



The Progression of Multiplication



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Session Outcomes

Participants will be able to:

- Understand the progression of multiplication standards from grades three through five.
- Learn ways to support your child at home.

Change *Your* Math Mindset

From


- I'm not good at math.
- I'm not a math person.
- That's the new math. I learned it the old way.
- That way is too complicated.
- Math is just a bunch of numbers.
- I know a trick for that problem.

To

- I can learn something new. Can you show me how you learned it?
- Now I know more strategies.
- I can show you how I understand this.
- I use math to help me solve problems every day.

Progression

Third Grade:

- Concept of Multiplication
- Arrays
- Area Model
- \times  \div

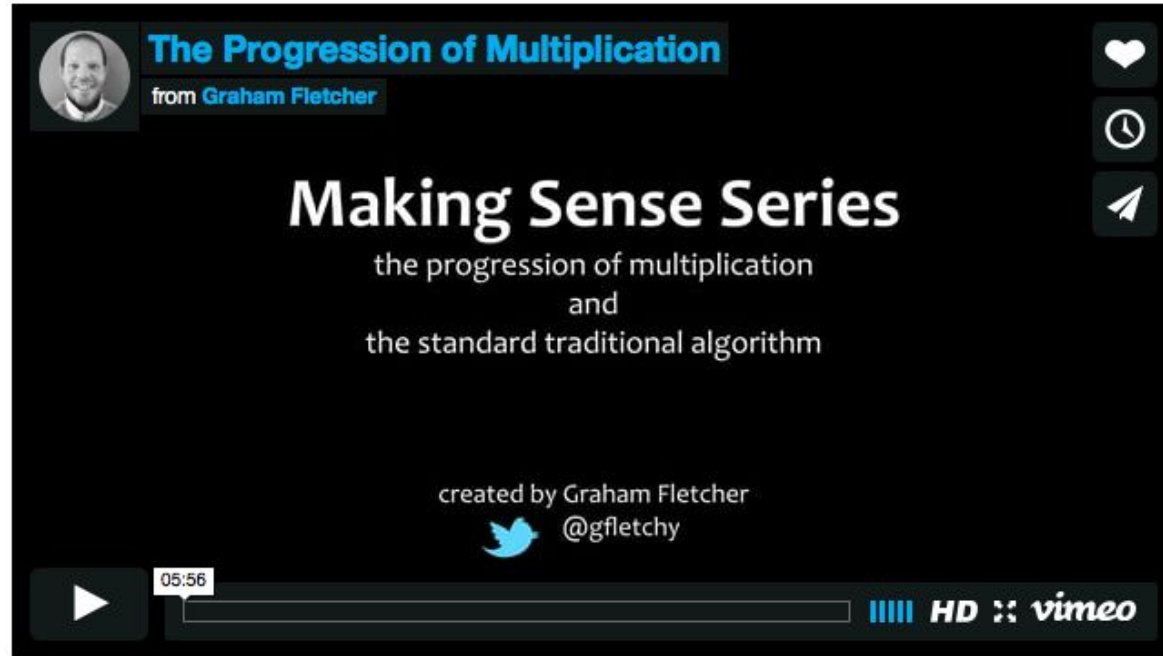
Fourth Grade:

- Alternative strategies
- 2-digit X 1-digit (Q1)
- 3-digit X 1-digit (Q2)
- 4-digit X 1-digit (Q2)
- 2-digit X 2-digit (Q3 & Q4)
- Problem Solving: Multiplicative comparison

Fifth Grade:

- Standard algorithm
- 3-digit X 1-digit
- 4-digit X 1-digit
- 3-digit X 2-digit (2nd and 3rd quarter)
- 4-digit X 2-digit (2nd and 3rd quarter)

The Progression of Multiplication



The video player interface features a dark background. At the top left is a circular profile picture of Graham Fletcher. To its right, the title "The Progression of Multiplication" is displayed in blue, with "from Graham Fletcher" in white below it. On the right side, there are three icons: a heart, a clock, and a share icon. The main title "Making Sense Series" is in large white font, followed by the subtitle "the progression of multiplication and the standard traditional algorithm" in smaller white font. Below this, it says "created by Graham Fletcher @gfletchy" with a blue Twitter bird icon. At the bottom, there is a play button, a progress bar showing 05:56, and a "vimeo" logo with "HD" and "vimeo" text.

