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Introduction

The Complete Book of Multiplication and Division provides all the necessary tools to review basic multiplication and division and introduce students to more advanced number theories that build on their basic fact knowledge. This resource guide features 11 lessons that contain strategies to help students review and master basic multiplication and division facts and 15 lessons to teach them to apply this knowledge to more advanced concepts. Learning math is a developmental process. That is why each lesson in this book focuses on a specific skill to enable students to build on prior knowledge as they learn a new concept. Each lesson is tied to the National Council of Teachers of Mathematics (NCTM) standards. Before you begin to teach a lesson, refer to the NCTM Standards Correlation chart on page 7 to identify the standards you will be teaching.

Each lesson includes a complete, simple-to-use lesson plan. The teacher pages in lessons 1–11 include objectives for student learning, direct instruction, guided practice, and assessment to provide students with a review of basic facts and practice for students who have not yet achieved mastery. The teacher pages in lessons 12–26 consist of objectives for student learning, direct instruction, guided practice, independent practice, and assessment as students are introduced to more advanced multiplication and division concepts. These components will provide thorough instruction to students as they are introduced to the new skills through a whole-class lesson, as they practice the new skills with your assistance and then independently, and as they complete a quiz to assess their comprehension. Use the Answer Key (pages 135–144) to check students' work on all the quizzes, tests, and practice pages in this resource.

Throughout this book, students are taught to use a thinking or reasoning approach rather than solely rote memory. To help them with this approach, lessons emphasize the use of manipulatives and pictures as well as the use of making connections to prior knowledge. Students are also encouraged to use mental math to help them achieve mastery of new concepts. This book is filled with interactive practice activities and games for partners, small groups, and the whole class to keep students actively participating in the learning process and to keep them motivated and excited about learning multiplication and division.

You will be amazed at how easily students will learn to use multiplication and division as you incorporate the lessons in this book into your everyday math curriculum. Your students will feel a sense of excitement and accomplishment each time they master a new skill area and will be overjoyed when they are congratulated on their achievement!

How to Use This Book

LESSONS

The first 11 lessons in this book review basic multiplication and division facts with students. The next 15 lessons introduce students to more advanced concepts that build upon their basic fact knowledge. For that reason, begin with lesson 1 if students need basic fact review. If students have mastered their basic facts, begin with lesson 12.

- **Lessons 1–8** teach basic multiplication facts and **lessons 9–11** teach basic division facts and help students make the connection between multiplication and division by introducing them to fact families. Each lesson includes teacher directions, a student practice page, and a quiz to assess their mastery.
- **Lessons 12–26** introduce students to more advanced number theory concepts. It is important that students have mastery of their basic facts prior to their introduction to these new concepts because these lessons teach students to apply their basic facts knowledge to more advanced concepts (i.e., dividing with two-digit divisors). Each of these lessons includes teacher directions, student practice pages, games, and a quiz to assess their mastery.

As students are introduced to new concepts, review prior lessons or basic knowledge that will help them master the new concept. Continually assess students' understanding and make adjustments to your teaching based on students' needs (see Differentiated Instruction on page 6).

EXTENSIONS

- ✓ If students need additional practice with basic facts, create sets of flash cards for partners or for students to take home to practice with their family. You can also use flash cards in a game format for use with the whole class. Choose five students to sit in chairs at the front of the classroom. Choose five more students to stand behind the seated students. Invite the remaining students to form a line. Challenge each pair (sitting vs. standing) to be the first to correctly answer the fact on a flash card. Have the winner of each pair sit down in the chair, and invite the students in the line to replace the standing students. (Have all of the standing students remain where they are until after the fifth pair has answered their question. Then, ask all of the students who are non-winners to walk to the back of the line together to avoid bad feelings.)
- ✓ Invite students to create their own word problems, similar to the ones students complete on the Problem Solving & Practice pages throughout lessons 12–26. Have students switch word problems with a partner and try to correctly answer their partner's problems. This type of activity will further increase students' mastery of new concepts because students will practice the new concept and internalize its rules and steps as they create their own word problems as well as when they solve someone else's problems.

