SCHOLASTIC
Do The Math
Created by Marilyn Burns

FROM MARILYN BURNS

Each module includes a series of thirty 30-minute step-by-step lessons. Preparation material is provided before each section of five lessons including this overview letter from Marilyn Burns.

In Lessons 21–25, students...

- Use the inverse relationship between division and multiplication to solve problems.
- Calculate the quotients and remainders for two-digit dividends divided by one-digit divisors.
- Communicate ideas with key math vocabulary: *division equation, dividend, divisor, quotient,* and *remainder.*

Dear Colleague,

These lessons introduce students to using long division notation when solving problems with greater numbers. The problems in these lessons are again presented in the context of forming relay teams, which builds on students' familiarity from their prior experience solving these types of problems. Also, even though the previous lessons have moved students toward relying on numerical skills, here the students again model solutions with tiles, thus giving them additional support for building their understanding.

To help them learn to record with long division notation, students first solve problems that do not present them with numerical challenges. Then they apply their new learning to problems with greater numbers, solving problems with and without remainders.

There are 30 students.
Each team has 5 students.
Can they make teams with no one left out?
How many teams can they make?

$$5\overline{)30}\quad 6 \qquad 30 \qquad 0 \qquad 6 \times 5 = 30$$

The procedure that students learn for recording long division differs from how students have traditionally been taught. Rather than the divide-multiply-subtract-bring down procedure, here students learn how to figure out partial quotients, which they then combine to figure out the answer. They are encouraged to use 10 as a partial quotient when possible to benefit from our place-value numeration system.

$$3\overline{)43}\quad 4 \qquad 10 \qquad 14\ R1 \qquad 30 \qquad 13 \qquad 10 \times 3 = 30 \qquad 12 \qquad 1 \qquad 4 \times 3 = 12$$

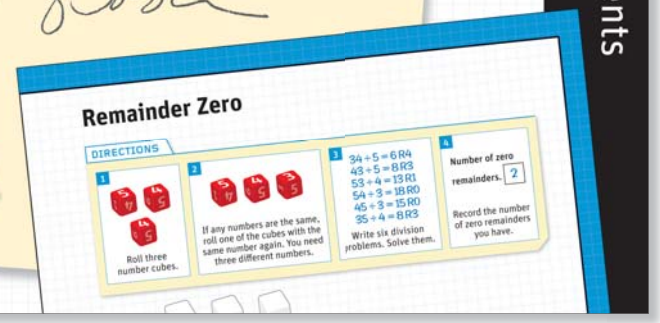
> "These lessons introduce students to using long division notation when solving problems with greater numbers."

Finally students practice division by learning to play *Remainder Zero*, a game in which they generate six division problems from rolling three number cubes, solve them (using long division as needed), and see how many problems result in a remainder of zero.

Marilyn Burns

Lessons 21–25

Calculate Quotients and Remainders



94 Calculate Quotients and Remainders

Division B: *Facts through 100 ÷ 10*
Teacher Guide, pages 94–95

Teacher Guide
Letter: Lessons 21–25

SCHOLASTIC

Do The Math

Created by
Marilyn Burns

See pages 36–39 for full lesson.

See pages 40–42 for full lesson.

The planner gives you an overview of lessons in series of five to help with lesson planning and preparation.