The Progression of Multiplication
from **Graham Fletcher**

Making Sense Series

the progression of multiplication
and
the standard traditional algorithm

created by Graham Fletcher
@gfletchy

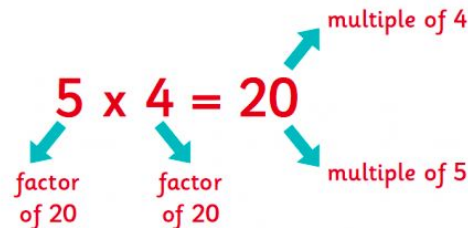
05:56 HD vimeo

The Concept of Multiplication

- Students are encouraged to think about multiplication in many ways. This begins with in-context or real-life situations.
- Multiplication can be conceptualized as:
 - Repeated addition
 - Equal groups
 - Rows and columns in an array
 - Area
- Strong focus on vocabulary

Vocabulary

- Factor- All whole numbers have at least two whole numbers you can multiply to get your number
 - What are all the factor pairs for 12? How about 29?
- Multiple- When you skip count you say multiples of a number
 - A multiple is a number that can be divided by another number a certain number of times with
- Product

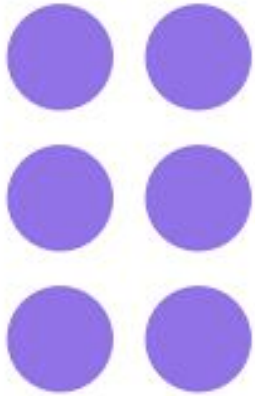


Why is vocabulary important?

- Division
- Fractions
- Prime and composite
- Algebra

Multiplication Vocabulary

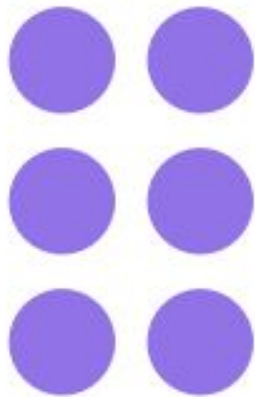
Array



3 rows, 2 in each row

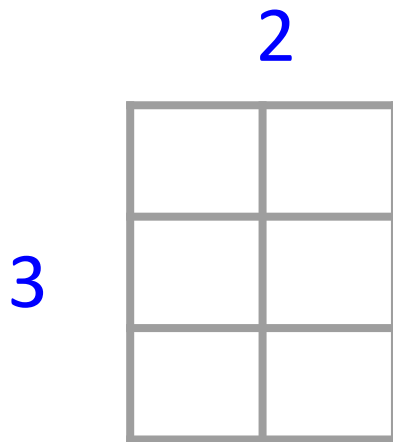
Multiplication Vocabulary

Array



3 rows, 2 in each row

Area Model



Building Conceptual Understanding

Students should be able to:

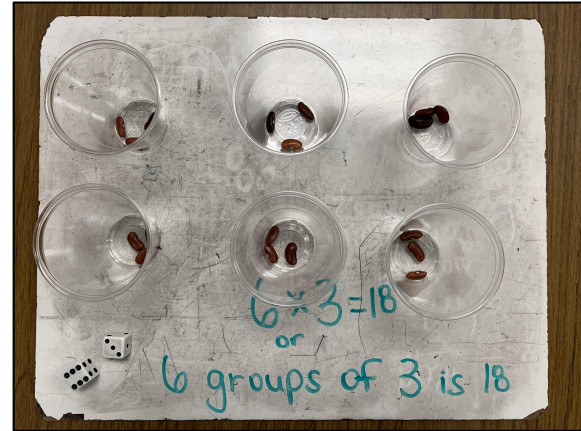
- Recognize that multiplication is the process of counting equal groups
- Interpret the language of multiplication as it appears in story problems.
- Interpret multiplication situations
- Solve multiplication problems
- See patterns in multiplication situations
- See the connection between multiplication and division

Why Math Games?

- Math games often include an element of strategy, which elevates the practice to a problem solving level.
- Games can be reused an infinite number of times.
- Math games are engaging!

Counting Equal Groups

- How Many Cups?
- Circles and Stars
- Build an Array
- Build an Area Model



Let's Play!

Multiplicative vs. Additive Comparison

Multiplicative

Phil ran 2 miles. Sally ran 3 times the distance that Phil ran. How many miles did Sally run?

