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Detailed Lesson Plans

Lesson 1: Relating Multiplication and Division

Standard: 4.NBT.6 Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the process using equations, rectangular arrays, and/or area models.

Standard

Materials:

- Counters (or any other type of manipulative that can be easily counted)
- Relating Multiplication and Division recording sheet

Materials

Mini-lesson

Today we are beginning a brand new unit about division! I realize that you learned a lot about division as third graders, and this year we will take what you already know and go a little farther. By the end of this unit, you'll be able to divide four-digit numbers by 1-digit numbers! We're going to start slow and take things step-by-step. First, can anyone tell me what division is? Give students time to respond. Make sure students understand that division is taking a total number and partitioning it into equal groups.

Mini Lesson

Show students the Relating Multiplication and Division recording sheet (do not distribute yet) and distribute counters. Explain that you are going to model the activity using a dividend of 36, which means you will use 36 counters. Allow students to model how to fill in the various rows with models, division sentences, and multiplication sentences.

Work Time

Work Time

Allow students to work in pairs or groups. They should complete the same steps in the mini lesson using a dividend of 48. Students will be able to group the number 10 different ways (you may need to remind students that they can use the commutative property). Students will draw a picture of each grouping method, as well as write a division equation and a multiplication equation with a missing number. On the back of the paper, students should explain how multiplication and division are related.

Closing

Closing

Select a few students to share their tables with the class. Use this time to ask questions such as: How did you know you could break the counters into 6 groups? Why didn't you have 5 groups? Allow students to share how their observations are alike and different with each other.

Intervention

Dividend of 48 with a dividend of 24

Extension

- Replace the dividend of 48 with a dividend of 24

Extension

Essential Questions

- How can I determine equal groups?
- What is the relationship between multiplication and division?

Essential Questions

Formative Assessment

- Observe students as they work. Students should be able to explain how they solved the division problem.
- Students should see the relationship between multiplication and division operations.

Formative Assessment

Teacher Notes

I sincerely hope that you and your students enjoy this division unit! This unit has been designed around the Common Core Standards, but you should find the content useful in any fourth grade classroom. In this unit you will find performance tasks to conceptually teach new skills through the workshop model, as well as work station activities and games for review. Please note that this version includes an extra week for relating multiplication and division models. This extra week does not include skills practice pages.

Unit at a Glance

Introducing Division	Lesson 1 Connecting Multiplication and Division	Lesson 2 Dividing Starfish	Lesson 3 Interpreting Remainders	Lesson 4 Remainder Game	Lesson 5 Divide by Multiples of Ten
Relating Division	Lesson 6 Place Value and Division	Lesson 7 Using Multiplication to Divide	Lesson 8 Using Place Value to Divide	Lesson 9 Relating the Area Model	Lesson 10 Using an Area Model
Dividing 2 Digit Numbers	Lesson 11 More Area Models	Lesson 12 Even More Area Models	Lesson 13 Spinning Area Models	Lesson 14 Division With Partial Quotient	Lesson 15 Division in Context
Dividing 3 Digit Numbers	Lesson 16 3-Digit Division With Manipulatives	Lesson 17 Transitioning to Partial Quotient	Lesson 18 3 Digit Partial Quotient	Lesson 19 Mixing Strategies	Lesson 20 Division Garden
Dividing 4-Digit Numbers	Lesson 21 Thinking About Efficiency	Lesson 22 Art Day	Lesson 23 4 Digit Partial Quotient	Lesson 24 Interpreting Remainders	Lesson 25 Party Planning

25 Conceptual Lessons

Relating Multiplication & Division

DIVISION WITH AREA MODELS

Directions: Solve the following division problems using the area model.

87÷6

Step 1: Write the divisor on the left side of the box.
Step 2: If you have a 2-digit number, divide your box into two sections. One for the tens place and one for the ones place.

Number Multiplied

Step 3: Find how many times you can multiply by 6 to get the number closest to, but less than 87. Since 20×6 is too large, we should use 10×6, which is 60. Write the 10 on top of the box.

Step 4: Subtract the product of 10×6 from the dividend.
Step 5: Move the difference to the next box.

