**Topic: 3rd Grade Conceptual Understanding of Division**

**Unit Goals:**

The purpose of this unit is to develop students’ conceptual understanding of division. Students come to recognize scenarios involving “equal sharing” as situations that can be represented mathematically with division. Students explore both partitive (when the size of the groups is unknown) and quotative (when the number of groups is unknown) equal sharing situations and recognize that both types of situations can be represented with division.

Students also connect their new learning about division to their prior learning about multiplication. As students see that, as in multiplication, a division equation involves a total, a number of groups, and a size of the groups, they begin to understand the relationship between the two operations. They begin to recognize multiplication as a tool for solving division problems, and in so doing they recognize division as a “missing factor” problem. The inverse relationship between multiplication and division is reinforced through these calculations.

Over the course of the unit, students move from concrete representations of division (“dealing out” counters into equal-sized piles) to more representational (models such as tape diagrams and arrays) and symbolic (equations). Finally, students apply their learning to an assortment of division and multiplication problems, learning to distinguish division and multiplication scenarios in word problems, and to multiply and divide within 100.

Unit Goals and Unit Plan: Excerpt of lesson study lesson plan developed by Ginger Cook, John Aragon, Elena Cabañas, Brigid Brown, and Jana Morse. Acorn Woodland Elementary School, Oakland. 2017.

**Unit Plan:**

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| Lesson | Date | TTP Problem | New Learning | Lesson Summary | Standards addressed |
| 1 | 10/27 | There are 15 stars in all and 3 circles. How many stars are in each circle? | We can use multiplication to find a missing factor. | Sometimes the number you’re trying to figure out ISN’T the total. | 3.OA.A.4 -  Determine the unknown whole number in a multiplication or division equation relating three whole numbers.  3.OA.B.6 Understand division as an unknown-factor problem. |
| 2 | 10/30 | We have 12 cookies. If they are divided equally among 3 children, how many will each child get? | Understand the meaning of partitive division and how to write a division equation. | To share, we need to have equal groups.  Division is an operation we can use when we want to share something equally. | 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.  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. |
| 3 | 10/31 | There are 20 strawberries. If 5 kids share these strawberries equally, how many will each kid get? | Understand how to find the answer to a partitive division problem | Division is a missing factor problem  The answer to 20 ÷ 5 is the number that goes in the ⧠ in the 5 x ⧠ = 20. | 3.OA.A.3 (see above)  3.OA.B.6 (see above)  3.OA.B.7 Apply properties of operations as strategies to multiply or divide |
| 5 | 11/1 | **RESEARCH LESSON**  There are 12 cookies. If we give 3 cookies to each kid, how many kids can share the cookies? | Understand the meaning of quotative division | If 12 cookies are divided so each kid gets 3 cookies, the cookies can be shared among 4 kids.  This case can also be written with the following division math sentence: 12 ÷ 3 = 4. | 3.OA.A.2 (see above)  3.OA.A.3 (see above) |

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| 6 | 11/2 | There are 35 flowers. We are making bouquets with 7 flowers. How many bouquets can we make?  There are 36 balls. How many baskets do we need if we put 4 balls in each basket? | Students understand that quotitive division situations can be expressed with division math sentences, as well as the meaning of quotative division | We can use division to solve fair sharing problems where we don’t know how many groups. | 3.OA.A.2 (see above)  3.OA.A.3 (see above) |
| 7 | 11/3 | There are 20 stickers. If we give 5 stickers to each person, how many people can we give stickers to? | Students understand how to find the answers to quotitive division problems | The Answer to 20/5 is the number that fits into the \_\_\_ in  ⧠ x5 = 20 | 3.OA.B.5 (see above)  3.OA.A.3 (see above) |
| 8 | 11/6 | Victor and Jayla made word problems using the math sentence 6/2. Let’s compare the word problems that they made. | Students understand that partitive and quotitive division can be consolidated as “division” and they can find answers to division calculations. | (two different 6/2)  Finding 1 person’s share and how many people something can be division among are expressed as division math sentences. (BOTH are division) | 3.OA.A.3 (see above) |
| 9 | 11/7 | Some cookies in a box will be shared equally among 4 children. How many cookies does each child get? (when there are 8, 4, and no cookies) | Students are able to solve division problems in which the dividend is 0 or the dividend and divisor have the same numerical value (division with 0 and 1) | We can use division even when the divisor is 0 or when the divisor and the dividend are the same | 3.OE.D.9 Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using the properties of operations. |
| 10 | 11/8 | ….multiplication problem…. | Students must determine which operation to use based on the word problem situation. | In order to solve a word problem correctly, we need to understand if the problem is a multiplication situation or a division situation. | 3.OA.A.1 Interpret products of whole numbers  3.OA.A.3 (see above) |
| 11 | 11/9 | ….division problem with array... | Students must determine which operation to use based on the word problem situation. | When the size of the rows in an array is unknown, we can use division to solve the problem. | 3.OA.A.2 (see above)  3.OA.A.3 (see above) |
| 12 | 11/13 | practice: various multiplication and division problems | Students practice determining the appropriate operation to match a word problem situation. | When we don’t know the total, we can use multiplication to solve. When we know the total, but we don’t know the size of the groups or the number of groups, we can use division. | 3.OA.A.1 (see above)  3.OA.A.2 (see above)  3.OA.A.3 (see above) |
| 13 | 11/14 | multi-step problem | Students interpret and solve a multi-step word problem | Some word problems require two steps to find the answer. | 3.OA.D.8 Solve two-step word problems using the four operations. |
| 14 | 11/15 | multi-step problem | Students apply their understanding of division and multiplication scenarios to solve a multi-step word problem. | In word problems with 2 steps, we have to read carefully to know what operations match the situations. | 3.OA.D.8 (see above) |
| 15 | 11/16 | Power Builder |  |  |  |
| 16 | 11/17 | Mastery |  |  |  |