That's Not How I Learned It! Multiplication & Division




Deep Run Elementary

Outcomes

By the end of the sessions, participants will have:

- Viewed and discussed the progression of multiplication
- Explored various strategies for multi-digit multiplication and division
- Received Write and Wipe Board w/ open array and open number lines for home use

Mental Math and Fluency Expectations

GRADE	END-OF-YEAR EXPECTATION	EXAMPLES
K	fluently + and – within 5	4 + 1 5 – 2 3 + 2
1	fluently + and – within 10	7 – 5 4 + 3 9 – 6
	± 10 for any two-digit number	26 + 10 84 – 10
2	know from memory all sums of two one-digit addends	6 + 7 8 + 3 7 + 8 2 + 7 9 + 5 4 + 9
	± 10 and ± 100 for any three-digit number	473 – 10 816 + 10 352 – 100 709 + 100
3	know from memory all products of one-digit factors	4 x 9 8 x 6 5 x 7 7 x 3 2 x 9 4 x 8

Computation Expectations by Grade

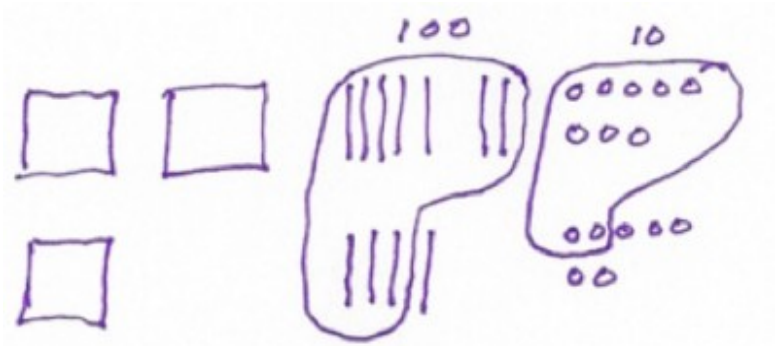
GRADE	END-OF-YEAR EXPECTATION
K	• add and subtract within 10
1	• add and subtract within 20 • add within 100 • subtract two-digit multiples of 10
2	• add and subtract within 1,000
3	• add and subtract within 1,000 • multiply two one-digit factors • multiply one-digit factors by a multiple of 10
4	• add and subtract within 1,000,000 • multiply: 1 by 4 and 2 by 2 • divide: up 4 by 1
5	• multiply multi-digit numbers • divide: up to 4 by 2 • perform all operations on decimals

Formal Algorithm Expectations by Grade

GRADE	END-OF-YEAR EXPECTATION
K	
1	
2	
3	

Formal Algorithm Expectations by Grade

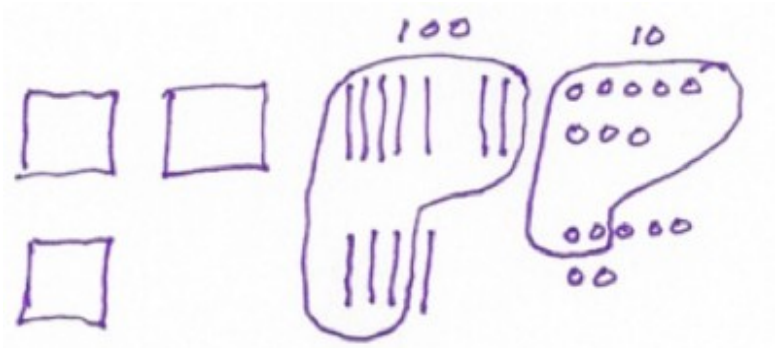
GRADE	END-OF-YEAR EXPECTATION
K	pictorial & concrete models



pictorial

Formal Algorithm Expectations by Grade

GRADE	END-OF-YEAR EXPECTATION
K	pictorial & concrete models
1	**pictorial & concrete models**; written methods



pictorial model

$$\begin{array}{r} 278 \\ +147 \\ \hline 300 \end{array} \qquad \begin{array}{r} 278 \\ +147 \\ \hline 300 \\ 110 \end{array} \qquad \begin{array}{r} 278 \\ +147 \\ \hline 300 \\ 110 \\ 15 \\ \hline 425 \end{array}$$

written method

Formal Algorithm Expectations by Grade

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1	**pictorial & concrete models**; written methods
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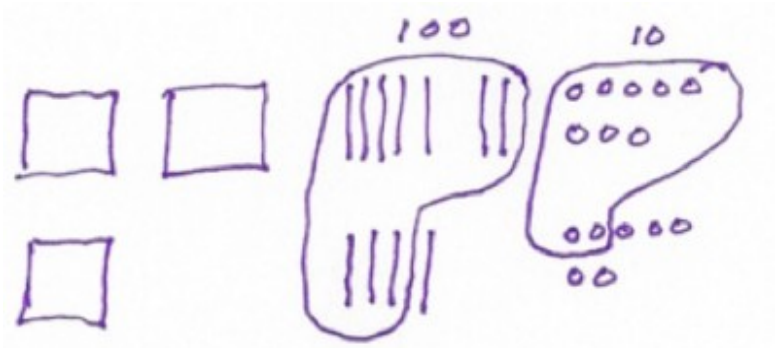

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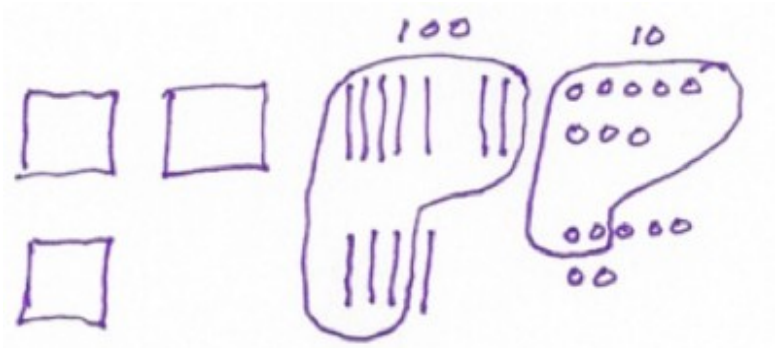

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1	**pictorial & concrete models**; written methods
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3	pictorial & concrete models; **written methods**
4	whole number addition & subtraction (algorithm)
5	whole number multiplication (algorithm)
6	whole number division decimal computation: all operations

Formal Algorithm Expectations by Grade

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Formal Algorithm Expectations by Grade

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K	
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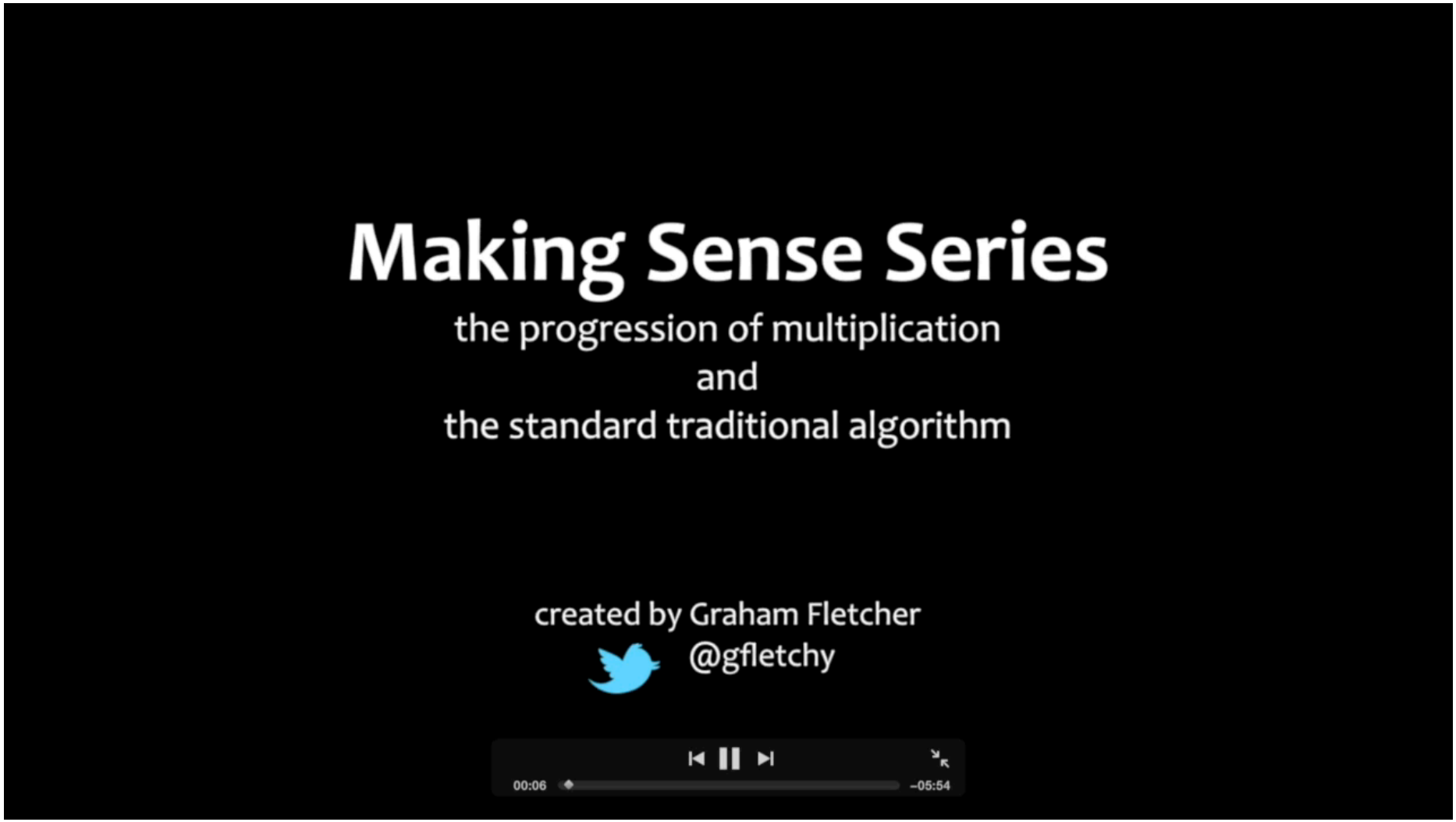
The Progression of Multiplication



Building Proficiency

Modeling

base ten blocks

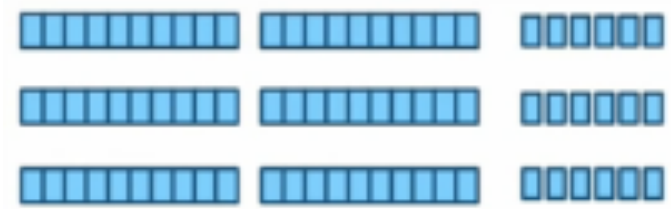
Building Proficiency

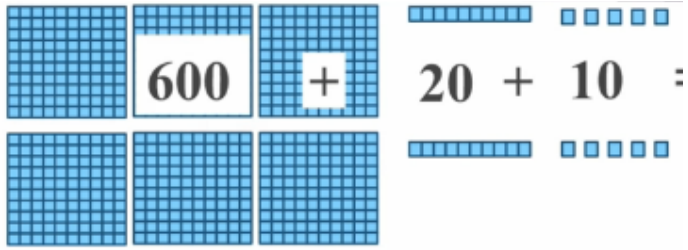
Modeling

base ten blocks
array models

area models

partial product
& partial quotient
models





852 ÷ 4

852
−400 (×100)
452
−400 (×100)
52
− 40 (×10)
12
− 4 (×1)
8
− 4 (×1)
4
− 4 (×1)
0

	200	30	7
8	1600	240	56

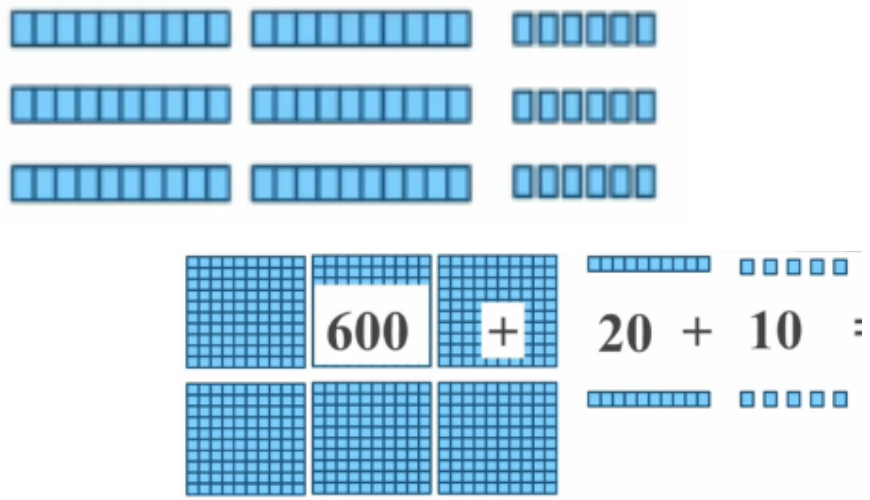
45 (40 + 5)
× 15 (10 + 5)
25 (5 × 5)
200 (5 × 40)
50 (10 × 5)
+ 400 (10 × 40)
675