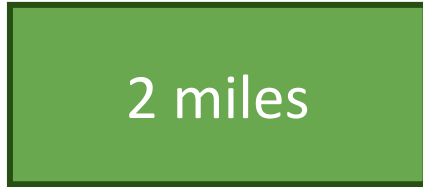
Additive

Phil ran 2 miles. Sally ran 3 more miles than Phil. How many miles did Sally run?

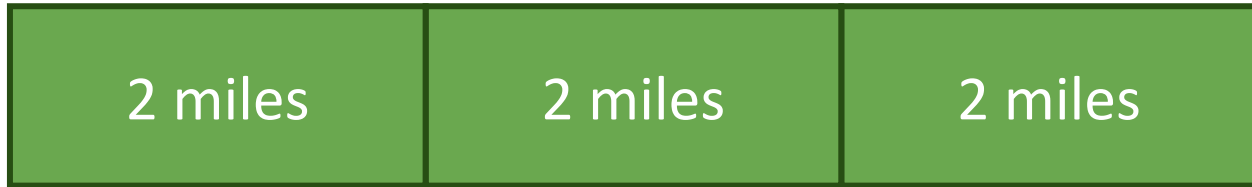
Multiplicative Comparison: Bar Models

Phil ran 2 miles. Sally ran 3 times the distance that Phil ran.
How many miles did Sally run?

Phil



Sally



Multiplicative Comparison

Create a model to represent each problem about Alexa and Oliver.

Alexa has six points. Oliver earned four times as many points as Alexa. How many points did Oliver score?

How are these problems the **same**?

Oliver has **24** points, and Alexa earned only six. How many times as many points did Oliver score compared to Alexa?

How are these problems **different**?

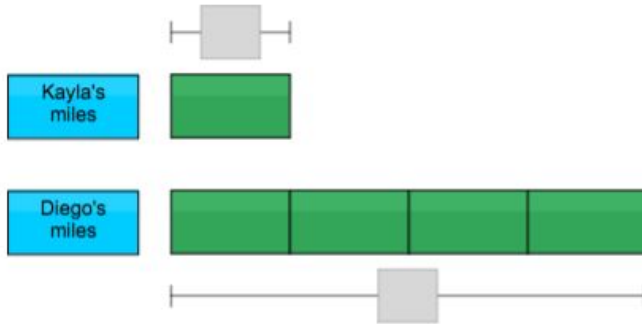
Oliver has **24** points. He earned four times as many points as Alexa. How many points did Alexa score?

Thinking Blocks

Kayla lives 9 miles away from the amusement park. Diego lives 4 times farther away than Kayla. How far does Diego live from the amusement park?



Thinking
Blocks



?

9



Feedback Good job! Now you can add numbers to the model. Tap the check mark when you are ready.

