



from
**GRAHAM FLETCHER &
TRACY JOHNSTON ZAGER**



Building Fact Fluency

A TOOLKIT FOR MULTIPLICATION & DIVISION



ZANER-BLOSER.COM
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Building Fact Fluency Through Conceptual Understanding

For years, teachers have been asking students to memorize their math facts, but somewhere between asking students to memorize their math facts in elementary school and then expecting students to use facts in practice, something isn't transferring.

It's for that reason math specialist Graham Fletcher and district math coach Tracy Johnston Zager created *Building Fact Fluency: A Toolkit for Multiplication & Division*—a comprehensive, research-based toolkit designed to help students learn math facts by developing deep, conceptual understanding and engaging in purposeful practice.

“Fact fluency means students *know* and can *use* their facts.”

— GRAHAM FLETCHER & TRACY JOHNSTON ZAGER



Graham Fletcher is a math specialist who is continually advocating for best practice in elementary mathematics by seeking new and innovative ways to support students and teachers in their development of conceptual understanding.



Tracy Johnston Zager is a district math coach who loves to get teachers hooked on listening to kids' mathematical ideas. Tracy edits professional books and is the author of *Becoming the Math Teacher You Wish You'd Had: Ideas and Strategies from Vibrant Classrooms*.

HOW It Works

With the *Building Fact Fluency* toolkit, students will be able to see how number facts connect to a wide variety of mathematical situations, explore the properties of the operations, and build a foundation of strategies they can draw from efficiently and with confidence.

Factors and Contexts

The *Building Fact Fluency* toolkit is designed around multiple contextual themes that invite students to explore 10 foundational and derived factors. Each of the factors is taught through three real-world contexts supported by a string of related activities, tasks, and games.

10 FACTORS, 30 REAL-WORLD CONTEXTS

2s	3s	4s	5s	6s
<ul style="list-style-type: none">• Toy Bikes• Honey Bears• Shoes	<ul style="list-style-type: none">• Tennis Balls• Stacking Blocks• Bobbers	<ul style="list-style-type: none">• Peaches• Coin Collection• Basketballs	<ul style="list-style-type: none">• Grapes• Crayons• Erasers	<ul style="list-style-type: none">• Eggs• Cupcakes• Toy Cars
7s	8s	9s	10s	Squares and Near Squares
<ul style="list-style-type: none">• Lemons• Gumballs• Balloons	<ul style="list-style-type: none">• Apple Slices• Paints• Emojis	<ul style="list-style-type: none">• Stickers• Tulips• Bookshelves	<ul style="list-style-type: none">• Bowling• Pencils• Bracelets	<ul style="list-style-type: none">• Sushi• Origami• Golf Balls

NOTE: 0s and 1s are interwoven throughout each factor.

Lesson String

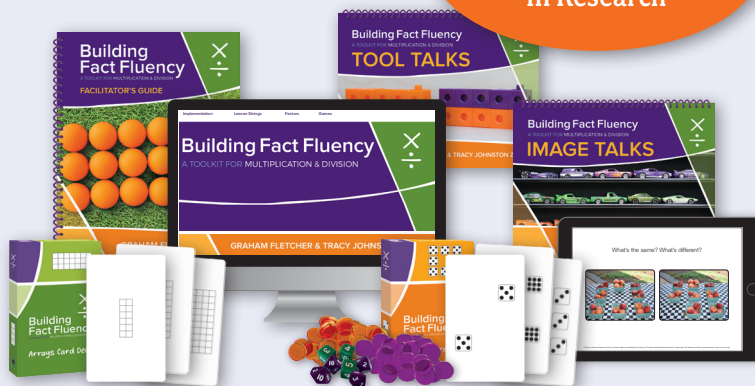
A Lesson String is a cluster of related activities, tasks, and games for each context. Over the course of a Lesson String, students will discuss vibrant images and solve problems using both informal and mathematical language as they mathematize situations. See pages 2–3 for Lesson String details.