Step 6: Find how many times you can multiply by 6 to get the number closest to, but less than 27. Since 4×6 is too large, we should use 4×6. Write the 4 on top of the second box.

Step 7: Subtract the product of 4×6 from the number in the box. The difference is the remainder.

Add the numbers in the top of the box for the quotient.

$$87 \div 6 = 14 \text{ R } 3$$

Division Equation

DIVISION WITH THE AREA MODEL

Directions: Solve the following division problems using the area model.

$$65 \div 3 = \dots$$

$$79 \div 4 = \dots$$

$$84 \div 5 = \dots$$

$$56 \div 3 = \dots$$

Division Garden

- There are 84 apples growing on 6 trees in the garden. Each tree holds the same number of apples. Draw ONE of the apple trees and the CORRECT number of apples on the tree.
- There are 306 blueberries grown on nine different blueberry bushes. Each bush contains the same number of blueberries. Draw ONE of the blueberry bushes and the CORRECT number of blueberries on that bush.
- There are 135 broccoli plants growing in three rows. Draw an array to show the crop of broccoli.
- All 252 carrots are grown in nine rows. Draw an array to show the crop of carrots.
- Farmer Brown is growing 82 heads of lettuce. The lettuce is planted in four rows.
- There are pumpkins growing, and will be ready to harvest just in time for fall. There are 128 pumpkins planted in eight rows.
- Several months ago, Farmer Brown planted 105 bean seeds in five rows. Now the beans are growing quickly and are almost ready to be picked.
- The seven rows of corn stalks are growing tall. The 78 corn stalks provide a great windbreak at the edge of the garden.
- Everyone says that the tomatoes in this garden are the best ever! There are 94 tomato plants growing in six different rows.
- There are flowers and herbs growing in the empty spaces. You're welcome to organize these the way you think would best fit in Division Garden.

To give yourself a little extra room, simply tape or glue two pieces of grid paper together. Since the Division Garden is so large, you'll probably want the extra space! You should also add something like a crop with the same of the space. You can write your labels small, so they are not distracting, but make sure they are easily seen. Most importantly, make sure your division is accurate.

DIVISION In Context

- | of Groups Missing | Number in |
|---|--|
| ally planted 9 seeds in 7 rows. How many seeds did he plant? 13 | There were 84 lily pads. How many lily pads on each lily pad? |
| tion, the girls kicked 98 goals. How many goals did each girl kick? 7 | The football coach divided 84 into four bags. How many were in each bag? |
| books and placed them in six boxes. How many books did I have? | There were 84 books. How many books in each class? 28 |
| 696 books. She placed them in 24 shelves. How many books did she have? 29 | There were 96 chickens. How many chickens were in each of the 24 pens? |
| children collected 87. Each child received 29. How many children shared? | The floral shop placed them in many rows. How many rows were there? |

3-DIGIT DIVISION WITH MANIPULATIVES

846 ÷ 6		
hundreds	tens	ones

782 ÷ 4		
hundreds	tens	ones

Name _____

Date _____

Using Area Models

Number in Each Row (factor) _____

Number in Each Row (factor) _____

Number
of Rows

What **multiplication** equation does the array above represent? _____What are the **partial products**? _____

What multiplication equation does the array above represent? _____

Factors tell you the number of _____ and the amount _____

What are the factors in the array above? _____

The product tells you _____ What is the product _____

The dividend tells you the _____ What is the dividend _____

The divisor tells you how many _____ What is the divisor _____

The quotient tells how many _____ What is the quotient _____

What division equation does the array above represent? _____

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Name _____

Date _____

Are You Kidding Me? More Area Models!