PLANNER

	LESSON 21	LESSON 22	LESSON 23	LESSON 24	LESSON 25
Lesson Summary	Students use long division to solve division problems set in the context of forming relay teams.	Students continue to use long division to solve division problems, now with remainders.	Students solve problems using long division for two-digit dividends and one-digit divisors.	Students play a division game that gives them practice dividing two-digit dividends by one-digit divisors.	ASSESSMENT ✓ Progress Monitoring Students demonstrate understanding of the objectives of Lessons 21–24 by completing a *WorkSpace* page independently.
Objectives Find an alignment to standards at www.scholastic.com/DoTheMath/community	• Use the inverse relationship between division and multiplication to solve problems. • Calculate the quotients and remainders for two-digit dividends and one-digit divisors. • Communicate ideas with key math vocabulary: *dividend, divisor, quotient,* and *remainder.*	• Use the inverse relationship between division and multiplication to solve problems. • Calculate the quotients and remainders for two-digit dividends and one-digit divisors. • Communicate ideas with key math vocabulary: *dividend, divisor, quotient,* and *remainder.*	• Use the inverse relationship between division and multiplication to solve problems. • Calculate the quotients and remainders for two-digit dividends and one-digit divisors. • Communicate ideas with key math vocabulary: *dividend, divisor, quotient,* and *remainder.*	• Use the inverse relationship between division and multiplication to solve problems. • Calculate the quotients and remainders for two-digit dividends and one-digit divisors. • Communicate ideas with key math vocabulary: *dividend, divisor, quotient,* and *remainder.*	• Use the inverse relationship between division and multiplication to solve problems. • Calculate the quotients and remainders for two-digit dividends and one-digit divisors. • Communicate ideas with key math vocabulary: *division equation, dividend, divisor, quotient,* and *remainder.*
Materials T = Teacher Bag G = Games Bag S = Student Bag	• *WorkSpace* page 52 • color tiles S T	• *WorkSpace* page 53 • color tiles S T	• *WorkSpace* pages 54 and 55	• *WorkSpace* pages 56–58 • number cubes (1–6) S T • *Do The Math Community News*	• *WorkSpace* pages 59–63 • number cubes (5–9, roll again) G
Built-in Differentiation	Using **manipulatives** to model a problem before solving it supports students as they convert the problem from the concrete representation to symbolic representation.	**Language development** through word problems allows students to build their math vocabulary and skill explaining how to solve division equations.	Working in pairs to solve problems by comparing answers, communicating their thinking, defending their answer, and explaining how to solve the problems, all support and reinforce students' **vocabulary development.**	Playing a game **cooperatively** with the support and help of a partner enables students to develop confidence and competence.	Assessing students with **familiar problems** that students have used in these lessons allows students to show their understanding without having to approach the material in an unfamiliar format.

TeacherSpace™: Division CD-ROM contains videos, professional articles, and reproducibles to support teaching these lessons.

Lessons 21–25

Calculate Quotients and Remainders

96 Calculate Quotients and Remainders

Teacher Guide
Planner: Lessons 21–25

Division B: *Facts through 100 ÷ 10*
Teacher Guide, pages 96–97

SCHOLASTIC
Do The Math
Created by
Marilyn Burns

LESSON 23 Solving division problems with partial quotients

Last lesson Students continue to use long division to solve division problems, now with remainders.

Lesson 23 Students solve problems using long division for two-digit dividends and one-digit divisors.

Next Lesson Students play a division game that gives them practice dividing two-digit dividends by one-digit divisors.

Lesson Summary

Students solve problems using long division for two-digit dividends and one-digit divisors.

Objectives

- Use the inverse relationship between division and multiplication to solve problems.
- Calculate the quotients and remainders for two-digit dividends and one-digit divisors.
- Communicate ideas with key math vocabulary: *dividend, divisor, quotient,* and *remainder.*

Materials

- *WorkSpace* pages 54 and 55

Language Development

Key Math Vocabulary

ENGLISH	SPANISH
dividend	*dividendo*
divisor	*divisor*
quotient	*cociente*
remainder	*residuo*

Academic Vocabulary

ENGLISH	SPANISH
multiplication equation	*ecuación de multiplicación*

Cognates are shown in italics; pointing out the similarity of these words to their English equivalents will help your Spanish-speaking students acquire vocabulary.

WHOLE GROUP

STEP 1 Demonstrate solving a division problem by taking out 10s.

1 Introduce the lesson.

Today we will continue to solve division problems using long division.

2 Present a problem.

Write the long division for 42 ÷ 3 on the board.

3)42

To solve the problem, I can write the related multiplication, but it doesn't help me because I don't know what number times 3 is 42.

I do know that there are at least 10 groups of 3 in 42. I know that because 10 × 3 = 30 and 30 is less than 42.

