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Using Place Value to Divide

Objectives

- Use models to regroup numbers for division.
- Find the quotient with regrouping.

Books & Materials

- Math in Focus 4A*
- Workbook 4A*
- counters
- place-value mat

Assignments

- Complete Warm-up.
- Read and complete pp. 96–100, *Math in Focus 4A*.
- Complete pp. 49–54, *Workbook 4A*.
- Continue working on your *Planning a Party Project*.
- Complete Math checkpoint.

Warm-up

First, show the following numbers with your counters and place-value mat. Next divide the blocks into two equal groups. How many tens and how many ones are in each group?

- 82
- 64
- 28
- 44
- 86

Instruction

Read **Learn** on pp. 96–97 in *Math in Focus*. Model the problem with your counters and place-value mat. Notice how you start by dividing the hundreds into equal groups. This is different from multiplication. In vertical multiplication, you start with the ones.

Pay attention as you regroup. After you place all of your hundreds counters into equal groups, you may have some left over. Each leftover hundreds counter is traded for 10 tens counters. Regroup any leftover hundreds to the tens column with the tens that are already there. After you place all of your tens counters into equal groups, you may have some leftover. Each leftover tens counter is traded for 10 ones counters. Regroup any leftover tens to the ones column with any ones that are already there.

Complete **Guided Practice** on pp. 98–100. Use your counters and your place-value mat as you complete each step.

To the Learning Guide

Allow your student to use the counters and place-value mat until he understands the concept. Your student may become frustrated with long division. There are multiple steps so he may feel lost in the problem.

The counters allow your student to visualize the problem and see how division works step by step. Many students want to skip the tangible step of working with the counters. However, the more your student works with the manipulatives, the greater his understanding of the concept of division will be.

Watch For These Common Errors

! Some students may confuse the order to work through a division problem. This is because when you multiply numbers that are stacked vertically, you start with ones and move from right to left. In division, you start with the greatest place value and move from left to right. Remind your student to start with the greatest place value when dividing.

Practice

Complete **Let's Practice** on p. 100 in *Math in Focus*. Then complete pp. 49–54 in *Workbook*.

Project

Continue working on your **Planning a Party Project**.

Wrap-up

Today you learned how to divide using long division. Start with the hundreds place and work from left to right to find the answer.

$$\begin{array}{r}
 376 \\
 2 \overline{)752} \\
 \underline{600} \\
 152 \\
 \underline{-140} \\
 12 \\
 \underline{-12} \\
 0
 \end{array}$$

Complete Math Checkpoint

3.3

Modeling Division with Regrouping

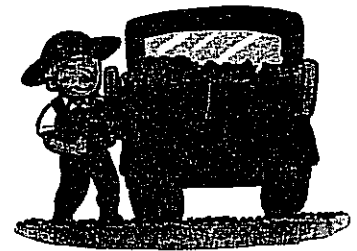
Lesson Objectives

- Model regrouping in division.
- Divide a 3-digit number by a 1-digit number with regrouping.

Vocabulary
regroup

Learn Model division with regrouping in hundreds, tens, and ones.

A farmer sells his crops to 3 restaurants. He divides 525 heads of lettuce equally among the 3 restaurants. How many heads of lettuce does each restaurant receive?



$$525 \div 3 = ?$$

| Hundreds | Tens | Ones |
|----------|-----------|-----------|
| ● | ● ● | ● ● ● ● ● |
| ● | ● ● ● ● ● | ● ● ● ● ● |
| ● | ● ● ● ● ● | ● ● ● ● ● |
| ● | ● ● ● ● ● | ● ● ● ● ● |

↓

| Hundreds | Tens | Ones |
|----------|-----------|-----------|
| ● | ● ● | ● ● ● ● ● |
| ● | ● ● ● ● ● | ● ● ● ● ● |
| ● | ● ● ● ● ● | ● ● ● ● ● |
| ● | ● ● ● ● ● | ● ● ● ● ● |

Step 1

Divide the hundreds by 3.

