dividing Whole Numbers by Unit Fractions



Dividing Wi 3 000 000 s - j - <u>20</u> The resignment of $\frac{1}{6}$ is $\frac{6}{1}$ is $\frac{6}{1}$ 2 + $\frac{1}{6}$ - 2 × $\frac{6}{-12}$ 2 + $\frac{1}{6}$ - $\frac{12}{-12}$ $\overset{\bullet}{\oplus}\overset{\bullet}{\bullet}{\bullet}\overset{\bullet}$ •---<u>--</u> **** a -) - <u>10</u> Divide by using the r $7 + \frac{3}{2} = \frac{21}{2}$ Q and - 40 1 a - 1 - 27 Model Application Guide students through using a model to divide a whole number by a unit fraction. Remind students that the quotient is the number of equal parts shown after each whole is divided.
 Remind students each whole must be divided into equal fourths. urage students to use Second Second

What does the whole-numbe dividend tell you about the

the quotient greater than o ss than the whole-number

w is the unit fraction

DIVIDING FRACTIONS BY FRACTIONS 21

The Spotlight on **Mathematical Practices** box provides embedded professional development.

C	2014	Triumph	Learning,	LLC
---	------	---------	-----------	-----

Mathematical Discourse

is included in every

lesson. Prompts and

Sentence Starters are

discussion.

outlined to help facilitate

TEACHER'S MANUAL: AN ANNOTATED GUIDE XIII

۲

Ready to Go Pages

READY TO GO Dividing Fractions by Fractions

		OBJECTIVES	CONCEPTS AND SKILLS	VOCABULARY
NTO NAL ANDING	PLUG IN Dividing Unit Fractions by Whole Numbers	• Divide unit fractions by whole numbers, using models and reciprocals to find the quotient.	Understand division of a unit fraction by a whole number, and find the quotient.	 unit fraction reciprocal
FOUND	POWER UP Dividing Whole Numbers by Unit Fractions	• Divide whole numbers by unit fractions, using models and reciprocals to find the quotient.	Understand division of a whole number by a unit fraction, and find the quotient.	
ON-LEVEL TARGET	► READY TO GO Dividing Fractions by Fractions Student edition pp. 28=33	 Divide fractions by fractions, using models, equations, and reciprocals to find the quotient. 	Understand and find the quotients of fractions, and solve word problems involving division of a fraction by a fraction.	

۲

Build Background

MATERIALS • Lesson 3 Quiz, Assessment Manual pp. 8–9 • Lesson 3 Quiz Answer Key, Assessment Manual • Math Tool: Fraction Strips, pp. A 11, A12 (Student Edition pp. 229, 231) • Grid paper (suggested)

ENGLISH LANGUAGE LEARNERS

LEARNERS Help ELL students understand how unit fractions relate to other fractions with the same denominator as the unit fraction. For example, the fraction 2 is made of two 2 junt fractions. The numerator tells the number of unit fractions needed to represent that fraction. Have students use grid paper to model the groups

grid paper to model the group of unit fractions that make up

 $\frac{3}{4}, \frac{2}{6}, \text{ and } \frac{4}{5}.$

22 LESSON 3

 Talk to students about reasons to find quotients of fractions in real life. For example, Barb has 3 pound of green beans. A recipe calls for ²/₂ pound of beans for one serving of stalad. How many servings of stalad can Barb make? Explain that finding the quotient of the two fractions can answer this question.
 Have students discuss additional examples of real situations that require

Finding quotients of fractions. = Tell students of fractions.

Introduce and Model

 Introduce Concepts Guide students through the information about finding quotients of fractions. Emphasize that only the divisor, or the second fraction, is written as a redprocal. Remind students that to simplify the quotient means to write the fraction in lowest terms.
 Support Discussion Have partners discuss briefly before group discussion. If needed, distribute sheets of paper to allow students to draw the model.

Prompt: Which fraction do you model first? How do you model the second fraction? Sentence Starter: The model shows the quotient...

LESSON LINK Connect to Foundational Understanding Skills learned in the Plug In and Power Up are referenced in the Lesson Link. Explain that, when a fraction is divided by a fraction, the dividend is being divided into a greater number of smaller parts.

© 2014 Triu

The **Lesson Link** connects the foundational skills from the Plug In and Power Up sections to the on-level standard in the Ready to Go section.