Record the multiplication equation, 10 in the quotient and 30 under 42.

```
  10
3)42
  30    10 × 3 = 30
```

When I subtract I get 12. Then I think: What number times 3 is 12? I know that 4 times 3 equals 12, so I can write 4 above the 10.

```
   4
  10
3)42
  30    10 × 3 = 30
  12
  12    4 × 3 = 12
   0
```

3 Demonstrate how to figure the answer.

We have 10 groups of 3 in 42 and another 4 groups of 3 in 42. In all, that is 14 groups of 3 in 42.

Draw lines from 4 and 10 and write 14.

```
   4 >14
  10
3)42
  30    10 × 3 = 30
  12
  12    4 × 3 = 12
   0
```

So the answer to the problem 42 ÷ 3 is 14.

4 Show how to check the answer.

Just to be sure, I can check to see if 14 × 3 equals 42.

Multiply 14 × 3 on the board.

```
   4 >14
  10                     14
3)42                    × 3
  30    10 × 3 = 30      42
  12
  12    4 × 3 = 12
   0
```

So 14 is correct.

WHOLE GROUP

STEP 2 Demonstrate a second example.

1 Solve 64 ÷ 5.

Write the long division for 64 ÷ 5 on the board.

I know that there are at least 10 groups of 5 in 64 because 10 × 5 = 50 and 50 is less than 64.

```
  10
5)64
  50    10 × 5 = 50
  14
```

When I subtract I get 14.

I ask myself: What number times 5 is close to 14? 2 times 5 equals 10, so I can write 2 in the quotient. Then I add 10 + 2 to figure the quotient. The remainder is 4.

Record the long division.

```
   2 >12 R4        12
  10              × 5
5)64               60
  50    10 × 5 = 50   + 4
  14               64
  10    2 × 5 = 10
   4
```

2 Show how to check the answer.

To check, multiply the quotient, 12, by the divisor, 5. Then add the remainder. We get 64, so 12 R4 is correct.

CONTINUE

B

Teacher Guide
Lessons 23

Division B: *Facts through 100 ÷ 10*
Teacher Guide, pages 106–107

continued

LESSON 23 Solving division problems with partial quotients

WHOLE GROUP

STEP 3 Elicit student responses to solve a problem.

❶ Present a problem.

Write the problem on the board.

$4\overline{)52}$

❷ Students help solve the problem.

As you ask students the following questions, record on the board.

I don't know what number times 4 is 52, so let's begin with 10. Are there at least 10 groups of 4 in 52? (yes)

How do you know? (10 × 4 = 40 and 40 is less than 52)

How much is left? (12) *How did you figure that?* (subtracted 40 from 52)

$$\begin{array}{r} 10 \\ 4\overline{)52} \\ 40 \\ \underline{12} \end{array} \quad 10 \times 4 = 40$$

How many 4s are there in 12? (3)

What is 3 × 4? (12)

Record as shown.

$$\begin{array}{r} 3 \\ 10 \\ 4\overline{)52} \\ 40 \\ 12 \\ \underline{12} \end{array} \quad \begin{array}{l} \\ \\ \\ 10 \times 4 = 40 \\ \\ 3 \times 4 = 12 \end{array}$$

What is the remainder? (0)

What is the quotient? (13)

How did you get the quotient? (added 10 + 3)

Record on the board as shown.

$$\begin{array}{r} 3 \\ 10 \\ 4\overline{)52} \\ 40 \\ 12 \\ \underline{12} \\ 0 \end{array} \quad \begin{array}{l} \rightarrow 13 \\ \\ \\ 10 \times 4 = 40 \\ \\ 3 \times 4 = 12 \end{array}$$

❸ Students check the answer.

You can check to see if 13 is correct by multiplying 13 × 4 to see if it is 52.

Have students calculate 13 × 4. Choose a student to record his or her multiplication on the board.

$$\begin{array}{r} 3 \\ 10 \\ 4\overline{)52} \\ 40 \\ 12 \\ \underline{12} \\ 0 \end{array} \quad \begin{array}{l} \rightarrow 13 \\ \\ \\ 10 \times 4 = 40 \\ \\ 3 \times 4 = 12 \end{array} \quad \begin{array}{r} 13 \\ \times\, 4 \\ \hline 52 \end{array}$$

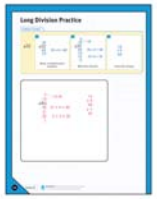
PARTNERS

STEP 4 Students solve a problem.