Building Proficiency

Modeling

base ten blocks
array models

area models



	200	30	7
8	1600	240	56

Building Both Sides of the Brain

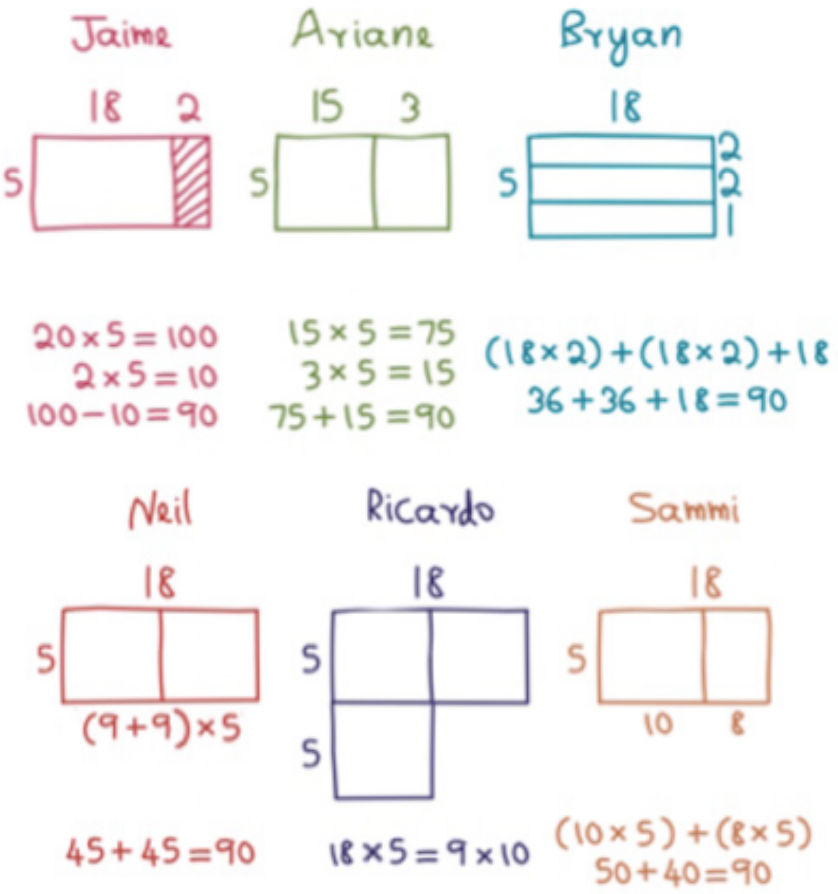
visual and spatial information

+

symbolic information

↓

improved mathematics performance



Park & Brannon (2013)

Building Proficiency

Modeling

base ten blocks
array models

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partial product
& partial quotient
models

Decomposition

Building Proficiency

Modeling

base ten blocks
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area models

partial product
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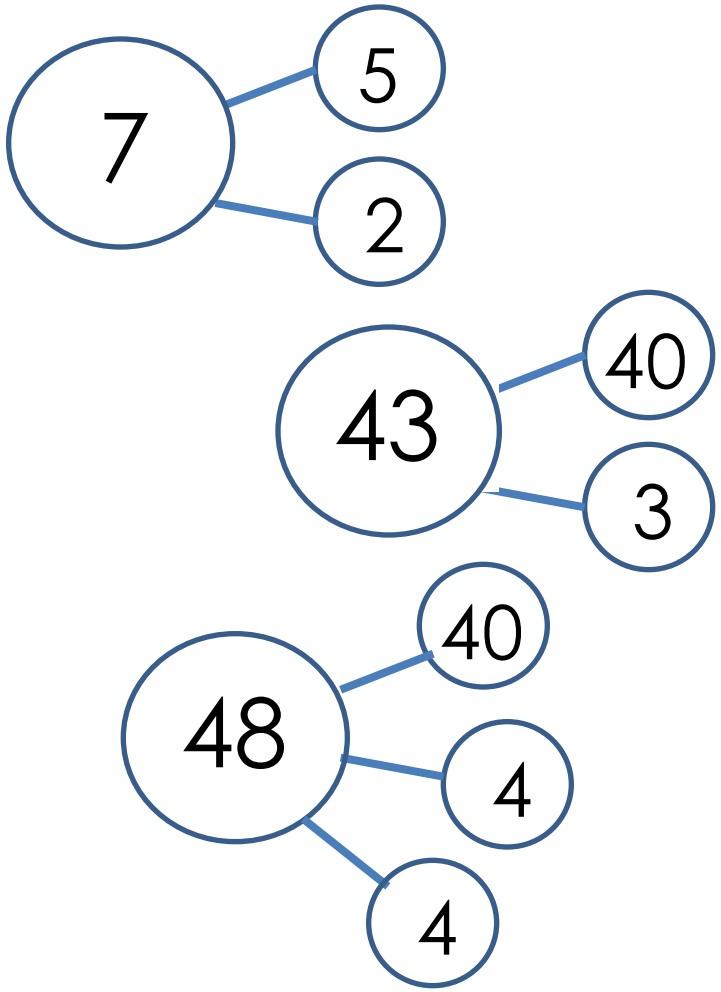
models