Comprehensive
Lessons Grounded
in Research

WHO It's For

An ideal supplement to any curriculum or for any situation where students need additional fact fluency practice and review, *Building Fact Fluency* toolkit can be used for:

- ✓ Grades 3–5+ Classrooms
- ✓ Intervention
- ✓ English Language Learners
- ✓ Special Education
- ✓ After School, Summer School, and Tutoring



“Fluency builds from initial exploration and discussion of number concepts to using informal reasoning strategies based on meanings and properties of the operations to the eventual use of general methods as tools in solving problems.”

—National Council of Teachers of Mathematics, 2014

SAMPLE Lesson String Sequence

The Lesson Strings for each context are designed to provide intentional exploration, practice, and review of key number strategies, moving from introducing the concept through a 3-Act Math Task Video or an Image Talk to eventually connecting the strategy to more abstract problems.

Building Fact Fluency: A Toolkit for Multiplication & Division offers two full sets of Lesson Strings for each context—a Set A and a Set B—so students can make connections year by year while working with brand-new tasks and problems. Here’s a brief overview of Set A of the Peaches Lesson String, one of the 30 strings included in the toolkit.



3-ACT MATH TASK VIDEOS

Problem-based lessons that give students opportunities to mathematize the world, engage in mathematical modeling, and understand the structure of story problems (in English and Spanish)



TRY IT OUT!

Visit zaner-bloser.com/mathematics/building-fact-fluency/materials.php

1. Request a Sample of the Multiplication & Division Toolkit.
2. Access the “Peaches” Lesson String activities featured here.

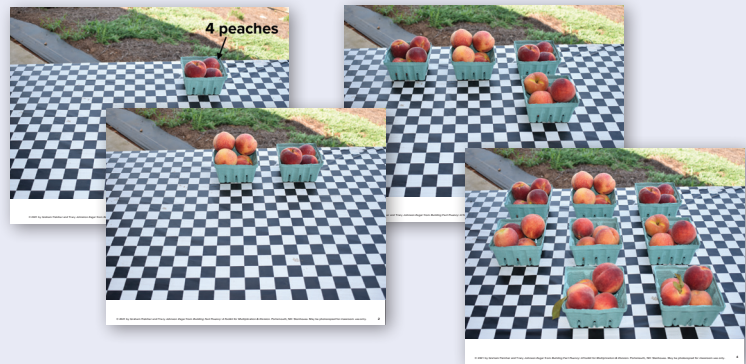
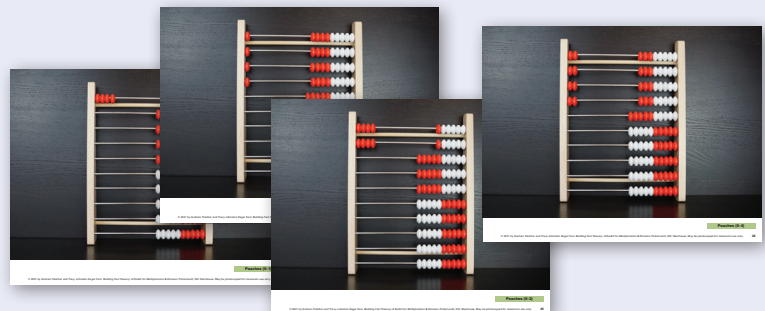


IMAGE TALKS

A series of photographs of everyday objects that invites students to make sense of multiplication in a context



TOOL TALKS

A series of photographs that provide opportunities for students to connect the meaning-making they’ve been doing with the context to slightly more abstract math tools

LESSON STRINGS...

- Align with research on how students develop fact fluency
- Build understanding of math relationships and encourage connections
- Can be used for whole-class or small-group instruction
- Supplement any math curriculum

GAMES FOR PURPOSEFUL PRACTICE (Games plus materials)

A set of highly-engaging games, including all the playing counters, dice, and downloadable game boards needed for whole-class number fact practice and fun (in English and Spanish)

Name: _____ Date: _____

Frankie picked peaches. If he wanted to pack them 4 to a basket, how many baskets would Frankie need?

[20] [36] [84]

CONTEXTUALIZED PRACTICE PROBLEMS

Story problems that provide ample opportunities for students to work deeply with the operations within each context and across all problem types, building connections with practice (in English and Spanish)

2 × 4

3 × 4

6 × 4

9 × 4

NUMBER TALKS

A series of expressions in which students talk about the different ways they can mentally solve decontextualized computation problems

OPTIONAL ROUTINES

For additional practice, support, variety, or extensions

What's the same? What's different?