❶ Partners solve a problem.

Have students turn to *WorkSpace* page 54.

Now you and your partner will solve the problem together, but each of you will record it on the WorkSpace page.



Give time for students to think, pair, share to solve the problem.

❷ Record the solution.

Choose a student to tell the steps and his or her thinking as he or she solved the problem, and record on the board.

$$\begin{array}{r} 5 \\ 10 \\ 4\overline{)61} \\ 40 \\ 21 \\ \underline{20} \\ 1 \end{array} \quad \begin{array}{l} \rightarrow 15 \text{ R1} \\ \\ \\ 10 \times 4 = 40 \\ \\ 5 \times 4 = 20 \end{array} \quad \begin{array}{r} 15 \\ \times\, 4 \\ \hline 60 \\ +\, 1 \\ \hline 61 \end{array}$$

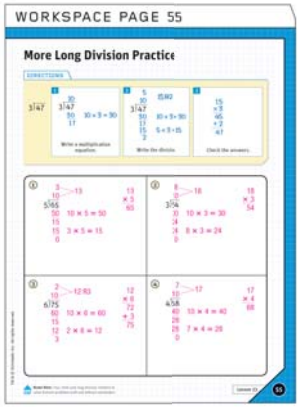
Have students compare their solution to the one on the board and make corrections or changes as necessary.

INDIVIDUALS

STEP 5 Students solve division problems.

❶ Students complete *WorkSpace* page 55.

Now you will solve some problems on your own. You may talk to your partner as you solve them or you may both wait until you are finished to compare your solutions.



SUPPORTING INSTRUCTION

Circulate around the room giving assistance as needed. If a student happens to know the answer without going through the steps, that's fine, but have him or her check the answer with multiplication.

STOP

Division B: *Facts through 100 ÷ 10*
Teacher Guide, pages 108–109

LESSON 25 Assessing student understanding

Last Lesson Students play a division game that gives them practice dividing two-digit dividends by one-digit divisors.

Lesson 25 Students demonstrate understanding of the lesson objectives of Lessons 21–24.

Next Lesson Students play *Remainder Zero* giving them practice dividing two-digit dividends and one-digit divisors.

Lesson Summary

Students demonstrate understanding of the objectives of Lessons 21–24 by completing a *WorkSpace* page independently.

Objectives

- Use the inverse relationship between division and multiplication to solve problems.
- Calculate the quotients and remainders for two-digit dividends and one-digit divisors.
- Communicate ideas with key math vocabulary: *division equation, dividend, divisor, quotient,* and *remainder.*

Materials

- ***WorkSpace*** pages 59–63
- **number cubes** (5–9, roll again)

= Games Bag

Language Development

Key Math Vocabulary

ENGLISH	SPANISH
dividend	*dividendo*
division equation	*ecuación de división*
divisor	*divisor*
quotient	*cociente*
remainder	residuo

Academic Vocabulary

ENGLISH	SPANISH
multiplication equation	*ecuación de multiplicación*

Cognates are shown in italics; pointing out the similarity of these words to their English equivalents will help your Spanish-speaking students acquire vocabulary.

INDIVIDUALS

STEP 1 Students complete an assessment.

1 Introduce the lesson.

Today you will show what you know by completing a WorkSpace *page and then you will play* Division Bingo.

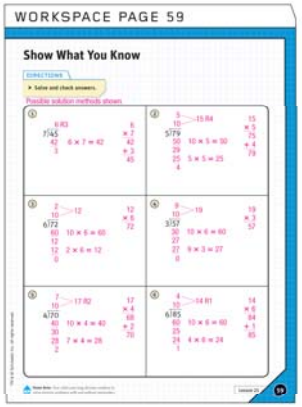
2 Explain the directions for the assessment.

Have students turn to *WorkSpace* page 59. Explain that they will be doing the same kinds of problems that they have been doing each day.