Decomposition



Building Proficiency

Modeling

base ten blocks
array models

area models

partial product
& partial quotient
models

Decomposition

371 → 300 & 70 & 1

371 → 300 & 60 & 11

371 → 350 & 21

371 → 300 & 50 & 21

371 → 360 & 11

Building Proficiency

Modeling

base ten blocks
array models

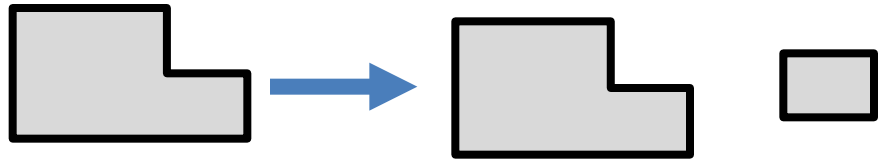
area models

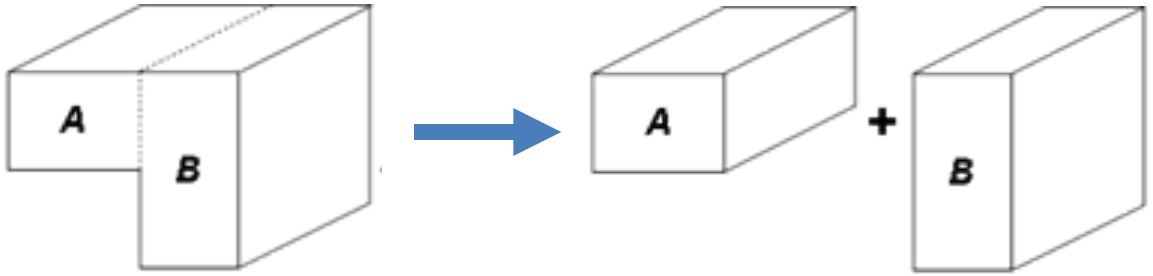
partial product
& partial quotient
models

Decomposition

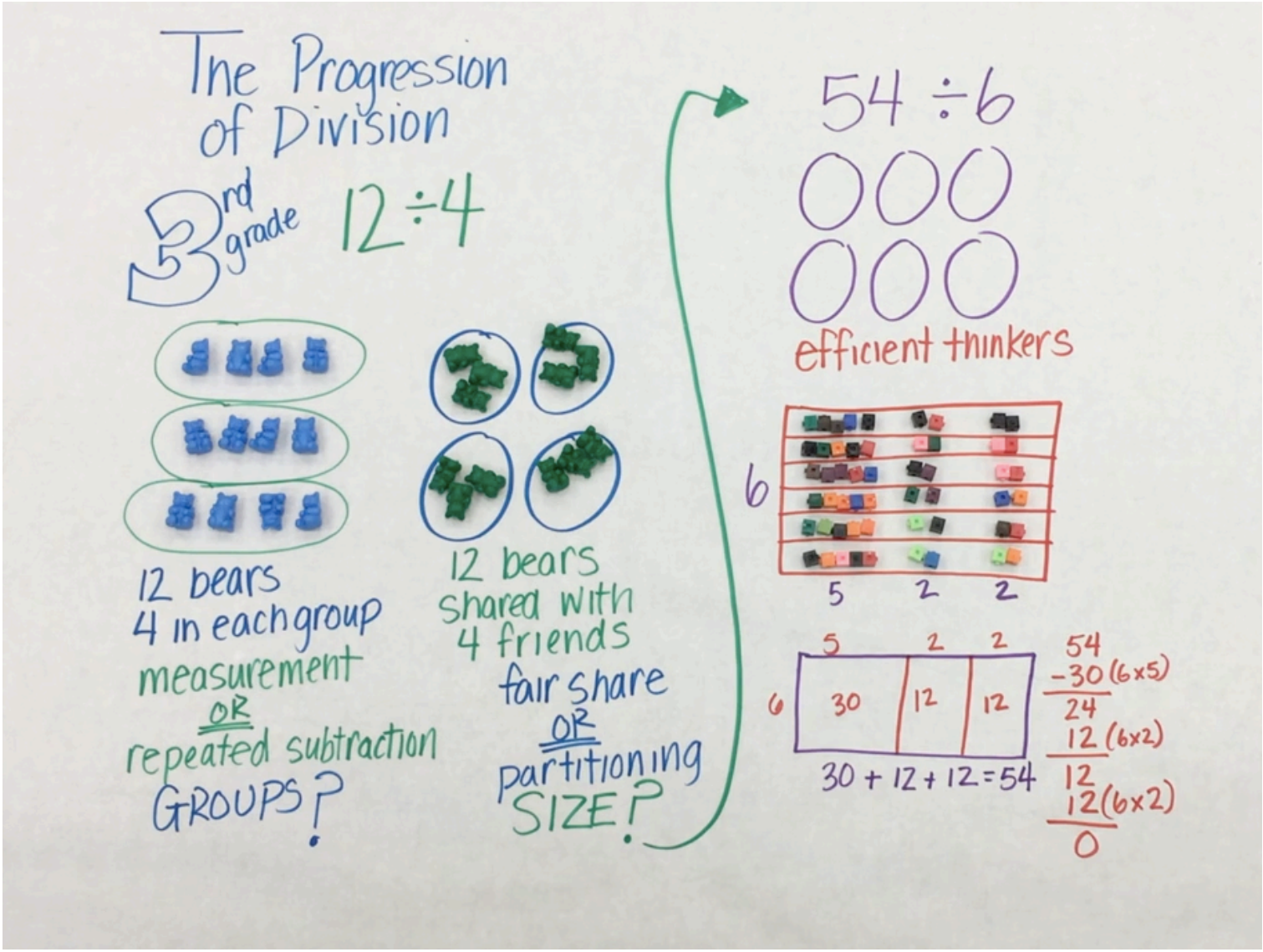
¾ → ¼ & ¼ & ¼

4.96 → 4 & 0.96





Progression of Division



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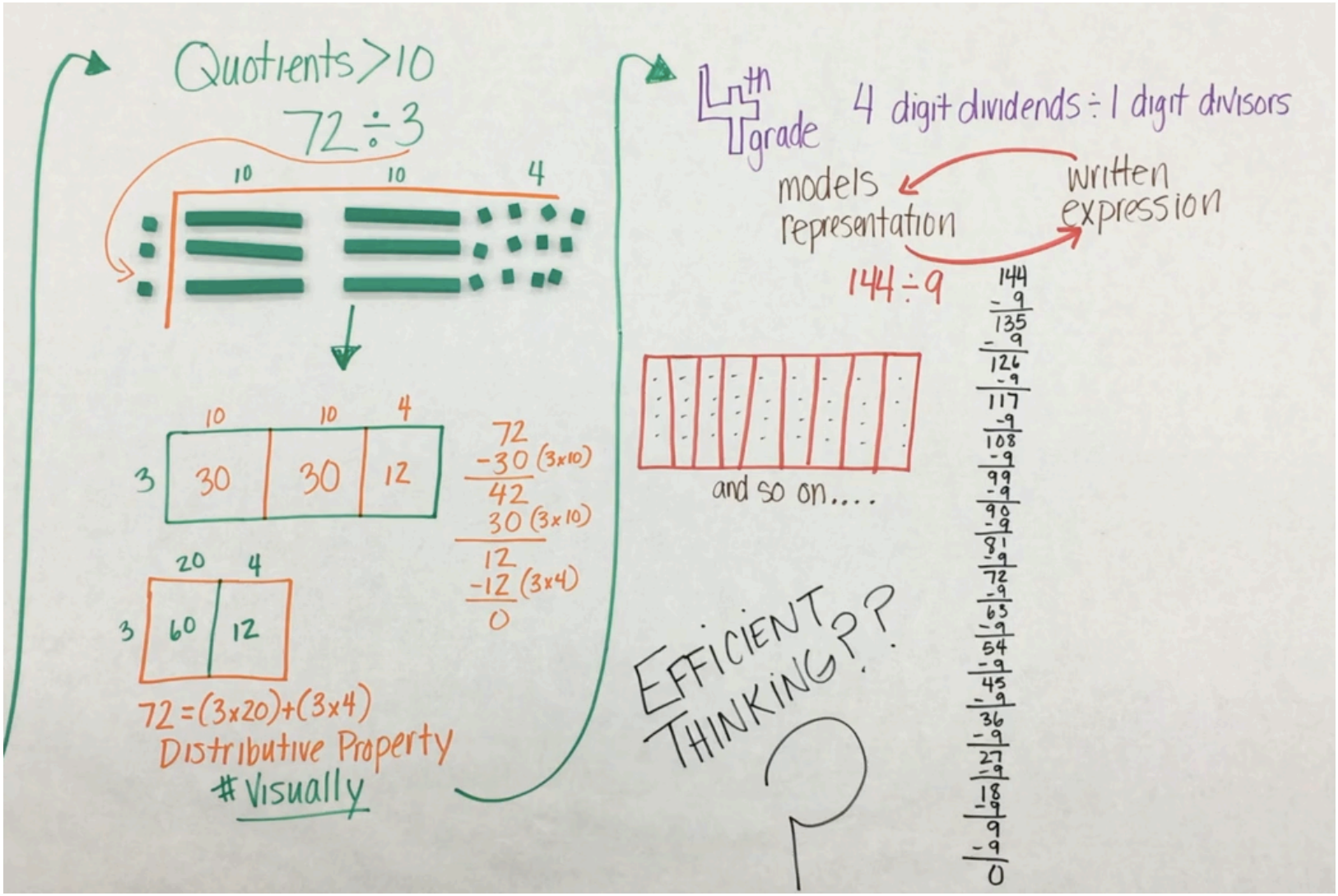