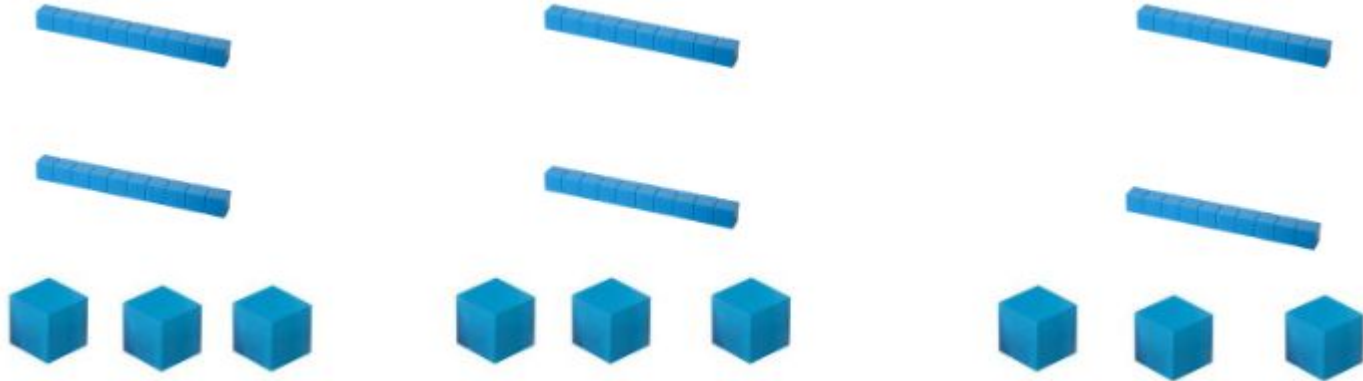


1 Step Compare



Modeling with Base Ten Blocks

Use base ten blocks to model 3×23

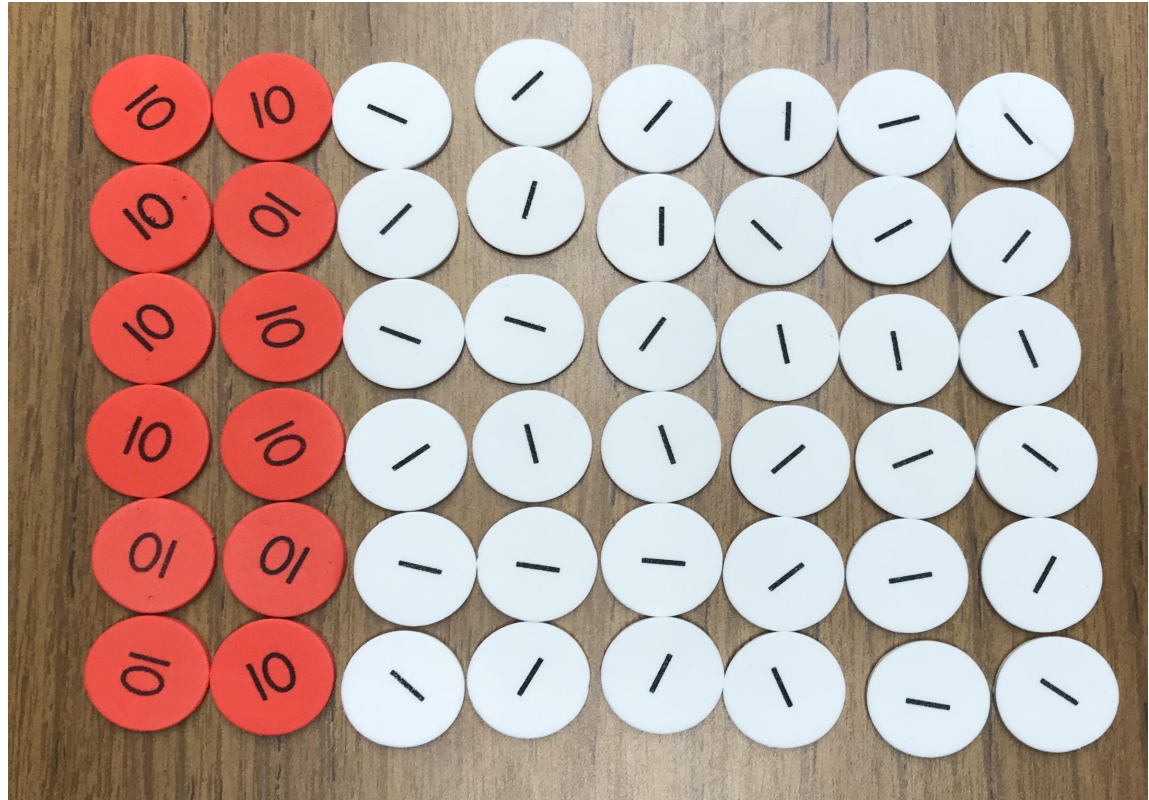


Area Model with Place Value Discs



Area Model with Place Value Discs

$$6 \times 26$$



Area Model--You try!

Please use your place value discs to model the following problem(s):

3rd Grade Parents - 3×10

4th Grade Parents - 3×45

5th Grade Parents - 3×145

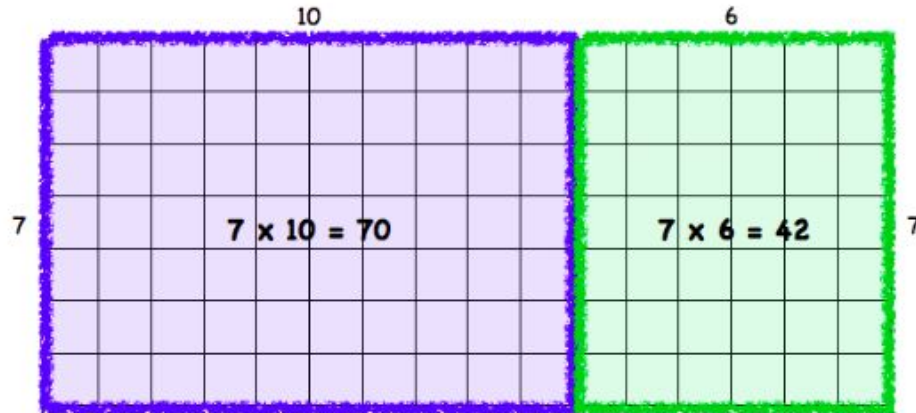
Area Model

The area model connects to multiplication arrays that your child learned in previous years. A model is created using the values of each digit in the factors. All parts are then multiplied by this/these factor(s) (**distributive property**).