۲



XIV TEACHER'S MANUAL: AN ANNOTATED GUIDE

© 2014 Triumph Learning, LLC

Ready to Go Pages



۲

© 2014 Triumph Learning, LLC

TEACHER'S MANUAL: AN ANNOTATED GUIDE

DIVIDING FRACTIONS BY FRACTIONS 25

۲

 (\bullet)

Assessments

The Assessment Booklet contains lesson quizzes, two performance tasks for each of the five domains, and two practice tests.

۲

Each Lesson Quiz helps you evaluate students' understanding of the skills taught in the lesson and determine whether they are prepared to move on to new material.

There are ten Performance Tasks in the Assessment Booklet. The two Performance Tasks have a task-specific rubric. The first of the two tasks is a bit easier than the second—which allows teachers to differentiate instruction on performance task practice.

Practice Test 1 can be administered before students begin the lessons in the Student Edition. The results allow you to establish a baseline measure of students' mathematics proficiency before starting the Student Edition lessons. You can then use Practice Test 2 to measure students' progress after completing the program.

The answer keys for the Lesson Quizzes, Performance Tasks, and Practice Tests identify the correct answers.





XVI ASSESSMENTS

© 2014 Triumph Learning, LLC

۲

۲

GCF and LCM

PLUG IN Factor Pairs

		OBJECTIVES	CONCEPTS AND SKILLS	VOCABULARY
ONAL	PLUG IN Factor Pairs Student Edition pp. 4–5	 Find factor pairs of a number using a multiplication table or array. 	Find factor pairs for a whole number in the range 1–100	• factor • factor pair • product
FOUNDATI	POWER UP Multiples	 Decide if a number is a multiple of another number. Find multiples of a number. 	Understand that a whole number is a multiple of each of its factors. Determine whether a whole number in the range 1–100 is a multiple of a number.	• multiple
ON-LEVEL TARGET	READY TO GO GCF and LCM	 Find a greatest common factor. Find a least common multiple. 	Find the greatest common factor of two whole numbers and the least common multiple of two whole numbers.	 greatest common factor (GCF) least common multiple (LCM)

۲

MATERIALS

۲

- Math Tool: Multiplication Table, p. A2 (Student Edition p. 211)
- Math Tool: Two-color Counters, p. A27 (Student Edition p. 261)

ENGLISH LANGUAGE LEARNERS

ELL students may need additional support for understanding the concept of *factor pairs*. Explain that factor pairs are part of multiplication facts. Have students write each of the basic multiplication facts that have a product of 8. Explain that the factors in each fact make up the factor pairs of 8.

2 LESSON 1

Build Background

- Talk to students about reasons to find factor pairs in real life. For example, you have 12 square tiles. You want to arrange the tiles in a rectangle that is short and wide. Explain that you can use the factor pairs of 12 to decide how to arrange the tiles.
- Encourage students to discuss additional examples of real situations that involve finding factor pairs.
- Tell students they will learn different methods for finding factor pairs.

Introduce and Model

- Introduce Concepts and Vocabulary Guide students through the information about finding factor pairs. Emphasize that every number has at least one factor pair, 1 and itself. Use Words to Know to clarify students' understanding of vocabulary. Have students demonstrate to a partner their understanding of factor, factor pair, and product.
- **Support Discussion** Have partners discuss briefly before group discussion. As needed, direct students to **Words to Know** and remind students to think about the one factor pair every number has.

Prompt: What factor pair does every number have? **Sentence Starter:** Every number has at least...

۲

GCF and LCM	CF and LCM You can use counters to find factor pairs of a number. Find all the factor pairs of 30.
<text></text>	9 Write the factor pair that has 1 as 1×30 a factor. 9 Arrange counters in equal rows and columns to show as many factor pairs as you can. 9 Write the factor pairs that the models show. 10 The factor pairs are 1×30 , 2×15 , 3×10 , and 5×6 10 You can use a multiplication table to find factor pairs of a number. 10 Write the first factor pairs of 20. 10 Write the first factor pairs of 20. 11 $\times 20$ = 20 22 $\times 10$ = 20, 4×5 = 20 5 $\times 4$ = 20, 10×2 = 20 12 Look in the multiplication table for all the 20. Write equations for each product of 20. 10 Write the factor pairs. 1×20 = 20, 4×5 = 20 10 $\times 2$ = 20. 11 $\times 20$, 2×10 = 20, 4×5 = 20. 12 $\times 10$, and 4×5 13 $\times 10$, and 4×5
factor a number that is multiplied in a multiplication sentence $2 \times 3 \times 9 = 54$ 2, 3, and 9 are factorsfactor pair two factors that can be multiplied together to get a product $18 \times 3 = 54$ $18 \times 3 = 54$ 18×3 is a factor pair of 54.product the answer to a multiplication problem $18 \times 3 = 54$ 54 is the product of 18×3 .Toolspan="3">Toolspan="3">Toolspan="3" See every number have a factor pair?Yes. Possible response: Every number has at least one factor pair, 1 and the number itself.	Factor pairs: 1×16 , 2×8 , 4×4 Complete the factor pairs. Use a multiplication table. 2 15 25 49 $\frac{1}{3} \times \frac{15}{5}$ $\frac{1}{5} \times \frac{25}{5}$ $\frac{1}{7} \times \frac{49}{7}$

Model Application

۲

DO A Guide students through using counters to find all the factor pairs of a number. Explain that each array will represent a factor pair.

DO B Explain that a multiplication table can also be used to find factor pairs of a number. Remind students that they will not find 20 in every column or row.

Practice and Assess

- Ask students to complete practice items 1–4 on page 5 independently or in pairs. Monitor ongoing work.
- Observe whether students are finding all the factor pairs. Use the chart below, as needed, to address any difficulties.

Observation	Action
Students struggle finding all of the factor pairs of a number.	Have students check each number in a systematic way. Ask: Is there a basic fact that has 1 as a factor and this number as a product? Is there a basic fact that has 2 as a factor and this number as a product? Have them continue until the factor being checked equals half the product.

SPOTLIGHT ON MATHEMATICAL PRACTICES

Find a Pattern

Help students find a pattern by asking probing questions:

- Would the digit in the ones place be even or odd?
- Do all odd numbers have only one factor pair?

© 2014 Triumph Learning, LLC

POWER UP Multiples

		OBJECTIVES	CONCEPTS AND SKILLS	VOCABULARY
	PLUG IN Factor Pairs	 Find factor pairs of a number using a multiplication table or models. 	Find factor pairs for a whole number in the range 1–100	• factor • factor pair • product
FOUNDATI	POWER UP Multiples Student Edition pp. 6–7	 Decide if a number is a multiple of another number. Find multiples of a number. 	Understand that a whole number is a multiple of each of its factors. Determine whether a whole number in the range 1–100 is a multiple of a number.	• multiple
ON-LEVEL TARGET	READY TO GO GCF and LCM	 Find a greatest common factor. Find a least common multiple. 	Find the greatest common factor of two whole numbers and the least common multiple of two whole numbers.	 greatest common factor (GCF) least common multiple (LCM)

 $(\mathbf{0})$

MATERIALS

۲

• Number cube (suggested)

ENGLISH LANGUAGE LEARNERS

ELL students may need extra support for understanding the concept of *multiples*. Explain that multiples are found by multiplying a number by other whole numbers. Have students find multiples of 3 by multiplying it by 1, 2, 3, 4, 5, and 6.

4 LESSON 1

Build Background

- Talk to students about reasons to find the multiples of a number in real life. For example, you have to practice piano every third day of the month. Today is the 6th and you want to know the date on which you will next have to practice. Explain that finding the multiples of 3 is one way to answer the question.
- Have students discuss additional examples of real situations in which they would need to find the multiples of a whole number.
- Tell students they will find the multiples of given whole numbers.

Introduce and Model

- Introduce Concepts and Vocabulary Guide students through the information about using the multiplication table to find multiples. Emphasize that each number within the multiplication table is a multiple of the numbers at the beginning of the given column and row. Use Words to Know to clarify students' understanding of vocabulary. Have students demonstrate to a partner their understanding of *multiple*.
- Support Discussion Have partners discuss briefly before group discussion. As needed, direct students to the column or row that begins with 5.

Prompt: Which column or row should you look at? **Sentence Starter:** 5×1 is 5, 5×2 is ...