Before you begin teaching the lessons in this resource book, take time to review the Table of Contents and the NCTM Standards Correlation chart (page 7) to help you understand what skills and standards will be met as you teach each lesson. Read through the following information to get a better feeling for the format of each lesson and the activities that are included in each and their purpose. Also, read the information on differentiated instruction (page 6) so you can plan ahead of time how to meet the needs of *all* the students in your classroom.

How to Use This Book

ASSESSMENT

- ✓ Pretest, quizzes, and a cumulative test are all included in this book.
- ✓ **Pretest (pages 132–133):** Use this after reviewing basic multiplication and division facts with students (lessons 1–11) or prior to teaching each advanced concept lesson (lessons 12–26). There are two questions to assess students' knowledge of each skill in lessons 12–26.
- ✓ **Quizzes:** Each lesson ends with a quiz with questions to assess students' mastery of the newly learned skill. Many quizzes also contain ten review questions to assess their retention of past skills. Challenge students to complete each test several times, quicker each time. Or, give each student a quiz and announce the time at 30-second or 1-minute intervals. Students who finish within that interval can write the time at the top of their paper and turn it over.
- ✓ **Cumulative Test (page 134):** The questions assess students' ability to answer questions based on each lesson in this book.
- ✓ **Teacher Record Sheet (page 131):** Keep records for the whole class or individual students.
- ✓ **Whole Class:** Write each student's name on the left side of the chart. Each time students take a test or quiz, record their results in the corresponding column.
- ✓ **Individuals:** Copy a chart for each student. Have students take the quizzes several times (as suggested in the lessons) to challenge them to "beat their time" and show their mastery of the skill. Write the date the student took the quiz on the left side of the chart, and record his or her score in the corresponding column. This individualized chart will provide a "running record" of students' growth throughout the school year.

Differentiated Instruction

Each lesson begins with a teacher lesson plan and includes student practice pages, games, problem-solving activities (lessons 12–26), and a quiz. It is important to realize that differentiated instruction does NOT mean you need to teach each student separately. It is more accurate to refer to it as a method of presenting the same skill or topic to all your students through several different learning experiences to enhance each student's ability to "get it."

Lessons 12–26 provide you with a whole-class lesson, guided practice, independent practice, and assessment. Some students may need more guided practice while some may need more independent practice. Shape the method of presentation and practice of activities within the lessons to fit the needs of your students. Have some students independently complete reproducibles that are presented as guided practice and others complete with teacher assistance reproducibles that are presented as independent practice. It is important for you to use the strategies and methods presented for learning concepts in a way that helps your students achieve and be successful!

A suggested time limit is given for each quiz at the end of a lesson. Use this time limit as a guideline for your assessment. Provide additional time for students who need it, and challenge other students to "beat their time" and complete the quiz with 90–100% accuracy in a shorter amount of time.

Give students a sense of ownership in their learning and assessment. Copy all of the pages in a lesson and staple them together to make a packet for each student. Invite students to complete the pages one at a time, beginning with the first page. Once they have completed a reproducible, have them check their answers on pages 135–144. Ask students to circle the answers they got wrong and to show you their paper. Discuss the incorrect problems with them and any questions they may have. Then, have students redo the incorrect problems until they correctly answer them. Tell students to record on the Teacher Record Sheet (page 131) how many they missed on their first try. When students are ready to complete an activity for partners, tell them to write their name on the chalkboard and work with another student who is at the same stage. This process will allow students to work at their own pace and receive help when they need it. It will also provide you with time to meet individually with students to assess their understanding as well as provide you with a visual record of your students' achievement through a skill area.

Differentiated instruction allows you to plan your teaching to meet the needs of all your students by assessing where they are and moving forward in a direction that will help them achieve. By presenting the lessons and activities this way, you will make learning accessible to every student in your classroom and allow each one to shine as he or she masters a new skill!