5 hundreds \div 3 = 1 hundred with 2 hundreds left over

$$\begin{array}{r} 1 \\ 3 \overline{) 525} \\ \underline{300} \\ 2 \end{array}$$

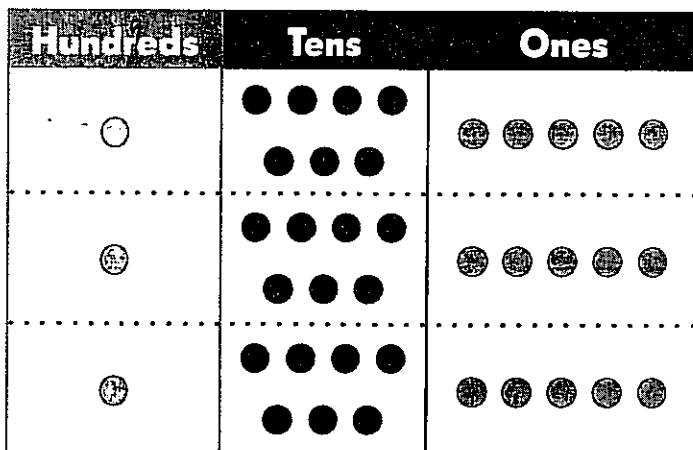
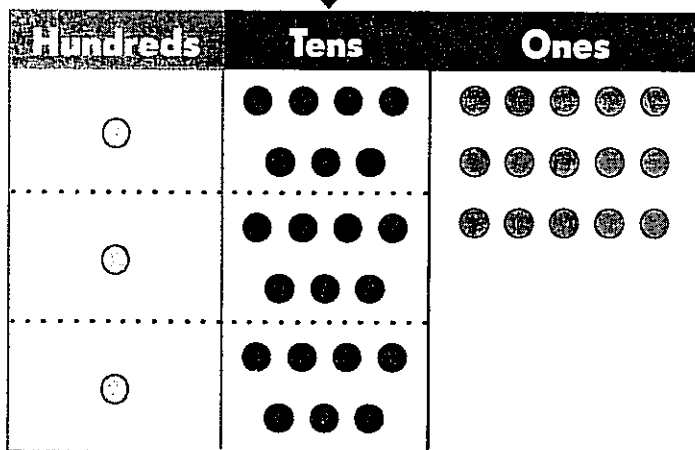
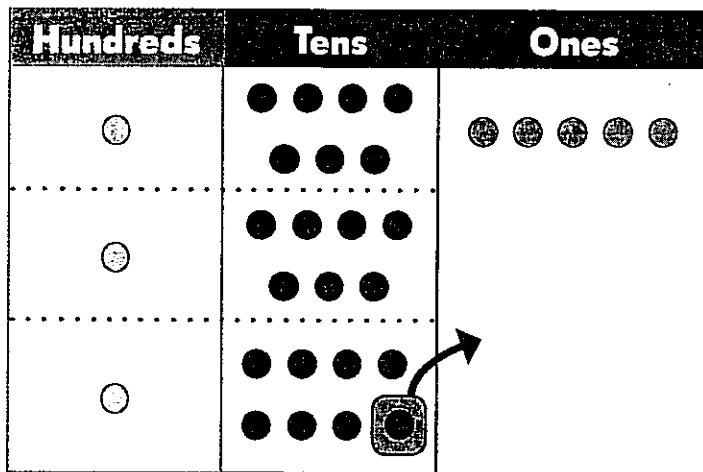
Regroup the hundreds.

2 hundreds = 20 tens

Add the tens.

20 tens + 2 tens = 22 tens

$$\begin{array}{r} 1 \\ 3 \overline{) 525} \\ \underline{300} \\ 225 \end{array}$$



So, $525 \div 3 = 175$.

Each restaurant receives 175 heads of lettuce.

Step 2

Divide the tens by 3.

$22 \text{ tens} \div 3 = 7 \text{ tens}$
with 1 ten left over

$$\begin{array}{r} 17 \\ 3 \overline{) 525} \\ \underline{300} \\ 225 \\ \underline{210} \\ 15 \end{array}$$

Regroup the ten.

1 ten = 10 ones

Add the ones.

$10 \text{ ones} + 5 \text{ ones} = 15 \text{ ones}$

$$\begin{array}{r} 17 \\ 3 \overline{) 525} \\ \underline{300} \\ 225 \\ \underline{210} \\ 15 \end{array}$$

Step 3

Divide the ones by 3.

$15 \text{ ones} \div 3 = 5 \text{ ones}$

$$\begin{array}{r} 175 \\ 3 \overline{) 525} \\ \underline{300} \\ 225 \\ \underline{210} \\ 15 \\ \underline{15} \\ 0 \end{array}$$

Guided Practice

Complete each step.

- 1 The farmer divides 735 carrots equally among 3 restaurants.
How many carrots does each restaurant receive?

$$735 \div 3 = ?$$



| Hundreds | Tens | Ones |
|----------|-------|--------------|
| ● ● | ● ● ● | ● ● ● ● ● |
| ● ● | | |
| ● ● | | |



| Hundreds | Tens | Ones |
|----------|-------|------|
| ● ● | ● ● ● | |
| ● ● | ● ● ● | |
| ● ● | ● ● | |
| ● ● | ● ● ● | |
| ● ● | ● ● | |

Step 1

Divide the hundreds by 3.

$$\begin{array}{r} 2 \\ 3 \overline{) 735} \\ \underline{600} \\ 1 \end{array}$$

7 hundreds \div 3 = 2 hundreds
with 1 hundred left over

Regroup the hundred.

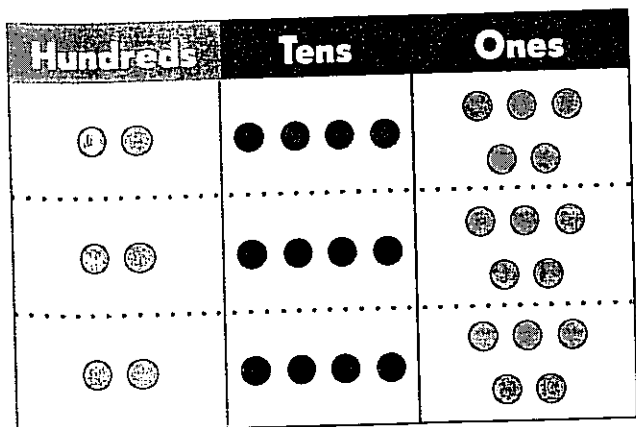
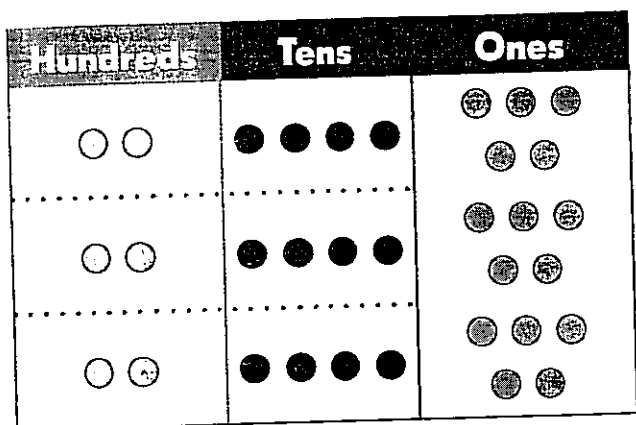
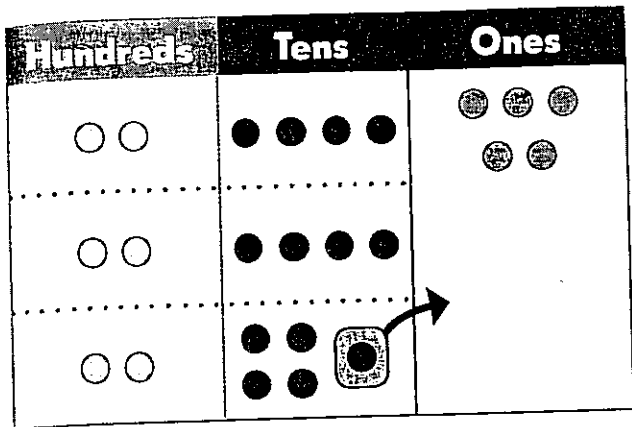
1 hundred = 10 tens

Add the tens.

2 tens + 3 tens

= 5 tens

$$\begin{array}{r} 2 \\ 3 \overline{) 735} \\ \underline{600} \\ 135 \end{array}$$



So, $735 \div 3 =$.

Each restaurant receives carrots.