۲

Nutriples Intersentence 32 = 4 × 8, 32 is a multiple of 4 and 8. Use a multiple cation table to tell if a number is a multiple of another number. Is 24 a multiple of 67 • Follow the column down to 24, so 24 is a multiple of. • Follow the column down to 24, so 43 is a multiple of. • Follow the row across from 24, so 41 is a number of the beginning of the row, 4. This means that 24 is also a multiple of 4.	1 GCF and LCMImage: Second Secon
multiple a number that is the product of a given number and another number $2 \times 3 = 6$ 6 is a multiple of both 2 and 3.	Image: Second set of the missing multiples are missing. Image: Second set of the missing multiples of the missing multiples of the missing multiples of the missing multiples are missing. Image: Second set of the missing multiples of the missing multiples are missing. Image: Second set of the missing multiples of the missing multiples are missing. Image: Second set of the missing multiples of the missing multiples are missing. Image: Second set of the missing multiples of the missing multiples are missing. Image: Second set of the missing multiples are missing mult
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	How do you know if a number is a multiple of another number? Possible response: If the number can be divided evenly by the other number, it is a multiple of that number. Write is or is not to tell if the number is a multiple of the other number. 1 28 <u>is</u> a multiple of 7. 2 48 <u>is not</u> a multiple of 9. Fill in the missing multiples. 2 Multiples of 4: 4, 8, <u>12</u> , 16, 20, 24, <u>28</u> , 32, <u>36</u> 3 Multiples of 7: 7, 14, 21, <u>28</u> , 35, 42, <u>49</u> , <u>56</u> , <u>63</u> , 70
6 LESSON 1	7 7

Model Application

۲

DO Guide students through using a multiplication table to determine if a number is a multiple of another number. Monitor that students list all of the multiples of 3 shown in the multiplication table.

DO B Explain that multiplication facts can be used to find multiples. Monitor that students find the correct products.

DO C Monitor that students find all the missing multiples.

 Support Discussion Have partners discuss briefly before group discussion. As needed, remind students that multiplication and division are related.

Prompt: Can you divide one number into the other number? **Sentence Starter:** I can divide...

Practice and Assess

- Ask students to complete practice items 1–4 on page 7 independently or in pairs. Monitor ongoing work.
- Observe whether students correctly identify each multiple. Use the chart below, as needed, to address any difficulties.

Observation	Action
Students identify numbers that are not multiples of the given number.	Have students check each number in a systematic way. Tell students: Begin by multiplying the given number by 1; the product is a multiple of the given number. Multiply the given number by 2. Continue, using 3, 4, 5, 6, 7, 8, and 9 as factors.

© 2014 Triumph Learning, LLC

FOCUS ON FLUENCY

Have students roll a number cube. Ask them to make a list of the first 10 multiples of the number shown on the number cube.

esson

GCF AND LCM 5

۲

READY TO GO GCF and LCM

		OBJECTIVES	CONCEPTS AND SKILLS	VOCABULARY
	PLUG IN Factor Pairs	 Find factor pairs of a number using a multiplication table or models. 	Find factor pairs for a whole number in the range 1–100	• factor • factor pair • product
FOUNDATIO	POWER UP Multiples	 Decide if a number is a multiple of another number. Find multiples of a number. 	Understand that a whole number is a multiple of each of its factors. Determine whether a whole number in the range 1–100 is a multiple of a number.	• multiple
ON-LEVEL TARGET	READY TO GO GCF and LCM Student Edition pp. 8–13	 Find a greatest common factor. Find a least common multiple. 	Find the greatest common factor of two whole numbers and the least common multiple of two whole numbers.	 greatest common factor (GCF) least common multiple (LCM)

MATERIALS

()

- Lesson 1 Quiz, Assessment Manual pp. 4–5
- Lesson 1 Quiz Answer Key, Assessment Manual
- Math Tool: Grid Paper, p. A17 (Student Edition p. 241)
- Math Tool: Two-Color Counters, p. A27 (Student Edition p. 261)

ENGLISH LANGUAGE LEARNERS

ELL students may need additional support for understanding the term GCF. Write two whole numbers on the board and list the factors. Have students circle the factors that appear in both lists. Then, have students determine which factor they would say last when counting from 1.