Each lesson in this book begins with objectives for student learning. Because students learn differently, and at different rates, it is important to differentiate your instruction to meet the needs of *all* your students. The activities in each lesson enable you to do this.

NCTM Standards Correlation

	Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5	Lesson 6	Lesson 7	Lesson 8	Lesson 9	Lesson 10	Lesson 11	Lesson 12	Lesson 13	Lesson 14	Lesson 15	Lesson 16	Lesson 17	Lesson 18	Lesson 19	Lesson 20	Lesson 21	Lesson 22	Lesson 23	Lesson 24	Lesson 25	Lesson 26
Arrays		•			•			•												•						
Basic Division Facts									•	•	•						•	•	•	•						
Basic Multiplication Facts	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•				•	•	•	•	•	•	•
Decimals																•						•	•	•		•
Divide with Two-Digit Divisors																		•	•							•
Division									•	•	•						•	•	•	•						•
Estimation																•			•					•		
Fact Families									•	•	•															
Factoring													•			•										•
Fractions																					•		•			
Least Common Denominator																					•					
Least Common Multiple																					•					
Mental Math												•						•								
Money			•			•		•									•					•				•
Multiples												•	•	•			•	•			•					
Multiplication	•	•	•	•	•	•	•	•				•	•	•	•	•				•	•	•	•	•	•	•
Multiply by Two or More Digits												•	•	•	•							•	•	•		
Percents																							•	•		
Prime Numbers													•													•
Square Numbers & Roots																				•						

LESSON
1

Multiply with 0, 1, and 10

DIRECT INSTRUCTION

Teach students to create mental images of multiplication problems as repeated addition problems. Write on the board $0 + 0 = ?$ Ask students how many zeroes they see. Write $2 \times \underline{\quad} = ?$ Ask what number is repeated two times. Write 0 on the line and as the answer. Tell students to read the multiplication problem as 2 zeroes are 0 and to picture two zeroes in their head. This will help them see multiplication number sentences as repeated addition. Write $0 + 0 + 0 = ?$ Discuss its conversion to $3 \times 0 = ?$ and its mental image of three zeroes. Repeat this for 4×0 up to 10×0 . After discussing the zero times tables, repeat the process with $1 + 1 = 2$ and its conversion to $2 \times 1 = 2$ (2 ones are 2) up to $10 \times 1 = 10$ (10 ones are 10) to introduce the one times tables. Introduce the ten times tables in the same way. For each problem, ask students how the multiplication problem should be read (e.g., 5 zeroes are 0, 2 tens are 20) and what they should picture in their head (e.g., five zeroes, two tens).

Discuss what the numbers in any multiplication problem mean. Write on the board $2 \times 10 = 20$. Tell students that the 2 means how many tens there are (the number of groups or sets) and the 10 means how many numbers (objects) are in each group. Write on the board several addition problems and multiplication problems (using zero, one, or ten). Ask students to convert repeated addition into multiplication and vice versa. For example, write $4 \times 1 = 4$ and have students convert it to $1 + 1 + 1 + 1 = 4$. Have them explain the meaning of each problem. (Use manipulatives or draw pictures to help students who are having difficulty.)

OBJECTIVES

Students will be introduced to the concept of multiplication as repeated addition. Students will master multiplication of 0, 1, and 10.

GUIDED PRACTICE

- ✓ Work with students in small groups to help them complete the **0, 1, and 10 Skill Practice reproducible (page 9)**. Challenge students to write their own rules at the bottom of the page.

ASSESSMENT

- ✓ Have students complete the **Lesson 1 Quiz (page 10)** in 2 minutes. Challenge students to “beat their time” and complete the quiz in 1 minute and then again in 30 seconds to show that they have mastered the number facts.

0, 1, and 10 Skill Practice

Match related number sentences. Write the correct letter on each line.