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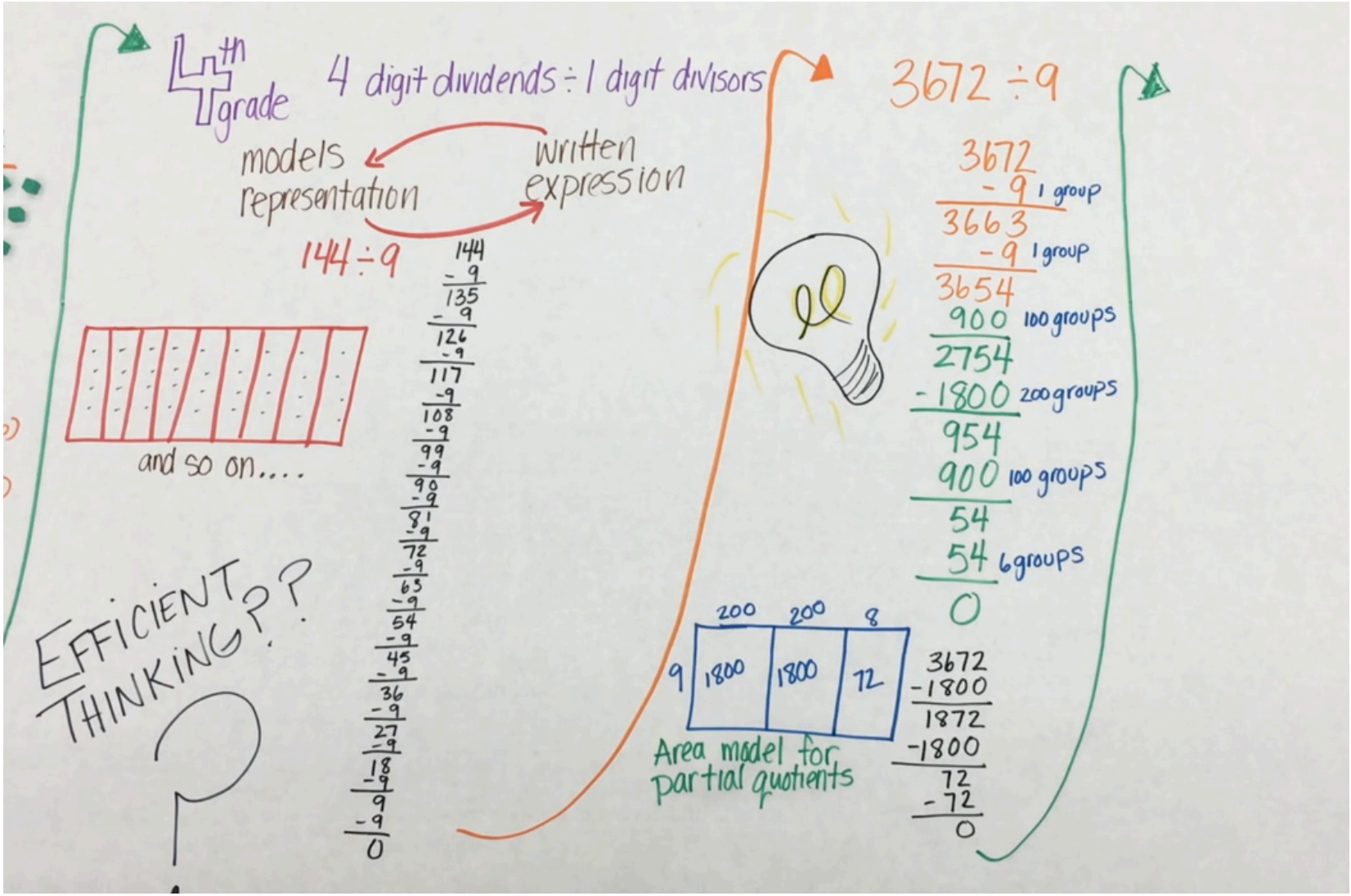