6 LESSON 1

Build Background

- Talk to students about reasons to find the greatest common factor (GCF) and the least common multiple (LCM) in real life. For example, Jasmine has 8 red napkins and 20 green napkins. She wants to put the same number of red napkins and green napkins on each table. What is the greatest number of tables Jasmine can use and have no napkins left over? Explain that finding the GCF is one way to answer the question.
- Encourage students to discuss additional examples of real situations that require finding the GCF and the LCM.
- Tell students they will find the GCF of two whole numbers and the LCM of two whole numbers.

Introduce and Model

۲

- Introduce Concepts and Vocabulary Guide students through the information about finding the GCF and the LCM. Use Words to Know to clarify students' understanding of vocabulary. Have students describe greatest common factor and least common multiple to a partner.
- Support Discussion Have partners discuss briefly before group discussion. As needed, work together to list multiples of two numbers.

Prompt: Do you need to find more than one common multiple? **Sentence Starter:** I need to find the least common multiple, which means I can stop...

© 2014 Triumph Learning, LLC

M_548NA_TM_6.indd 6

8/7/14 3:26 PM

 (\bullet)

()

EADY TO GO	GCF and I	LCM	mmon multiple (ICM) of		WORK TOGETHE	R	The GCF can new be greater that the numbers you start with.
had us graat the factors of each the factors they have in comm atest factor that appears in both tors of 14: 1, 2, 2, 14 tors of 35: 1, 5, 2, 35 common factors of 14 35 are 1 and 7. greatest factor in both is 7.	number. Then on. Look for the h lists.	No numbers, list the number. Then find common. Look for line oth lists. Multiples of 4: 4, 8, Multiples of 6: 6, <u>12</u> 12 and 24 are two The least multiple in	he first few multiples of each the multiples they have in the least multiple that appears 12 , 16, 20, 24 1, 18, 24 , 30, 36 common multiples of 4 and 6. to both lists is 12 .	•	f two numbers. Find the greatest common factor of 18 and 12. The rectangles show the factor pair and factors of 18 and 12. The factors that 18 and 12 have in common are 1, 2, 3, and 6. The greatest common factor is 6.	Factors of 18: f 1, 2, 3, 6, 9, 18 2×9 rs 3×6 1×12 Factors of 12: 1, 2, 3, 4, 6, 12 2×6	
greatest common factor (GC the common factor of two num the highest value Factors of 18: 12, 3, 6, 9, 18 Factors of 27: 1, 3, 9, 27 The GCF of 18 and 27 is 9.	F) ibers that has en you can stop listir n stop listing mu	least common multi the common multi the smallest value Multiples of 3: 3, 6 Multiples of 8: 8, 11 The LCM of 3 and 8 ag multiples when fa	Ittiple (LCM) ble of two numbers that has ,9, 12, 15, 18, 21, 24, 27 5, 24, 32 is 24. inding the LCM? u find at least one	יייים דרק אינער אינע אינער אינער אינע	 You can use Grid Paper to find th Find the GCF of 42 and Draw rectangles to find the factor pairs of 42 and 56. List the factors. Write the factors that 42 and 56 have in common. Write the greatest common factor. 	e GCF of two numbers. 156. Factors of 42: <u>1</u> <u>2</u> <u>3</u> <u>6</u> <u>7</u> <u>7</u> Factors of 56: <u>1</u> <u>2</u> <u>4</u> <u>7</u> <u>8</u> <u>7</u> The common factors are <u>1</u> <u>2</u> <u>7</u> The GCF is <u>14</u>	Grid Paper can be found on p. 241. 14, 21, 42 14, 28, 56 , and 14.
PLUG IN a can use arrays or a itriplication table to help uf ind factor pairs of a mber. 2 × 3 is a factor pair of 6.	You can use multifacts to help you multiples. $4 \times 1 = 4$ $4 \times 2 = 8$ $4 \times 1_{1} = 4$ $4 \times 2 = 8$ $4 \times 1_{1} = 4$ $4 \times 2 = 8$ $4 \times 1_{1} = 4$ $4 \times 2 = 8$ $4 \times 1_{1} = 4$ $4 \times 2 = 8$ $4 \times 1_{1} = 4$ $4 \times 2 = 8$ $4 \times 1_{1} = 4$ $4 \times 2 = 8$ $4 \times 1_{1} = 4$ $4 \times 2 = 8$ $4 \times 1_{1} = 4$ $4 \times 2 = 8$ $4 \times 1_{1} = 4$ $4 \times 2 = 8$ $4 \times 1_{1} = 4$ $4 \times 2 = 8$ $4 \times 1_{1} = 4$ $4 \times 2 = 8$	Plication find $\times 3 = 12$ $\times 4 = 16$ e some	GD! I seal Knowing how to find factors and multiples will help me find the GEF or LCM of two numbers.	y part of this book is prohibiod by law. © 2014 Thamph L y part of this book is prohibiod by law. © 2014 Thamph L	Zach used counters to 1	find the LCM of 2 and 3.	I need to multiply when finding the LCM.