Step 2

Divide the tens by 3.

$$\begin{array}{r}
 24 \\
 3 \overline{) 735} \\
 \underline{600} \\
 135 \\
 \underline{120} \\
 15
 \end{array}$$

tens \div 3 = tens

with ten left over

Regroup the ten.

ten = ones

Add the ones.

$$\begin{array}{r}
 \text{ones} + \quad \text{ones} \\
 = \quad \text{ones} \\
 24 \\
 3 \overline{) 735} \\
 \underline{600} \\
 135 \\
 \underline{120} \\
 15
 \end{array}$$


Step 3

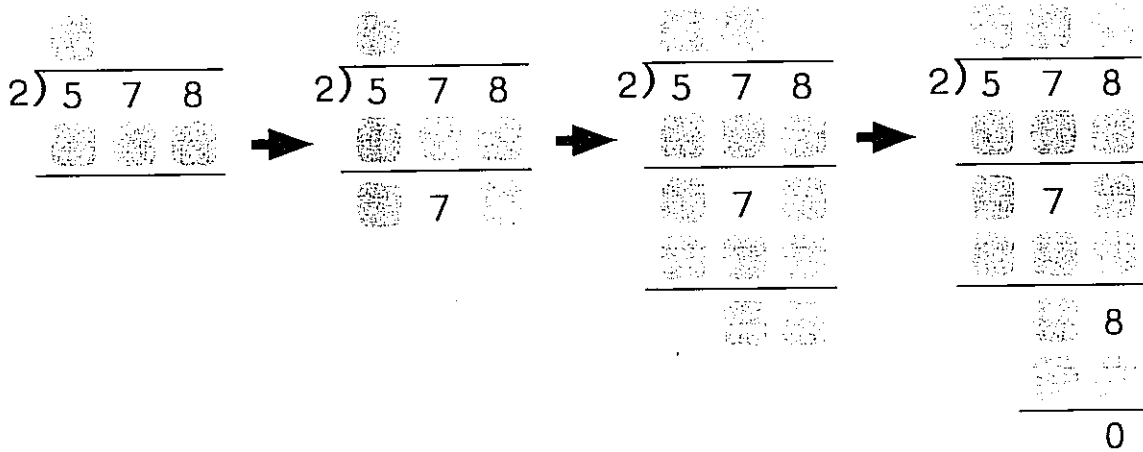
Divide the ones by 3.

ones \div 3 = ones

$$\begin{array}{r}
 245 \\
 3 \overline{) 735} \\
 \underline{600} \\
 135 \\
 \underline{120} \\
 15 \\
 \underline{15} \\
 0
 \end{array}$$


Find the missing numbers.


2 $578 \div 2 =$ 





$$\begin{array}{r} 2 \overline{) 578} \\ \underline{10} \\ 7 \\ \underline{14} \\ 8 \\ \underline{16} \\ 0 \end{array}$$

Divide.

3 $338 \div 2 =$ 

4 $345 \div 5 =$ 


5 $656 \div 4 =$ 


6 $138 \div 3 =$ 


7 Mr. Young has 256 stickers. He gives each of his 8 grandchildren an equal number of stickers. How many stickers does each grandchild get?


Let's Practice


Divide.


1 $267 \div 3 =$ 

2 $528 \div 4 =$ 

3 $465 \div 5 =$ 

4 $714 \div 7 =$ 

5 $837 \div 9 =$ 

6 $952 \div 8 =$ 

ON YOUR OWN

**Go to Workbook A:
Practice 3, pages 49–54**

Practice 3 Modeling Division with Regrouping

Lisa cannot remember the steps to divide.
Help her complete the steps.

Example

1.

| | | | | | | | | | |
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| 1 | <table style="margin: 0 auto; border-collapse: collapse;"> <tr> <td style="border-right: 1px solid black; padding: 5px 10px;">4</td> <td style="padding: 5px 10px;">6</td> <td style="padding: 5px 10px;">8</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 5px 10px;">3</td> <td style="padding: 5px 10px;">0</td> <td style="padding: 5px 10px;">0</td> </tr> </table> | | | 4 | 6 | 8 | 3 | 0 | 0 |
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| 3 | 0 | 0 | | | | | | | |

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| □ | 6 | □ | | | | | | | | | | | |

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Divide. Then use the quotients to complete the number puzzle.

