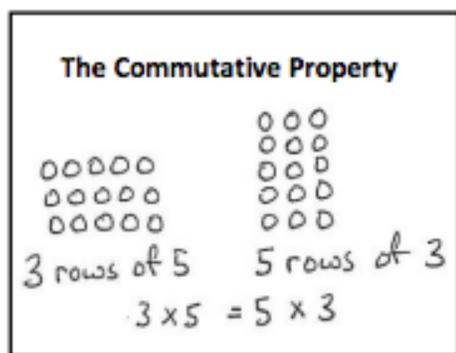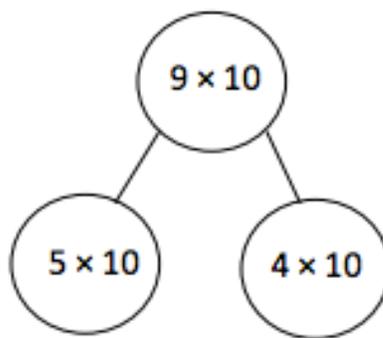## Properties of Multiplication and Division and Solving Problems with 2-5 and 10

In this first module of Grade 3, we build on second grade knowledge of addition and work toward greater fluency. We will also be building arrays (arrangements of a set of objects organized into equal groups in rows and columns), and setting the stage for multiplication and division.

A number bond illustration of the Distributive Property:

$9 \times 10 = (5 \times 10) + (4 \times 10)$

The Commutative Property

3 rows of 5   5 rows of 3

$3 \times 5 = 5 \times 3$

An illustration of the Commutative Property

What Comes After this Module:

In Module 2, students will have opportunities to use tools that build both measurement skills as well as conceptual understanding of metric and time units. Through practical application of measurement skills, students will practice both estimating and rounding numbers.

New Terms, Phrases, and Strategies in this Module:

Array - a set of numbers or objects that follow a specific pattern, a matrix

Commutative Property - e.g., rotate a rectangular array 90 degrees to demonstrate that factors in a multiplication sentence can switch places

Equal groups - with reference to multiplication and division; one factor is the number of objects in a group, and the other is a multiplier that indicates the number of groups

Equation - a statement that 2 expressions are equal, e.g., $3 \times 4 = 12$

Distributive Property - e.g. $12 \times 3 = (10 \times 3) + (2 \times 3)$. The 3 is the multiplier and the 12 is decomposed into 10 and 2

Factors - i.e., numbers that are multiplied to obtain a product

Quotient - the answer when one number is divided by another

Key Common Core Standards:

- *Represent and solve problems involving multiplication and division*
  - Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities
- *Understand properties of multiplication and the relationship between multiplication and division*
  - Apply properties of operations as strategies to multiply and divide
  - Understand division as an unknown-factor problem
- *Multiply and divide within 100*
  - *Fluently multiply and divide within 100*
- *Solve problems involving the four operations, and identify and explain patterns in arithmetic*
  - *Solve two-step word problems using the four operations*

✚ How you can help at home:

- Have your student set out groups of small objects in arrays (equal groups in rows and columns) and write the accompanying multiplication equation

- Encourage your student to practice multiplication facts for 2s, 5s, and 10s until they know them fluently

Welcome to *A Story of Units*!

Each module's parent tip sheet will highlight a new strategy or math model your student will be working on.

Arrays: students worked with arrays toward the end of grade 2, learning how to use them to show repeated addition. Now, in grade 3, students put all of their knowledge to work as they learn multiplication and division skills, using arrays to demonstrate the properties of both operations.

(Below) A simple teddy bear array for 3 x 4, or three rows with four in each row

(Left) An array with multiple rows of 3 in each row, showing foundation for multiplication as repeated addition
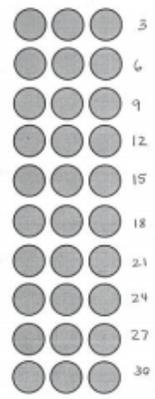
Read on to learn a little bit about *Eureka Math*, the creators of *A Story of Units*:

Eureka Math is a complete, PreK–12 curriculum and professional development platform. It follows the focus and coherence of the Common Core State Standards (CCSS) and carefully sequences the progression of mathematical ideas into expertly crafted instructional modules.

This curriculum is distinguished not only by its adherence to the CCSS; it is also based on a theory of teaching math that is proven to work. That theory posits that mathematical knowledge is conveyed most effectively when it is taught in a sequence that follows the "story" of mathematics itself. This is why we call the elementary portion of *Eureka Math* "*A Story of Units*." The sequencing has been joined with methods of instruction that have been proven to work, in this nation and abroad. These methods drive student understanding beyond process, to deep mastery of mathematical concepts.
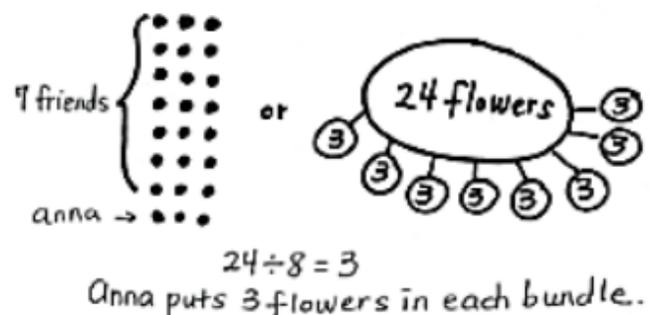
The goal of *Eureka Math* is to produce students who are not merely literate, but fluent, in mathematics. Your student has an exciting year of discovering the story of mathematics ahead!

Sample Problem from Module 1:

Anna picks 24 flowers.
She makes equal bundles of flowers and gives 1 bundle to each of her 7 friends.
She keeps a bundle for herself too.

How many flowers does Anna put in each bundle?

(Sample taken from Module 1, Lesson 7)

$24 \div 8 = 3$
Anna puts 3 flowers in each bundle.

COMMON CORE *consider the source*