SAME/DIFFERENT: A routine that shows two images side by side and asks, "What's the same? What's different?" Asking about attributes rather than answers invites students to see and think differently.

True or false? Why?

$6 \times 4 = 3 \times 2 \times 4$

TRUE/FALSE: This is a powerful reasoning routine from Cognitively Guided Instruction (CGI) where students look at an equation, decide whether it is true or false, and justify their thinking.

Which representation shows $24 \div 4$? Can you argue for both?

CARD TALKS: This routine can be facilitated as whole-class warm-ups, discussion starters for small groups, or during individual conferences. Card Talks can be taught at any time in the Lesson String.

Open Middle Problem

Remember: There is a limit to how many numbers you can use. You may use any digit from 1 to 9, but you may only use each digit once.

× 4 =

4 × =

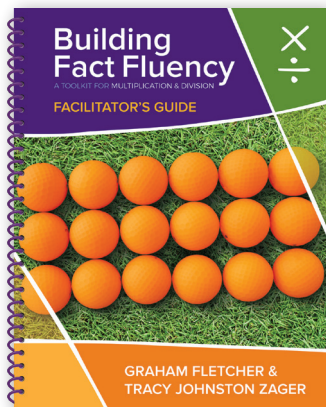
Remember: What is the largest possible sum of the two products? The smallest?

OPEN MIDDLE PROBLEMS: Open Middle Problems are challenging problems that are designed to generate multiple solution paths: students start with the same question, which has a correct answer, but students may get from start to finish in a variety of ways (in English and Spanish).

Toolkit COMPONENTS

WHAT'S INSIDE

Provides multiple years of fact fluency lessons and practice!



FACILITATOR'S GUIDE

The Facilitator's Guide offers a comprehensive overview of the toolkit, including detailed chapters describing the components, implementation tips, possible uses in different settings, and embedded assessment strategies.

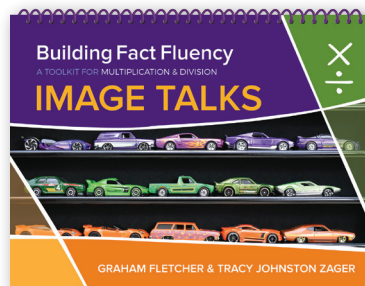
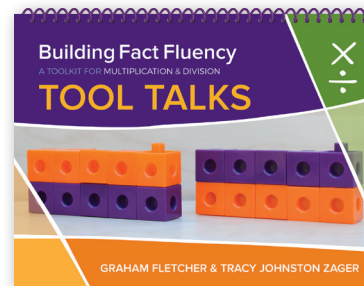


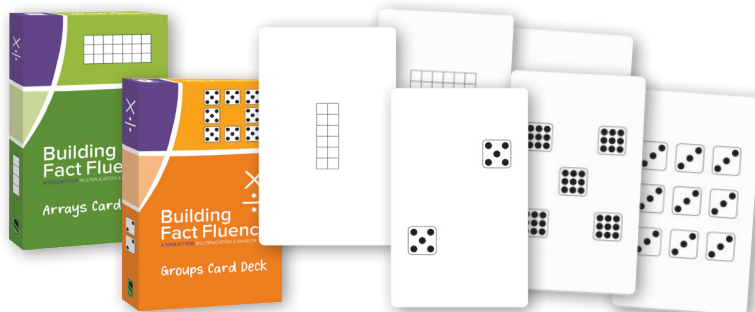
IMAGE TALKS FLIPCHART (For Small Groups)

This small-group resource includes 60 sets (30 for Set A and 30 for Set B) of colorful, engaging photographs of everyday objects that are used in the Image Talks routine—a visual, inviting warm-up designed to begin the strategy discussion.



TOOL TALKS FLIPCHART (For Small Groups)

The 60 sets (30 for Set A and 30 for Set B) of photos in the Tool Talks flipchart provide opportunities for small groups to connect meaning-making to slightly more abstract math tools such as cubes or counters.



ARRAY AND GROUP CARDS

The Array and Group Cards measure 5" x 8" and are sized for teacher demonstration purposes. They show all number combinations from 1s through 10s.