Down

3. $2 \overline{) 798}$

4. $3 \overline{) 849}$

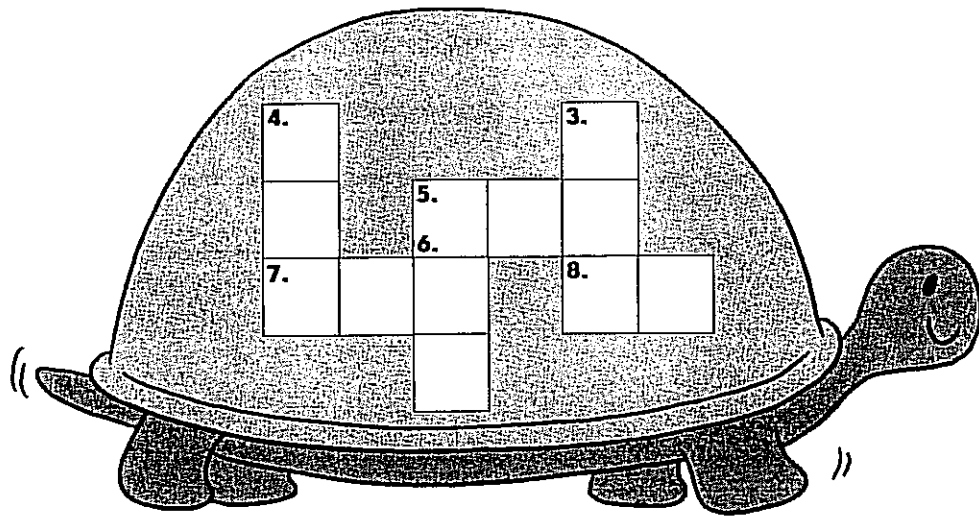
5. $4 \overline{) 696}$

Across

6. $5 \overline{) 695}$

7. $2 \overline{) 754}$

8. $4 \overline{) 372}$



Divide. Then solve the riddle.

9.

$$2 \overline{) 346}$$

S

$$4 \overline{) 760}$$

T

$$3 \overline{) 489}$$

U

$$5 \overline{) 855}$$

E

$$3 \overline{) 870}$$

M

$$4 \overline{) 528}$$

P

$$5 \overline{) 705}$$

K

$$3 \overline{) 375}$$

R

Which pet makes the loudest noise?

Match the letters to the quotients below to find out.

190

125

163

290

132

171

190

Divide.

10. $516 \div 2 = \underline{\hspace{2cm}}$

11. $144 \div 3 = \underline{\hspace{2cm}}$

12. $396 \div 4 = \underline{\hspace{2cm}}$

13. $885 \div 5 = \underline{\hspace{2cm}}$

Look at the steps for dividing a 3-digit number by a 1-digit number.

Example

This shows the steps in division.

| Step 1 | Step 2 | Step 3 | Step 4 | Step 5 |
|--|--|---|--|--|
| $\begin{array}{r} 1 \\ 5 \overline{) 695} \\ \underline{500} \\ 1 \end{array}$ | $\begin{array}{r} 1 \\ 5 \overline{) 695} \\ \underline{500} \\ 195 \end{array}$ | $\begin{array}{r} 13 \\ 5 \overline{) 695} \\ \underline{500} \\ 195 \\ \underline{150} \\ 4 \end{array}$ | $\begin{array}{r} 13 \\ 5 \overline{) 695} \\ \underline{500} \\ 195 \\ \underline{150} \\ 45 \end{array}$ | $\begin{array}{r} 139 \\ 5 \overline{) 695} \\ \underline{500} \\ 195 \\ \underline{150} \\ 45 \\ \underline{45} \\ 0 \end{array}$ |

Write a number for each instruction box to match the instruction with the correct step for division. The first one has been done for you.

Divide the hundreds by 5.

Step 1

Divide the ones by 5.

Step

Divide the tens by 5.

Step

Regroup the remaining hundreds. Add the tens and ones.

Step

Regroup the remaining tens. Add the ones.

Step

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Complete the division.

14.

| Step 1 | Step 2 | Step 3 | Step 4 | Step 5 |
|----------------------|----------------------|----------------------|----------------------|----------------------|
| $4 \overline{) 752}$ | $4 \overline{) 752}$ | $4 \overline{) 752}$ | $4 \overline{) 752}$ | $4 \overline{) 752}$ |
| → | → | → | → | |

Then write the steps, using the exercise on page 53 as a guide.

Step 1

Step 2

Step 3

Step 4

Step 5
