Unit 5 - *Multiplication, Division & Area*

Overview

Unit 5 returns to the study of multiplication, especially as it relates to division. Students again build arrays, but use them to model and solve division as well as multiplication problems. Story problems play a major role in the unit, helping students to connect their everyday experiences with division to more formal mathematical concepts. As they solve and pose story problems, students encounter different interpretations of division—area, sharing and grouping—and have numerous opportunities to build understandings of these different models and meanings. The connection between multiplication and division is also drawn through work that revolves around fact families. Toward the end of the unit, area is introduced, a topic that will be revisited in Unit 6.

21st Century Capacities: Analyzing

Stage 1 - Desired Results

ESTABLISHED GOALS/ STANDARDS

MP 1 Make sense of problems and persevere in solving them.
MP 2 Reason abstractly and quantitatively.
MP 4 Model with Mathematics
CCSS.MATH.CONTENT.3.OA.A.1 Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each.
CCSS.MATH.CONTENT.3.OA.A.2 Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each.
CCSS.MATH.CONTENT.3.OA.A.3 Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.[1]
CCSS.MATH.CONTENT.3.OA.A.4 Determine the unknown whole number in a multiplication or division equation relating three whole

Transfer:

Students will be able to independently use their learning in new situations to...

1. Make sense of a problem, create a problem, initiate a plan, execute it, and evaluate the reasonableness of the solution.(product creation)
2. Demonstrate fluency with math facts, computation and concepts. (multiplication & division)
3. Justify reasoning using clear and appropriate mathematical models (analyzing)

Meaning:

UNDERSTANDINGS: *Students will understand that:*

1. Effective problem solvers work to make sense of the problem before trying to solve it.
2. Strategies help us to recognize relationships between numbers

ESSENTIAL QUESTIONS: *Students will explore & address these recurring questions:*

A. How do I create a multiplication or division story problem?
B. How can I to break a problem down into manageable parts?
C. Does my answer make sense and

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<td rowspan="3">numbers.
CCSS.MATH.CONTENT.3.OA.B.5 Apply properties of operations as strategies to multiply and divide.[2]
CCSS.MATH.CONTENT.3.OA.B.6 Understand division as an unknown-factor problem.
CCSS.MATH.CONTENT.3.OA.C.7 Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.
CCSS.MATH.CONTENT.3.OA.D.8 Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.[3]
CCSS.MATH.CONTENT.3.NBT.A.3 Multiply one-digit whole numbers by multiples of 10 in the range 10-90 (e.g., 9 × 80, 5 × 60) using strategies based on place value and properties of operations.
CCSS.MATH.CONTENT.3.MD.C.5.A A square with side length 1 unit, called "a unit square," is said to have "one square unit" of area, and can be used to measure area.
CCSS.MATH.CONTENT.3.MD.C.5.B A plane figure which can be covered without gaps or overlaps by n unit squares is said to have an area of n square units.
CCSS.MATH.CONTENT.3.MD.C.6 Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).
CCSS.MATH.CONTENT.3.MD.C.7.A Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.
CCSS.MATH.CONTENT.3.MD.C.7.B Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.</td>
<td>to develop fact fluency .
3. Mathematicians flexibly use different tools, strategies, and operations to build conceptual knowledge or solve problems.
4. Multiplication and division are inversely related (multiplication helps to solve division problems and vice versa)</td>
<td>how can I explain my answer to someone else?
D. What is the best way to show my thinking?
E. How are multiplication and division related?</td>
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<td colspan="2">Acquisition:</td>
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<td>Students will know…

1. how to use models to solve multiplication and division equations
2. how to use multiplication to solve division problems
3. that unit squares can be used to measure the area of plane figures
4. how to write a fact family to match an array
5. how to determine the appropriate operation to solve a word problem
6. <u>Vocabulary:</u> array, row, column, dimension, divide, equation, expression, quotient, product</td>
<td>Students will be skilled at…

1. interpreting products and quotients of whole numbers
2. writing story problems or describing problem situations to match a multiplication or division expression or equation
3. fluently multiplying and dividing within 100 using strategies
4. identifying fact families to match an array
5. solving for unknown factor, divisor or dividend
6. solving one and two-step story problems using multiplication and division with products and dividends to 100
7. solving sharing and grouping division problems
8. finding the area of a rectangle
9. drawing and labeling an array model and writing a corresponding equation</td>
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