GAME PIECES

The toolkit contains:

- 700 playing counters
- 48 10-sided dice
- 48 6-sided dice

WHAT'S ONLINE

Each toolkit includes access to a robust Companion Website that includes a variety of downloadable, printable, and projectable resources for whole-class and small-group use:

CONTEXTUALIZED PRACTICE PROBLEMS

60 story problems (two for each context: one for Set A and one for Set B) provided in both projectable and printable formats (in English and Spanish)

NUMBER TALKS

60 powerful, short, mental math routines (two for each context: one for Set A and one for Set B) in which students talk about different ways they solve computation problems

IMAGE TALKS

Projectable versions of the 60 Image Talks (two for each context: one for Set A and one for Set B)—a total of 240 individual images

TOOL TALKS

Projectable versions of the 60 Tool Talks (two for each context: one for Set A and one for Set B)—a total of 240 full-color images

SAME/DIFFERENT

60 routines (two for each context): one for Set A and one for Set B

CARD TALKS

60 routines (two for each context): one for Set A and one for Set B

TRUE/FALSE

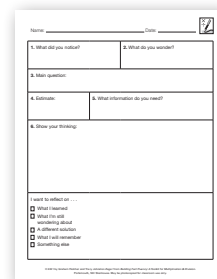
60 routines (two for each context): one for Set A and one for Set B

OPEN MIDDLE PROBLEMS

30 problems for Set B only (in English and Spanish)

GAME BOARDS

46 different demonstration game boards (in English and Spanish)



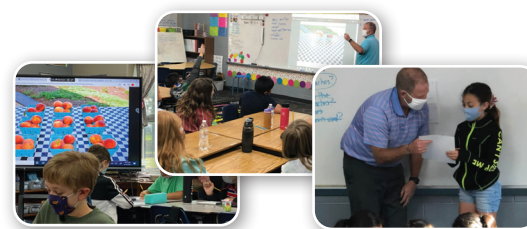
STUDENT RECORDING SHEETS

Downloadable sheets for students to record their work and reflections (in English and Spanish)



3-ACT MATH TASK VIDEOS

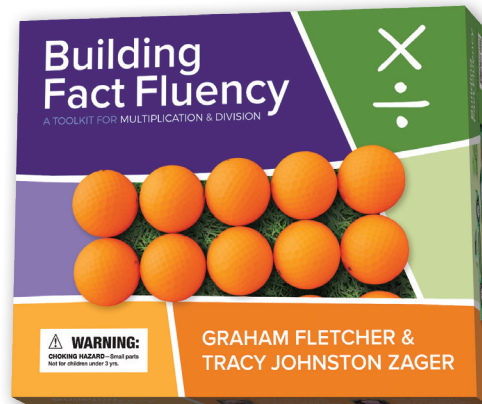
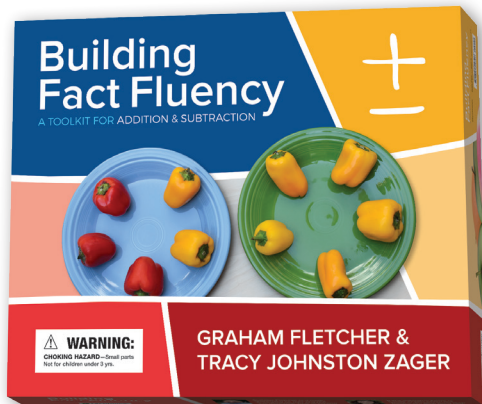
Engaging, story-based problems (one per Lesson String, in English and Spanish)



PROFESSIONAL LEARNING VIDEOS

More than 35 videos containing classroom lessons and reflections, game demonstrations, and assessment strategies, including:

- Observations and Interviews
- Looking at Student Work
- Journaling and Reflection
- Student Self-Assessment



Build math skills and understanding across the grades

Use both *Building Fact Fluency: A Toolkit for Addition & Subtraction* and *Building Fact Fluency: A Toolkit for Multiplication & Division*—two research-driven, engaging, ready-to-use resources—in your school to create cohesion in your math instruction by using common routines and formative assessment strategies that students will recognize across the grades.



Join the *Building Fact Fluency* Facebook Community!

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