Practice Task: Division Four in a Row

STANDARDS FOR MATHEMATICAL CONTENT

MCC5.NBT.6. Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

Be sure students know and understand the appropriate vocabulary used in this task. Provide index cards or sentence strips with key vocabulary words (i.e. quotient, dividend, and divisor). Have students place the cards next to the playing area to encourage the usage of correct vocabulary while playing the game.

As students play this game, it is important to remind them that they can use the calculator **only after** they announce their quotients. Remember that we want students to use estimation skills and mental math strategies to divide a 3-digit number by a 1-digit number.

Even though this standard leads more towards computation, the connection to story contexts is critical. Make sure students are exposed to problems where the divisor is the number of groups and where the divisor is the size of the groups. In fourth grade, students' experiences with division were limited to dividing by one-digit divisors. This standard extends students' prior experiences with strategies, illustrations, and explanations. When the two-digit divisor is a "familiar" number, a student might decompose the dividend using place value.

ESSENTIAL QUESTIONS

- How can estimating help us when solving division problems?
- What strategies can we use to efficiently solve division problems?

MATERIALS

- Color Counters
- "Division Four in a Row" game board (printed on card stock and/or laminated for durability)
- Calculators

GROUPING

Small Group or Partner Task

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION:

In this task, students practice dividing numbers up to 4-digits by 1 and 2-digit numbers in a game format.

Comments

Being able to estimate and mentally divide a 3 and 4-digit number by a 1-digit number is an important pre-requisite skill for dividing a whole number by a 2-digit number. Helping students develop their mental computation or estimation ability in general is also an important focus of Grade 5 CCGPS. This task challenges your students with game boards that contain simple 4-digit numbers in the Dividend Box or multiples of 10 (i.e., 10, 20, … 90) in the Divisor Box.

This practice standards directly addressed within this task are:

3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

KEY TO DIVISION FOUR IN A ROW GAME

$315 \div 10$ 31 R5	$315 \div 9$ 35	$504 \div 28$ 18	$360 \div 15$ 24	$315 \div 3$ 105	$6725 \div 15$ 448 R5
$315 \div 15$ 21	$1684 \div 2$ 842	$6725 \div 3$ 2241 R2	$1684 \div 3$ 561 R1	$1684 \div 15$ 112 R4	$504 \div 28$ 18
$630 \div 15$ 315	$360 \div 7$ 51 R3	$630 \div 15$ 315	$630 \div 15$ 42	210	$1684 \div 10$ 168 R4
$315 \div 3$ 105	$630 \div 15$ 42	$1684 \div 15$ 561 R1	$360 \div 9$ 40	$360 \div 15$ 24	$315 \div 9$ 35
$1684 \div 10$ 168 R4	$504 \div 10$ 50 R4	$1684 \div 15$ 112 R4	$360 \div 9$ 40	$315 \div 10$ 31 R5	$6725 \div 15$ 448 R5
$504 \div 10$ 50 R4	63	$6725 \div 3$ 2241R2	$315 \div 15$ 21	$1684 \div 2$ 842	$360 \div 7$ 51 R3

This game can be made available for students to play independently. However, it is important for students to share some of the strategies they develop as they play. Strategies may include:

- Estimating the product of the number in a desired space with one of the divisors to find the dividend.
- Estimating by rounding the numbers in Box A.
- Using expanded notation for example, $2682 \div 25 = (2000 + 600 + 80 + 2) \div 25$
- Using an equation that relates division to multiplication.
- Using base ten models to make an array.
- An area model for division and keep track of how much of the dividend is left to divide.

TASK:

Students will follow the directions below from the "Division Four in a Row" Game Board.

This is a game for two or three players. You will need color counters (a different color for each player), game board, pencil, paper, and a calculator.

Step 1: Prior to your turn, choose one number from Box A and one number from Box B. Divide these numbers using a mental strategy. Record your answer on a scratch piece of paper. Be prepared with your answer when your turn comes.

Step 2: On your turn, announce your numbers and the quotient for your numbers. Explain your strategy for finding the answer.

Step 3: Another player will check your answer with a calculator after you have announced your quotient. If your answer is correct, place your counter on the appropriate space on the board. If the answer is incorrect, you may not place your counter on the board and your turn ends.

Step 4: Your goal is to be the first one to make "four-in-a-row," horizontally, vertically, or diagonally.

FORMATIVE ASSESSMENT QUESTIONS

- What do you think about what _____ said?
- Do you agree? Why or why not?
- Does anyone have the same answer but a different way to explain it?
- Do you understand what _____ is saying?
- Can you convince the rest of us that your answer makes sense?
- _____ can you explain to us what _____ is doing?
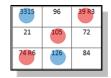
DIFFERENTIATION

Extension

- Have students develop their own game boards to include different divisors, dividends and quotients.
- A variation of the game above is to require each player to place a paper clip on the numbers they use to divide. The next player may move only one paper clip either the one in Box A or the one in Box B. This limits the quotients that can be found and adds a layer of strategy to the game.

Intervention
- Allow students time to view the game boards and work out two or three of the problems ahead of time to check their readiness for this activity.
- Use numbers in Box A that are evenly divisible, and then move to quotients with remainders.

3315	96	39 R3
21	105	72
74 R6	126	84

Name _____ Date _____

Division Four in a Row Game Board

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Dividend					Divisor						
1684	315	360	504	630	2	3	15	7	28	9	10
		6725									

31 R5	35	18	24	105	448 R5
21	842	2241 R2	561 R1	112 R4	18
315	51 R3	315	42	210	168 R4
105	42	561 R1	40	24	35
168 R4	50 R4	112 R4	78 R6	31 R5	448 R5
50 R4	63	2241 R2	21	842	51 R3