

East Islip School District

A Story of Units
Parent Handbook



Grade 4

Module 3

Grade 4 Module 3

Multi-Digit Multiplication and Division

OVERVIEW

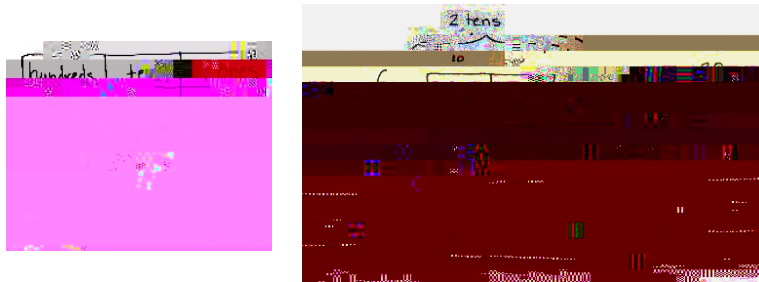
In this 43-day module, students use place value understanding and visual representations to solve multiplication and division problems with multi-digit numbers. As a key area of focus for Grade 4, this module moves slowly but comprehensively to develop students' ability to reason about the methods and models chosen to solve problems with multi-digit factors and dividends.

Students begin in Topic A by investigating the formulas for area and perimeter. They then solve multiplicative comparison problems including the language of *times as much* with a focus on problems using area and perimeter as a context (e.g., “A field is 9 feet wide. It is 4 times as long as it is wide. What is the perimeter of the field?”). Students create diagrams to represent these problems as well as write equations with symbols for the unknown quantities (**4.OA.1**). This is foundational for understanding multiplication as *scaling* in Grade 5 and sets the stage for proportional reasoning in Grade 6. This Grade 4 module, beginning with area and perimeter, allows for new and interesting word problems as students learn to calculate with larger numbers and interpret more complex problems (**4.OA.2**, **4.OA.3**, **4.MD.3**).

In Topic B, students use number disks to multiply single-digit numbers by multiples of 10, 100, and 1,000 and two-digit multiples of 10 by two-digit multiples of 10 (**4.NBT.5**). Reasoning between arrays and written numerical work allows students to see the role of place value units in multiplication (as pictured below). Students also practice the language of units to prepare them for multiplication of a single-digit factor by a factor with up to four digits and multiplication of 2 two-digit factors.



In preparation for two-digit by two-digit multiplication, students practice the new complexity of multiplying 2 two-digit multiples of 10. For example, students have multiplied 20 by 10 on the place value chart and know that it shifts the value one place to the left, $10 \times 20 = 200$. To multiply 20 by 30, the associative property allows for simply tripling the product, $3 \times (10 \times 20)$, or multiplying the units, 3 tens $\times$ 2 tens = 6 hundreds (alternatively, $(3 \times 10) \times (2 \times 10) = (3 \times 2) \times (10 \times 10)$). Introducing this early in the module allows students to practice during fluency so that by the time it is embedded within the two-digit by two-digit multiplication in Topic H, understanding and skill are in place.



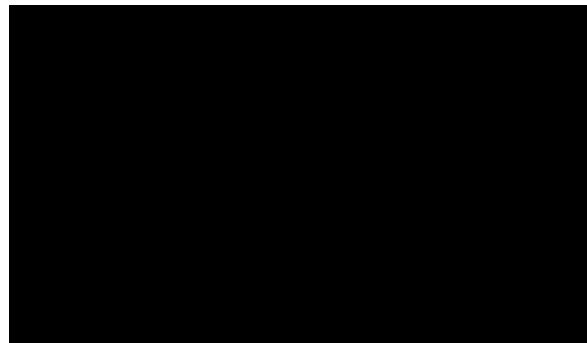
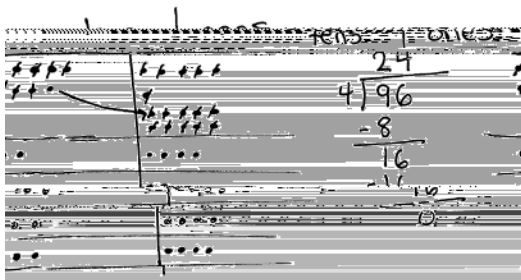
Building on their work in Topic B, students begin in Topic C decomposing numbers into base ten units in order to find products of single-digit by multi-digit numbers. Students use the distributive property and multiply using number disks to model. Practice with number disks is used for two-

In Topic E, students synthesize their Grade 3 knowledge of division types (*group size unknown* and *number of groups unknown*) with their new, deeper understanding of place value.

Students focus on interpreting the remainder within division problems both in word problems and within long division (4.OA.3). A remainder of 1, as exemplified below, represents a leftover flower in the first situation and a remainder of 1 ten in the second situation.²



While we have no reason to subdivide a remaining flower, there are good reasons to subdivide a remaining ten. Students apply this simple idea to divide two-digit numbers unit by unit: dividing the tens units first, finding the remainder (the number of tens unable to be divided), and decomposing remaining tens into ones to then be divided. Students represent division with single-digit divisors using arrays and the area model before practicing with place value disks.



In Topic F, armed with an understanding of remainders, students explore factors, multiples, and prime and composite numbers within 100 (**4.OA.4**), gaining valuable insights into patterns of divisibility as they test for primes and find factors and multiples. This prepares them for Topic G's work with multi-digit dividends.

Topic G extends the practice of division with three- and four-digit dividends using place value understanding. A connection to Topic B is made initially with dividing multiples of 10, 100, and 1,000 by single-digit numbers. Number disks support students visually as they decompose each unit before dividing. Students then practice using the standard algorithm to record long division, including solving word problems

The image shows handwritten student work. On the left is a place value chart with columns for 20 and 6. The number 4 is written above the 20 column and 30 is written to the left of the 6 column. The number 600 is written in the 20 column and 180 is written in the 6 column. To the right of the chart are two multiplication problems. The first problem is 26×34 with a partial product of 80 and a final product of 884. The second problem is 26×34 with a partial product of 180 and a final product of 884. Arrows indicate the relationship between the partial products and the final product.

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