Quotient _____

Partial Quotient _____

Partial Quotient _____

Divisor

The dividend tells you the _____ What is the dividend in the array? _____

The divisor tells you how many _____ What is the divisor in the array? _____

The quotient tells how many _____ What is the quotient in the array? _____

What **division** equation does the array above represent? _____

700

50

6

5

What is the total? (dividend) _____ How many groups are there? (divisor) _____

How many are in each group? (quotient) _____

What **division** equation does the area model represent? _____

200

60

8

3

What is the total? (dividend) _____ How many groups are there? (divisor) _____


How many are in each group? (quotient) _____

What **division** equation does the area model represent? _____

25 Practice Sheets

Name: _____ Date: _____

Partial Quotient Practice



10 ÷ 3 =	16 ÷ 4 =
52 ÷ 3 =	87 ÷ 6 =
73 ÷ 5 =	65 ÷ 4 =

Name: _____ Date: _____

The Missing Number

2. $8 \times \dots = 800$

5. $90 \times \dots = 9,000$

8. $300 \times \dots = 3,000$

11. $500 \times \dots = 5,000$


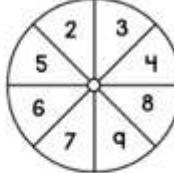
14. $4,000 \times \dots = 20,000$

17. $50 \times \dots = 3,000$

Name: _____

Spin and Divide

Spin is number on both spinners and divide the first number by the second number.

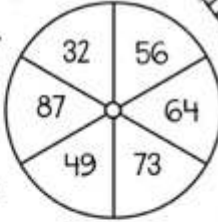



Work Space	
÷	=
÷	=
÷	=
÷	=
÷	=
÷	=
÷	=

Name: _____

SPIN a QUOTIENT

Use a paperclip and pencil to make a spinner. Find a division number sentence with a quotient of the number you spun. Color the number sentence on the game board. If playing with a partner, the first person to color three in a row wins!



$288 \div 9 =$	$488 \div 8 =$	$511 \div 7 =$	$384 \div 6 =$	$245 \div 5 =$
$348 \div 4 =$	$96 \div 3 =$	$112 \div 2 =$	$504 \div 9 =$	$512 \div 8 =$
$448 \div 7 =$	$438 \div 6 =$	$435 \div 5 =$	$196 \div 4 =$	$288 \div 3 =$
$128 \div 4 =$	$280 \div 5 =$	$384 \div 6 =$	$511 \div 7 =$	$392 \div 8 =$
$441 \div 9 =$	$174 \div 2 =$	$261 \div 3 =$	$128 \div 4 =$	$280 \div 5 =$

Name: _____ Date: _____

PARTIAL QUOTIENT

Use the following division problems with a partial quotient method.

1. I had 244 marbles and I lost 4. How many marbles did I have left?

2. I had 244 marbles and I lost 4. How many marbles did I have left?

3. I had 244 marbles and I lost 4. How many marbles did I have left?

4. I had 244 marbles and I lost 4. How many marbles did I have left?

Name: _____

Interpreting Remainders

USE IT	IGNORE IT	ROUND UP
There were 123 children in the school bus. They needed 3 buses to take them all. How many buses were there?	The hotel office had 127 tickets in groups of eight. How many groups of tickets were sold? How many extra tickets were there?	Victor was making neckties out of beads. He needs two beads to make one necktie. How many neckties can he make with 391 beads?
My Grandma placed her 88 chicken eggs in baskets with two eggs in each basket. How many baskets did she use? How many extra eggs did she have?	The Girl Scouts were going on a trip. There were 76 girls on the trip, and they made 10 extra that each held two girls. How many cars were needed?	Christian was building robots with Legos. To build a robot, he needs eight Legos. How many robots can he build with 163 Legos?
Caroline was taking pictures. She took two pictures of each person. She took 100 pictures. How many people did she take 100 pictures of?	My mom placed her 107 pictures in her family photo album. She placed two pictures on a page. How many pages did she use? How many extra pictures were there?	The Boy Scouts went on a canoe trip. There were 58 boys on the trip, and each canoe held three boys. How many canoes did they need?

2 Games

DIVISION BUMP

2 $87 \div 2 =$	3 $98 \div 3 =$	4 $78 \div 4 =$	5 $69 \div 5 =$	6 $59 \div 6 =$	7 $96 \div 7 =$
8 $89 \div 8 =$	9 $74 \div 9 =$	10 $87 \div 10 =$	11 $53 \div 11 =$	12 $76 \div 12 =$	stock 2 to be locked in

13 r4

43 r1

11 r1

53

8 r2

6 r4

3

13 r5

8 r7

DIVISION SCOOT

53 ÷ 2 =

65 ÷ 3 =

74 ÷ 4 =

87 ÷ 5 =

92 ÷ 6 =

99 ÷ 7 =