Working Together to Build Mathematical Thinkers

The school's role...

- offer rich, purposeful mathematical experiences
- provide number strategy instruction & practice

The families' role...

- ask your child to show you what he or she has learned
- look for ways to apply the learning in real-life situations

Our shared role...

- highlight and build on the students' strengths
- celebrate questions, mistakes, growth, effort, and struggle

Additional Resources

GRADE 3 FAMILY AND COMMUNITY RESOURCES
OVERVIEW

RELATED ARTS | MATHEMATICS | LANGUAGE ARTS | SCIENCE | SOCIAL STUDIES | HEALTH

- Overview
- What Your Child Will Learn
- How to Support Your Child
- Additional Resources

The Howard County ...S) is nationally recognize... learning. Our rigoro... ...ges students in learning... classroom experien... ...written by Howard County teachers and is designed to provide students a thorough grounding in essential knowledge and skills that will give them a leading edge in tomorrow's global environment. Our curriculum challenges students to think strategically, solve problems, innovate, collaborate, communicate effectively, and achieve goals.

The HCPSS curriculum is aligned to the Common Core State Standards. These standards for literacy and mathematics education resulted from a state-led effort coordinated by the National Governors Association Center for Best Practices (NGA Center) and the Council of Chief State School Officers (CCSSO). The Standards were developed in collaboration with teachers, school administrators, and experts, to provide a clear and consistent framework to prepare our children for college and the workforce. Additional information about the Common Core State Standards .

HCPSS Curriculum is:

1. Deep: Mastery of essential skills is emphasized at each level, so students build the skills and confidence to tackle more advanced concepts.

2. Broad: Instruction crosses content areas – for example, science and social studies curriculum incorporates reading, math, and writing skills

3. Relevant: Classroom lessons are reinforced through hands-on activities and real-world experiences.

Additional Resources

GRADE 4 FAMILY AND COMMUNITY RESOURCES
MATHEMATICS • HOW TO SUPPORT YOUR CHILD

RELATED ARTS | MATHEMATICS | LANGUAGE ARTS | SCIENCE | SOCIAL STUDIES | HEALTH

How to Support Your Child Resources


Whole Numbers


Multiplication and Division

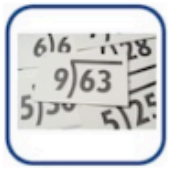

Fractions


Decimals

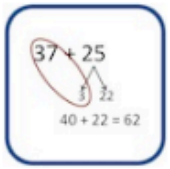

Measurement and Data


Geometry


Patterns



Basic Facts



Computational Fluency


iTunes Mobile Apps


Android Mobile Apps

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Additional Resources

Multiplication and Division Online Activities

Multiplication and Division

Thinking Blocks- Multiplication and Division


Quotient Cafe


Study Jams Divisibility Rules


The Product Game


Remainders Count

Demolition Division

Factoring


Factorize


Factor Game


Beematics

The Factor Tree Game


Not A Factor


Study Jams Multiples

Factor Trees

Word Problems

Thinking Blocks- Multiplication and Division Word Problems

Grand Slam Math

Multistep Word Problems


Hoops