3 Students complete page 59 independently.

Give students as much time as they need to complete the assessment page.

WORKSPACE PAGE 59



PARTNERS

STEP 2 Students play a game.

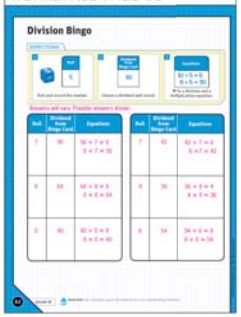
1 Students play *Division Bingo*.

As a student finishes the assessment, have him or her pair up with someone else who is finished. They should play quietly while others are completing their assessment.

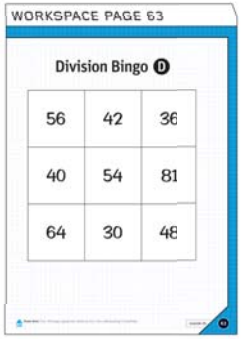
Students should record their equations on *WorkSpace* page 60 and use the *Division Bingo* card C on *WorkSpace* page 61.

If time allows, they can play *Division Bingo* again but this time recording equations on *WorkSpace* page 62 and using the *Division Bingo* card D on *WorkSpace* page 63.

WORKSPACE PAGE 62



WORKSPACE PAGE 63



AFTER THE LESSON

B

Teacher Guide
Lessons 25

Division B: *Facts through 100 ÷ 10*
Teacher Guide, pages 114–115

To review the full size Annotated Teacher Version of this *WorkSpace* see page 43.

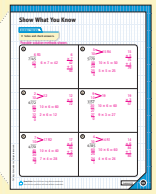
LESSON 25 continued
Assessing student understanding

ASSESSMENT ✓ **Progress Monitoring**

Objectives
- Use the inverse relationship between division and multiplication to solve problems.
- Calculate the quotients and remainders for two-digit dividends and one-digit divisors.
- Communicate ideas with key math vocabulary: *division equation, dividend, divisor, quotient,* and *remainder.*

Assess

Use the annotated page to correct *WorkSpace* page 59.



Note the progress of each student in the appropriate rows on the tracking chart on page 143.

Differentiating Instruction

Although the lessons are carefully scaffolded and paced at a rate more likely to give students a chance for optimal learning, there will be instances when students are still struggling and need extra support. Also, there will be instances when students would benefit from additional challenges or practice. Try the teaching ideas below.

For Students Who Need More Support

For students who work slowly to solve the six division problems when playing *Remainder Zero,* modify the game rules so that they only need to choose four of the six problems to solve. The winning team is still the one with the greater number of zero remainders.

For Students Ready for a Challenge

Have the student play *Remainder Zero* by himself or herself using the 3-9 number cube, the 4-9 number cube, and the 1-6 number cube. The dividends will range up to 98 making more challenging division problems. The student could also play against another student who is ready for a challenge.

Division B: *Facts through 100 ÷ 10*
Teacher Guide, page 116

Show What You Know

DIRECTIONS
➤ Solve and check answers.

Possible solution methods shown.

① 7)45 — 6 R3; 42; 3; 6 × 7 = 42; 6 × 7 = 42; + 3 = 45

② 5)79 — 15 R4; 50; 29; 25; 4; 10 × 5 = 50; 5 × 5 = 25; 15 × 5 = 75; + 4 = 79

③ 6)72 — 12; 60; 12; 12; 0; 10 × 6 = 60; 2 × 6 = 12; 12 × 6 = 72

④ 3)57 — 19; 30; 27; 27; 0; 10 × 6 = 60; 9 × 3 = 27; 19 × 3 = 57

⑤ 4)70 — 17 R2; 40; 30; 28; 2; 10 × 4 = 40; 7 × 4 = 28; 17 × 4 = 68; + 2 = 70

⑥ 6)85 — 14 R1; 60; 25; 24; 1; 10 × 6 = 60; 4 × 6 = 24; 14 × 6 = 84; + 1 = 85

Home Note: Your child uses long division notation to solve division problems with and without remainders.

Division B: *Facts through 100 ÷ 10*
Annotated WorkSpace, page 59