7×0 _____

9×1 _____

4×10 _____

10×0 _____

3×0 _____

6×1 _____

6×10 _____

a $1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1$

b $10 + 10 + 10 + 10 + 10 + 10$

c $0 + 0 + 0$

d $10 + 10 + 10 + 10$

e $1 + 1 + 1 + 1 + 1 + 1$

f $0 + 0 + 0 + 0 + 0 + 0 + 0$

g $0 + 0 + 0 + 0 + 0 + 0 + 0 + 0 + 0 + 0$



Write the answers.



h	$1 \times 0 =$	$1 \times 1 =$	$1 \times 10 =$	$4 \times 1 =$
i	$2 \times 0 =$	$2 \times 1 =$	$2 \times 10 =$	$2 \times 0 =$
j	$3 \times 0 =$	$3 \times 1 =$	$3 \times 10 =$	$1 \times 10 =$
k	$4 \times 0 =$	$4 \times 1 =$	$4 \times 10 =$	$5 \times 1 =$
l	$5 \times 0 =$	$5 \times 1 =$	$5 \times 10 =$	$9 \times 10 =$
m	$6 \times 0 =$	$6 \times 1 =$	$6 \times 10 =$	$6 \times 1 =$
n	$7 \times 0 =$	$7 \times 1 =$	$7 \times 10 =$	$7 \times 0 =$
o	$8 \times 0 =$	$8 \times 1 =$	$8 \times 10 =$	$2 \times 10 =$
p	$9 \times 0 =$	$9 \times 1 =$	$9 \times 10 =$	$1 \times 1 =$
q	$10 \times 0 =$	$10 \times 1 =$	$10 \times 10 =$	$10 \times 0 =$

r What happens when you multiply any number by 0?

s What happens when you multiply any number by 1?

t What happens when you multiply any number by 10?

Lesson 1 Quiz

Solve each problem.

- a** $4 \times 1 =$ _____
 b $5 \times 0 =$ _____
 c $4 \times 10 =$ _____
 d $6 \times 0 =$ _____
e $7 \times 1 =$ _____
 f $9 \times 10 =$ _____
 g $8 \times 1 =$ _____
 h $3 \times 10 =$ _____
i $8 \times 10 =$ _____
 j $6 \times 10 =$ _____

Write the letter to match related number sentences.

6×0 _____

a $0 + 0 + 0 + 0 + 0$

8×1 _____

b $0 + 0 + 0 + 0 + 0 + 0 + 0 + 0 + 0$

2×10 _____

c $1 + 1 + 1 + 1 + 1 + 1 + 1 + 1$

9×0 _____

d $1 + 1 + 1$

5×0 _____

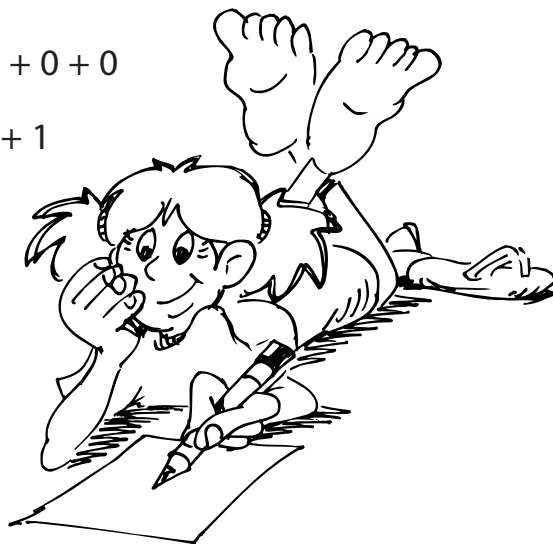
e $0 + 0 + 0 + 0 + 0 + 0$

3×1 _____

f $10 + 10$

5×10 _____

g $10 + 10 + 10 + 10 + 10$



These are the number facts I missed on the quiz:
