

Introduction

Mathematics 5 is built on the thesis that most children can learn, understand, and master mathematical concepts. It seeks to relate math to everyday life and to make it practical. We believe that mathematics should help students achieve the ultimate goal of loving, serving, and glorifying God.

Mathematics 5 introduces concepts in incremental steps, allowing the student to master each increment of a skill before advancing to the next step, meeting several simple concepts simultaneously. Each increment easily becomes a part of his “big picture,” not only because it is small, but also because it fits with what he has already learned.

Students retain what they have learned by consistent, systematic review. *Mathematics 5* uses a system of continuous review. Instead of a grand review at the end of the year, a large part of every day’s work is review. The goal is mastery, not just exposure.

Materials

Student

- **Mathematics 5 Textbook**
- **Student Packet**
 - Worksheets
 - Tests
 - Quizzes
 - Speed/Mastery Drills

Teacher

- **Mathematics 5 Teacher’s Guide**
 - Resource CD
- **Full Solution Answer Key**

Unit 1

Contents



Lesson 1	2	Lesson 10	27
Reading and Writing Numbers Through Millions		Quiz 2	
Lesson 2	5	Lesson 11	28
Multiplying Whole Numbers		Solving Addition and Subtraction Word Problems	
Lesson 3	8	Lesson 12	31
Kinds of Fractions; Adding and Subtracting Fractions		Using Divisibility Rules to Find Factors; Doubling Two-Digit Numbers Mentally	
Lesson 4	11	Lesson 13	34
Rounding Whole Numbers and Money; Multiplying and Dividing by 10, 100, or 1,000		Measuring Circles	
		Lesson 14	37
Lesson 5	14	One Half, Five Tenths, and Fifty Hundredths	
Quiz 1		Lesson 15	40
Lesson 6	15	Measurements	
Dividing by One-Digit Divisors		Lesson 16	43
Lesson 7	18	Unit 1 Test	
Understanding Decimals			
Lesson 8	21		
Lines, Line Segments, and Rays			
Lesson 9	24		
Finding Digit Sums; Aligning Decimals to Add or Subtract			

Student Materials

Textbook

Mathematics 5 is a non-consumable text, designed to be reused year after year. Students write their answers on separate paper. For teacher ease in grading, set up a form for students to follow. Show them in the first math class of the year how you expect them to number their papers. Tell them whether you want their work to be done in spiral-bound notebooks or on notebook paper. *Appendix C* page 480 contains suggestions and samples for ways to have students set up their work pages.

Mathematics 5 is divided into 10 units with 16 lessons each. Lessons 1-4, 6-9, and 11-15 are daily lessons. Lessons 5 and 10 are quiz lessons, and Lesson 16 is the test lesson.

We Remember

The *We Remember* section systematically reviews concepts taught in earlier lessons. The first exercises in *We Remember* review material from the previous day. The final exercises in *We Remember* review the concept taught in this lesson.

20. Below each bold black exercise number is at least one small, gray *reference number*. The reference number indicates the textbook page where the concept reviewed in this exercise was taught.

Sharpening Your Skills

Math skills must be continually sharpened. The *Sharpening Your Skills* section in each lesson hones those skills day by day. These exercises include *Computation*, *Fact Focus*, and *Mental Math* sections. Exercises in *Sharpening Your Skills* do not have reference numbers.

Unit 2

Lesson 1 46

Remainders in Division

Lesson 2 49

Finding Volume; Comparing and Ordering Decimals

Lesson 3 52

Finding the Greatest Common Factor

Lesson 4 55

Types of Graphs

Lesson 5 58

Quiz 1

Lesson 6 59

Solving Multiplication Word Problems

Lesson 7 62

Understanding Negative Numbers

Lesson 8 65

Division With 0 in the Quotient; Reducing Proper Fractions

Lesson 9 68

Understanding Ratios



Lesson 10 71

Quiz 2

Lesson 11 72

Reducing Improper Fractions to Simplest Form

Lesson 12 75

Simplifying Expressions; Counting Zeros to Multiply

Lesson 13 78

Reading and Writing Billions and Trillions; Squares to 15

Lesson 14 81

Estimating

Lesson 15 84

Choosing Sensible Measurement Units: Distance

Lesson 16 87

Unit 2 Test



Unit Story

Unit 1 begins with an introduction to math in many nations. Units 2-10 each feature a different part of the world where math is used by missionary families in everyday life. Each unit begins with a short story to introduce and depict the geographical theme.

Teaching Boxes

Daily lessons begin with at least one framed and colored teaching box that introduces and explains one or more mathematics increments. A few lesson exercises follow each teaching box to reinforce the new material.

Computation

Math problems that require computing addition, subtraction, multiplication, and division appear in this section. Students copy and work the problems. Specific instructions in gray tell how to check, when to simplify fractions, and how to write remainders in division. These instructions refer only to computation exercises.

Fact Focus

Some lessons include reviews of simple facts. Students write only the answers without copying the problem. *Fact Focus* may include multiplication and division facts, month numbers, number of days in each month, and measurement equivalents.

Mental Math

Students solve the exercises mentally and write only the answers on their papers.

Quiz or Unit Test

After a concept has been reviewed for five days, it may appear on any quiz or test.

Fascinating Discoveries

Quiz and test lessons include one or two optional enrichment activities to expose students to new concepts. *Fascinating Discoveries* activities are neither reviewed nor tested.

Textbook Graphics



Did You Know—

Informative nuggets, often relating to the unit's geographic topic. These tidbits of information may generate additional discussion and/or research. Measurements in nuggets are often rounded to whole units such as inches, feet, yards, miles, meters, and kilometers.

We Remember

We Remember—The daily review section continuously reviews skills and concepts.



Sharpening Your Skills

Sharpening Your Skills—Computation, Fact Focus, and Mental Math.

Unit 3

Lesson 1 90

Solving Division
Word Problems



Lesson 2 93

Simplifying Mixed Numbers
With Improper Fractions

Lesson 3 96

Decimals and Fractions;
Finding Averages

Lesson 4 99

Rounding Decimals to Whole
Numbers; Multiplying Decimals

Lesson 5 102

Quiz 1

Lesson 6 103

Formula for Finding
the Area of a Rectangle



Lesson 7 106

Using Digit Sums to Check
Addition; Understanding Angles

Lesson 8 109

Subtracting Fractions
From Whole Numbers

Lesson 9 112

Finding the Least Common
Multiple; Measuring to the
Fourth-Inch

Lesson 10 115

Quiz 2

Lesson 11 116

Dividing by Multiples of 10

Lesson 12 119

Combining Like Integers

Lesson 13 122

Formula for Finding
the Area of a Square

Lesson 14 125

Borrowing to Subtract Mixed
Numbers With Like
Denominators

Lesson 15 128

Choosing Sensible
Measurement Units: Weight

Lesson 16 131

Unit 3 Test



Glossary, Reference Charts, Index

Students can work more independently when they are able to look up information as needed. The *Glossary*, *Reference Charts*, and *Index* are tools to help them achieve this goal. The *Glossary* defines terms used throughout the course. When new terms are used in textbook lessons, they are in **bold** print. The *Reference Charts* provide definitions, diagrams, equivalent measures, geometry, and abbreviations. The *Index* contains topics under various headings and the page number where they can be found.

Unit 4

Lesson 1 134

Dividing Decimals and Money

Lesson 2 137

Multiplying by Moving the
Decimal Point; Using Digit Sums
to Check Subtraction

Lesson 3 140

Writing Decimals in Shortest
Form

Lesson 4 143

Combining Unlike Integers

Lesson 5 146

Quiz 1

Lesson 6 147

Dividing by Moving the Decimal
Point; Understanding Polygons:
Quadrilaterals

Lesson 7 150

Formula for Finding
the Circumference of a Circle

Lesson 8 153

Finding the Least
Common
Denominator



Lesson 9 156

Combining Opposite Integers

Lesson 10 159

Quiz 2

Lesson 11 160

Ordering Decimals
With Differing Place Values

Lesson 12 163

Dividing by Any Two-Digit
Divisor

Lesson 13 166

Square Roots to 15;
Finding Perimeters

Lesson 14 169

Making Equal Fractions

Lesson 15 172

Choosing Sensible
Measurement Units: Capacity

Lesson 16 175

Unit 4 Test



Tests and Quizzes

Tests and quizzes are designed for the student to write on. Each test is on a larger folded sheet with a cover and three working pages. Each quiz is on one two-sided sheet. Distribute quizzes in Lessons 5 and 10 and tests in Lesson 16 of each unit. Separate, collate, and file the quizzes by quiz and test number or store them in the booklet and separate as needed.

Student Packet

The Student Packet contains worksheets, tests, quizzes, and Speed/Mastery Drills needed throughout the course. These pages are designed for the student to write on. Separate the pages from the packet and file them for easy retrieval when needed, or store them as packets and separate when needed.

Worksheets

Worksheets are provided for *Fascinating Discoveries* in Unit 2, Lesson 10 and Unit 6, Lesson 5. Units 9 and 10 use grid worksheets. These worksheets are at the top of the Student Packet.

Speed/Mastery Drills

Addition, subtraction, and multiplication Speed Drills have 42 facts. Division Speed Drills have 40 facts. Mastery Drills have 24 problems—measurement equivalents, month facts, polygons, angle classifications, fraction and decimal equivalents, degrees in a circle and half circle, squares and square roots to fifteen, and metric prefixes. Unit 1 has sixteen Speed Drills. Units 2-10 each have eleven Speed Drills and five Mastery Drills.

Distribute drills at the beginning of each math class. Time students for one minute to complete as many problems as they can.

Teacher Materials

Teacher's Guide

The goal of *Mathematics 5 Teacher's Guide* is to enable teachers of all levels of experience to successfully teach this course. The *Teacher's Guide* includes replicas of each student page with answers, complete lesson plans for each lesson, additional resources in the Appendixes, and a *Resource CD* with posters and practice sheets for teaching the lessons.

Discussion Points

Each unit begins with a list of questions and suggestions to help generate discussion about the unit story on the next page. Use and/or adapt as time and interest allows.

Reflect—Units 2-10

Before beginning each unit, you may take some time to reflect on the material in the previous unit. Use this list of questions or come up with your own.

Research Challenge

Students who finish early and need an extra challenge may research number-related topics for each unit's country. Use the questions for ideas to research or generate additional ideas.

Assess

At the beginning of a unit is a good time to assess students' math skills. Use this list as a reminder of items to randomly check. Add your own as needed.

Unit 5



Lesson 1 178
Using the LCD to
Add or Subtract Fractions

Lesson 2 181
Naming and Measuring Angles

Lesson 3 184
Revising Quotients
When the Estimate Is Too Large

Lesson 4 187
Equations Must Balance

Lesson 5 190
Quiz 1



Lesson 6 191
Borrowing to Subtract Mixed
Numbers With Unlike
Denominators

Lesson 7 194
Annexing Zeros to
Add or Subtract Decimals

Lesson 8 197
Divisibility Rule for Six;
Expanding With Place Value



Lesson 9 200
Congruent Angles

Lesson 10 203
Quiz 2

Lesson 11 204
Solving Two-Step Word Problems

Lesson 12 207
Multiplying Fractions

Lesson 13 210
Three Ways to Write Ratios

Lesson 14 213
Using Digit Sums
to Check Multiplication

Lesson 15 216
Understanding Polygons:
Parallelograms

Lesson 16 219
Unit 5 Test



Unit Material, Terms, and Symbols

The concepts taught in the unit are categorized by addition, subtraction, geometry, measures, word problems, etc. In the sidebar are terms and symbols used in the unit. Use these lists as reference, to preview the unit, or to review at the end of the unit.

Student Page

A replica of the textbook page appears on each corresponding *Teacher's Guide* page. Answers are red. Where answers do not fit on the page, a note tells the appendix page where the answer is given. Solutions are shown in detail in the *Full Solution Answer Key*.

Unit 6

Lesson 1 222
Revising Quotients When the
Estimate Is Too Small

Lesson 2 225
Annexing Zeros in Decimal
Products; Drawing Angles

Lesson 3 228
Canceling Before
Multiplying Fractions

Lesson 4 231
Setting Up
Decimal Multiplication

Lesson 5 234
Quiz 1

Lesson 6 235
Introducing and
Checking Proportions

Lesson 7 238
Lines, Line Segments, and Rays

Lesson 8 241
Solving Equations

Lesson 9 244
Rounding Decimals

Lesson 10 247
Quiz 2

Lesson 11 248
Learning Decimal Equivalents
of Common Fractions



Lesson 12 251
Changing Whole and Mixed
Numbers to Improper Fractions;
Checking Equations

Lesson 13 254
Using Digit Sums to Check
Division

Lesson 14 257
Making Equivalent Ratios

Lesson 15 260
Understanding
Rectangles and Rhombuses

Lesson 16 263
Unit 6 Test



of the third page of each lesson (second page of quiz lessons). If several students are not doing well on speed drills, occasionally skip a day's drill and spend extra time practicing the facts on the skipped drill. Have any students who need the extra practice, work the drill at another time—possibly as homework.

► Mental Computations

The ability to compute math mentally is a valuable life skill. Math lessons, speed drills, and flash cards provide practice in reading math facts and giving answers. *Mental Computations* provide practice in hearing math facts and giving answers. At the beginning of each math class take time to drill mental computations. Instruct students to raise a hand when they have the answer—after hearing *equals*. Read the first number. Pause to give students time to picture the number. Read the operator (+, −, ×, ÷) and the next number. Pause to allow students to figure the answer. Continue reading and pausing until

you reach the equals sign, then say, “equals.”

► Review

Each lesson contains exercises to review the concepts that were taught in the previous lesson. Answers are **blue**. Spend a few minutes reviewing before teaching the lesson.


► Teach

This is a list of the new concept(s) that will be taught in the lesson.

► Assign

This is a list of the sections of student exercises in daily lessons or the quiz or test to be administered in the quiz and test lessons.

Materials Needed

Check here for a list of materials needed for the day's lesson. The Speed/Mastery Drill listed is the same as the lesson number. Posters and practice sheets are in the *Resource CD* and are indicated in this list by a CD icon  and a poster number.

Lesson Overview

► Speed/Mastery Drill

Distribute the day's drill and time the students for one minute to complete as many facts as they can. Instruct students either to trade drills for grading or to grade their own. Speed or Mastery Drill problems with answers are in the *Teacher's Guide* in the sidebar

Teaching the Lesson

► Daily Lessons

Refer to the colored teaching box and to this section for teaching each part of the lesson. Text in this section is intended to enhance and further explain without merely repeating material from the textbook. Familiarize yourself with both the teaching box and *Teaching the Lesson*. In the *Teacher's Guide* new terms are **bold italic**. Board exercises are **bold**, and the answers are **blue**. Write board exercises on the board before class or as the lesson is taught. Work examples as directed and call on students to work the other examples.

► Quiz and Test Lessons

Use the exercises in the *Review* section to prepare students for problems they have not yet encountered on a quiz or test.

Administer the quiz or test. Have students clear their desks except for pencils, erasers, and any other needed tools (ruler, protractor, etc.). Distribute the quiz or test and give students time to complete it. If you have allowed a set amount of time for the test, inform students how much time they will be given. Solutions and answers are **red** on the student page in the *Teacher's Guide*.

Assign *Fascinating Discoveries* on the student page. This optional activity is intended to be enjoyed by students who finish the quiz or test before class time is over. You may choose to work some *Fascinating Discoveries* activities as a class.

Assign Class Work

► Lesson Alert

Exercises that may need special attention are noted here. Extra lines provide a place for you to write additional alerts.

Unit 7



Lesson 1 266
Multiplying Whole Numbers,
Mixed Numbers, and Fractions

Lesson 2 269
Changing Ratios to Simplest Form

Lesson 3 272
Formula for Finding
the Area of a Triangle

Lesson 4 275
Finding a Fraction
of a Number Mentally

Lesson 5 278
Quiz 1

Lesson 6 279
Understanding Percents

Lesson 7 282
Understanding
Prime and
Composite
Numbers

Lesson 8 285
Changing Fractions
to Decimals and Percents

Lesson 9 288
Using Cross Multiplication
to Solve Proportions

Lesson 10 291
Quiz 2



Lesson 11 292
Solving Word
Problems With
Remainders



Lesson 12 295
Introducing Reciprocals

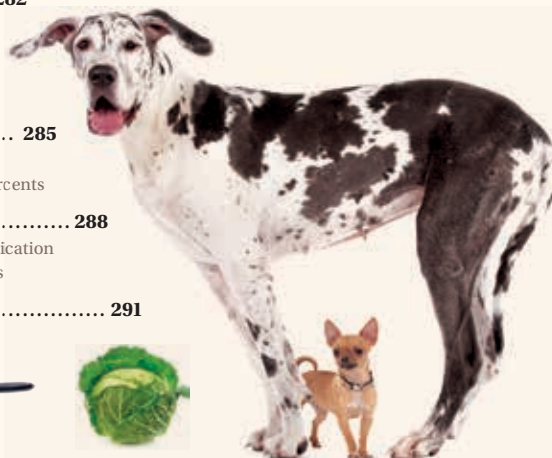
Lesson 13 298
Learning Metric Prefixes



Lesson 14 301
Dividing Fractions

Lesson 15 304
Abbreviating
Metric Measurements

Lesson 16 307
Unit 7 Test



► Assign the lesson exercises

Assign the exercises following the teaching box(es) after teaching the lesson and before *We Remember*. If students do not understand part or all of the lesson, consider working these exercises together in class.

► Assign *We Remember* and *Sharpening Your Skills*

After the lesson is taught and the accompanying lesson exercises completed, assign *We Remember* and *Sharpening Your Skills*. Students should be able to complete these exercises independently. Any exercises not completed in class time should be completed before the next day's class.

Decide whether a struggling student must work every computation exercise. If multiple problems review

Unit 8



Lesson 1 310

Adding or Subtracting Time

Lesson 2 313

Dividing Whole Numbers,
Mixed Numbers, and Fractions

Lesson 3 316

Annexing Decimal
Places to Complete Division

Lesson 4 319

Multiplying Two-Digit Numbers
by One-Digit Numbers Mentally

Lesson 5 322

Quiz 1

Lesson 6 323

Solving Word Problems
Using Proportions

Lesson 7 326

Short Division

Lesson 8 329

Finding How Much Time Has
Passed

Lesson 9 332

Understanding Calculator Keys



Lesson 10 335

Quiz 2

Lesson 11 336

Using Proportions
to Convert U.S. Measures

Lesson 12 339

Converting Metric Units

Lesson 13 342

Degrees in a Circle

Lesson 14 345

Relating Money, Decimals, and
Fractions;
Understanding Trapezoids

Lesson 15 348

The Decimal Key on a Calculator

Lesson 16 351

Unit 8 Test



Student Helps

Student Helps in the sidebars include tips, explanations, shortcuts, practice, games, etc. that may help students better understand the material taught in the lesson.

► Leading Questions for Two-Step Word Problems

These questions begin in Unit 5, Lesson 11, providing additional direction to guide a student through each two-step word problem.

► Manipulative Math

Some *Student Helps* are labeled *Manipulative Math*. These sections suggest ways of using manipulatives to understand the newly-taught material. Manipulatives help students better understand a concept by giving a concrete image of an abstract concept. Ideas for manipulatives include linking math cubes, LEGOs or other blocks, toothpicks, candies, or any small objects that can be manipulated into groups. Consider obtaining from an educational supply store a set of base ten counting blocks—individual cubes to represent ones, sticks of 10 cubes to

the same operation, you may allow him to work one problem. If he works that problem correctly, he may skip the others.

Extra Practice

The *Extra Practice* list provides additional examples to review the concept(s) taught in the lesson. Answers are **blue**.

Fascinating Discoveries

One or more *Fascinating Discoveries* activity appears in each quiz and test lesson. Any additional explanation or discussion relating to the *Fascinating Discoveries* activity in this lesson is included here.

represent tens, sheets of 100 cubes to represent hundreds, and large cubes of 1,000 to represent thousands.

► Extra Challenge/Activity

Use extra challenges for students who finish early and need more to do. For additional work, students may conduct further research based on the story and photos in the beginning of the unit or from any *Did You Know* nuggets throughout the unit.

Use extra activities as time and need allow to reinforce math concepts.

Speed/Mastery Drill

The sidebar on the third page of each lesson contains a list of all the exercises and answers from that lesson's Speed/Mastery Drill.

Teaching Tips

Teaching Tip
Additional teaching tips are scattered throughout the *Teacher's Guide* on yellow sticky notes. Use these tips as you see fit.

Additional teaching tips are scattered throughout the *Teacher's Guide* on yellow sticky notes. Use these tips as you see fit—if they help and if time allows.

Appendixes A-D

Appendix A consists of the textbook glossary, reference charts, and index. *Appendix B* has games, activities, strategies, and skills to supplement the *Teacher's Guide*. *Appendix C* contains student answers that don't fit on the student pages in the *Teacher's Guide* and samples of student page setups. *Appendix D* supplies a list of the material on the *Resource CD*, and a list of teaching resources (books, manipulatives, and websites).

Resource CD

The *Resource CD* is inside the back cover of the *Teacher's Guide*. It contains posters and practice sheets for use in teaching and reviewing daily lessons. Print and file the posters and practice sheets ahead of time or print them as needed. Laminate the posters to make them sturdier and reusable for write on/wipe off activities. Print practice sheets as needed for each student.

The first page on the CD lists the contents with interactive links. Click on the poster name or number to be taken directly to that poster. The *Teacher's Guide Appendix D* pages 481-482 contains a list of the materials on the CD.

Unit 9



Lesson 1 354
Solving Equations
With Variables on Either Side

Lesson 2 357
Finding Time Passing Over 12:00

Lesson 3 360
Learning About
Sets and Symbols for Sets

Lesson 4 363
Order of Operations on a
Calculator

Lesson 5 366
Quiz 1

Lesson 6 367
Converting Units of Measure

Lesson 7 370
Locating Points on a Grid

Lesson 8 373
The Identity Property



Lesson 9 376
Plotting Points on a Grid

Lesson 10 379
Quiz 2

Lesson 11 380
Comparing Measurements
in Word Problems

Lesson 12 383
Union of Sets

Lesson 13 386
Adding and Subtracting
Feet and Inches

Lesson 14 389
The Zero Property of
Multiplication

Lesson 15 392
Multiplying Feet and Inches

Lesson 16 395
Unit 9 Test



Full Solution Answer Key

The *Full Solution Answer Key* provides answers to all *Mathematics 5* exercises and, where applicable, detailed solutions. Final answers are black. Where answers have solutions, the exercise copied from the textbook is blue, and the solution is gray.

Grading

Daily Lessons

Answers are red on the *Teacher's Guide* student page. Answers that do not fit can be found in *Appendix C* pages 475-479. For best results, grade student papers as soon as possible. To check students' worked solutions,

Unit 10



Lesson 1 398	Lesson 8 417
Comparing Prices in Word Problems	Reading Roman Numerals Through 2,999
Lesson 2 401	Lesson 9 420
Classifying Triangles by Sides	Rounding Decimals to Estimate
Lesson 3 404	Lesson 10 423
Estimating Length	Quiz 2
Lesson 4 407	Lesson 11 424
Comparing Fractions Using Decimal Equivalents	Taking Shortcuts in Multiplication
Lesson 5 410	Lesson 12 427
Quiz 1	Introducing Biological Symmetry
Lesson 6 411	Lesson 13 430
Intersection of Sets	Measuring With Precision
Lesson 7 414	Lesson 14 433
The Commutative Properties of Addition and Multiplication	Comparing Estimated Products With Exact Products
	Lesson 15 ... 436
	Recognizing Incorrect Calculator Results
	Lesson 16 439
	Unit 10 Test



see the *Full Solution Answer Key*. Record the scores and return papers to students so they can learn from any wrong answers. If students consistently miss specific types of problems, spend extra time with review or other remedial material.

Speed/Mastery Drills

Speed/Mastery Drill problems with answers are in the *Teacher's Guide* in the sidebar of the third page of each lesson. In quiz lessons they are on the second page and test lessons on the third page. Drill answers are also in the *Full Solution Answer Key*.

Quizzes and Tests

Quiz and test answers and solutions are red on the replicated quiz and test pages in the *Teacher's Guide*. Quiz and test answers and solutions are also in the *Full Solution Answer Key*. Each quiz and test has a total of 100 points. Direction lines indicate how many points each problem is worth. Count the number of points missed and subtract from 100 to find the score.

Analyze student quizzes and tests. Several students missing the same problems may indicate a weakness in that area. Revisit the areas and make sure students understand the concept. Plan extra class review to strengthen the concept. A student who repeatedly misses the same type of problem may need remedial help.