Partial Products and Area Model

$$7 \times 16 =$$

$$7 \times (10 + 6) =$$



$$70 + 42 = 112$$

Partial Products and Area Model

$$549 \times 8$$

	549 =	500		+	40		+	9
8		$8 \times 500 =$			$8 \times 40 =$			$8 \times 9 = 72$
		$8 \times 5 \text{ hundreds} =$			$8 \times 4 \text{ tens} =$			
		40 hundreds			32 tens			

$$\begin{aligned} 8 \times 549 &= 8 \times (500 + 40 + 9) \\ &= 8 \times 500 + 8 \times 40 + 8 \times 9 \end{aligned}$$

Area Model

$$478 \times 5$$

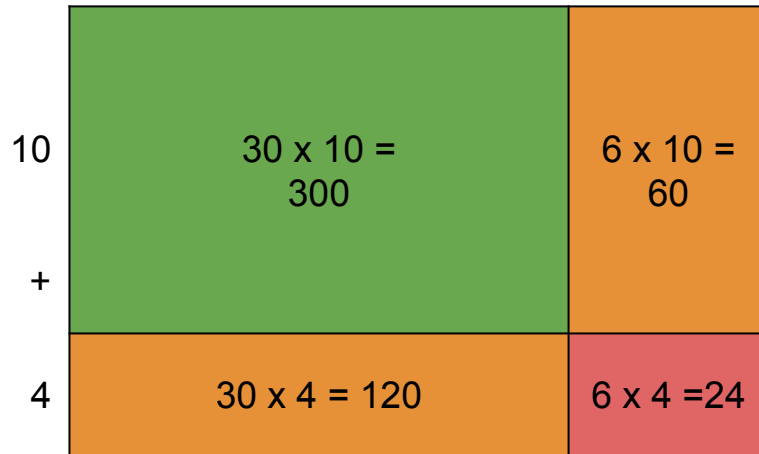
$$400 + 70 + 8$$



$$2,000 + 350 + 40 = 2,390$$

$$36 \times 14$$

$$30 + 6$$



$$300 + 120 + 60 + 24 = 504$$

Area Model - You try!

Show an area model for 3×12 using the graph paper.

Show an area model for 3×45 and for 3×145 without the aid of the graph paper.

Partial Products

Using partial products, students break apart the factors into “parts” using the place value of each digit and then multiplying to find a “partial” product. These products are added together to arrive at the final product.

Partial Products

$$\begin{array}{r} 63 \\ \times 7 \\ \hline 7 \times 3 = 21 \\ 7 \times 60 = + 420 \\ \hline 441 \end{array}$$

$$\begin{array}{r} 25 \\ \times 61 \\ \hline 1 \times 5 = 5 \\ 1 \times 20 = 20 \\ 60 \times 5 = + 300 \\ 60 \times 20 = 1,200 \\ \hline 1,525 \end{array}$$

Partial Products--You try!

$$\begin{array}{r} 3,048 \\ \times \quad 9 \\ \hline \end{array}$$

$$\begin{array}{r} 324 \\ \times 16 \\ \hline \end{array}$$

Standard Algorithm

$$\begin{array}{r} 25 \\ x 61 \\ \hline 1 \times 5 = 5 \\ 1 \times 20 = 20 \\ 60 \times 5 = + 300 \\ 60 \times 20 = 1,200 \\ \hline 1,525 \end{array}$$

$$\begin{array}{r} ^3 25 \\ x 61 \\ \hline 25 \\ + 1,500 \\ \hline 1,525 \end{array}$$

Alternative Strategies

$$26 \times 4$$

Standard Algorithm

$$\begin{array}{r} 26 \\ \times 4 \\ \hline 24 \\ + 80 \\ \hline 104 \end{array}$$

Alternative Strategy

$$\begin{array}{l} 26 \times 4 \\ (25 + 1) \times 4 \\ (25 \times 4) + (1 \times 4) \\ 100 + 4 \\ 104 \end{array}$$

Final Thought: Number Talks

(not available online)



Thank you!

- Next Workshop on Wednesday, November 6th
- Feedback at <https://tinyurl.com/yaru8fhw>
- Canvas Resources