۲

LESSON LINK

۲

Connect to Foundational Understanding Skills learned in the **Plug In** and **Power Up** are referenced in the **Lesson Link**. Explain that knowing how to find factors and multiples enables students to find the GCF or LCM of two numbers.

• Work Together Explain to students that they will use grid paper to find the GCF. Begin by looking at the rectangles that model 18 and 12. Point out the factors that are used in both rectangles. Then find the greatest factor that is used in both rectangles.

DO A Monitor students as they draw their rectangles. Remind students to look for the factors that are used in the rectangles for both numbers.

• **Support Discussion** Have partners discuss briefly before group discussion. As needed, have students list some multiples of 2 and 3.

Prompt: Which multiple(s) do 2 and 3 have in common? **Sentence Starter:** The counters show...

COMMON ERRORS

Students may confuse factors and multiples. Have students think of the word multiply when finding a multiple. Remind students that a multiple is the result when you multiply a number by another whole number.

esson



ADDITIONAL PRACTICE

Provide students with additional practice to model and solve: Find the GCF of each pair of numbers: 15 and 12 6 and 18 Find the LCM of each pair of numbers: 10 and 6 2 and 7

Support Independent Practice

1-6 Remind students to read the **REMEMBER**. If needed, ask: What are the factor pairs of each number?

7–10 Remind students to read the **HINT**. What are the multiples of each number? Which multiple is in both lists and is the least common multiple?

11–12 How can you use multiples to find the answer?

Support Discussion Have partners discuss briefly before group discussion. As needed, help students list multiples of each number.

Prompt: Is there a lesser number that is a common multiple of the two numbers?
 Sentence Starter: The number I found using Emma's method is...

Problem Solving

• **Model the Four-Step Method** Guide students through the four-step method using think-aloud strategies. Point out the GCF clue words *the same number* and *the greatest number*.

Think Aloud David wants to equally divide 12 apples and 20 pears and determine the greatest number of baskets he can make.

• **Support Problem-Solving Practice** Have students use the Checklist as they complete each step.

Prompt: Do you need to find multiples or factors of the two numbers?Prompt: Do you need the GCF or the LCM to solve the problem?

© 2014 Triumph Learning, LLC

SPOTLIGHT ON MATHEMATICAL LANGUAGE

Support students in using mathematical language as they work:

What is the GCF?

• What is the LCM?

8 LESSON 1

۲



• **Explore Student Thinking** Invite volunteers to explain how and why they found the GCF or LCM. Have partners compare their work on a problem and describe their results.

SPOTLIGHT ON MATHEMATICAL PRACTICES

Critiquing Others' Reasoning

Help students think critically about Emma's reasoning by asking probing questions:

- Did Emma find all of the multiples of each number?
- Does Emma's method find the common multiple with the least value?

Assess

۲

- Use the table below to observe whether students can accurately find the GCF and LCM of two whole numbers, and to address any difficulties, as needed, before the quiz.
- When students are ready, assign the Lesson 1 Quiz.

\mathbf{T}	Observation	Action
	Errors in finding the GCF and LCM of two whole numbers are frequent; general confusion about GCF and LCM.	Have students use counters to model the multiples and factor pairs of two whole numbers.
5	Observation	Action
	Makes occasional errors when finding the GCF and LCM of two whole numbers; some understanding of GCF and LCM.	Provide additional practice problems for finding the GCF and LCM of two whole numbers. Encourage students to model the lists of factors or multiples.
	Observation	Action
	Accurately determines the GCF and LCM of two whole numbers.	Assign the Lesson 1 Quiz.

© 2014 Triumph Learning, LLC

GCF AND LCM 9