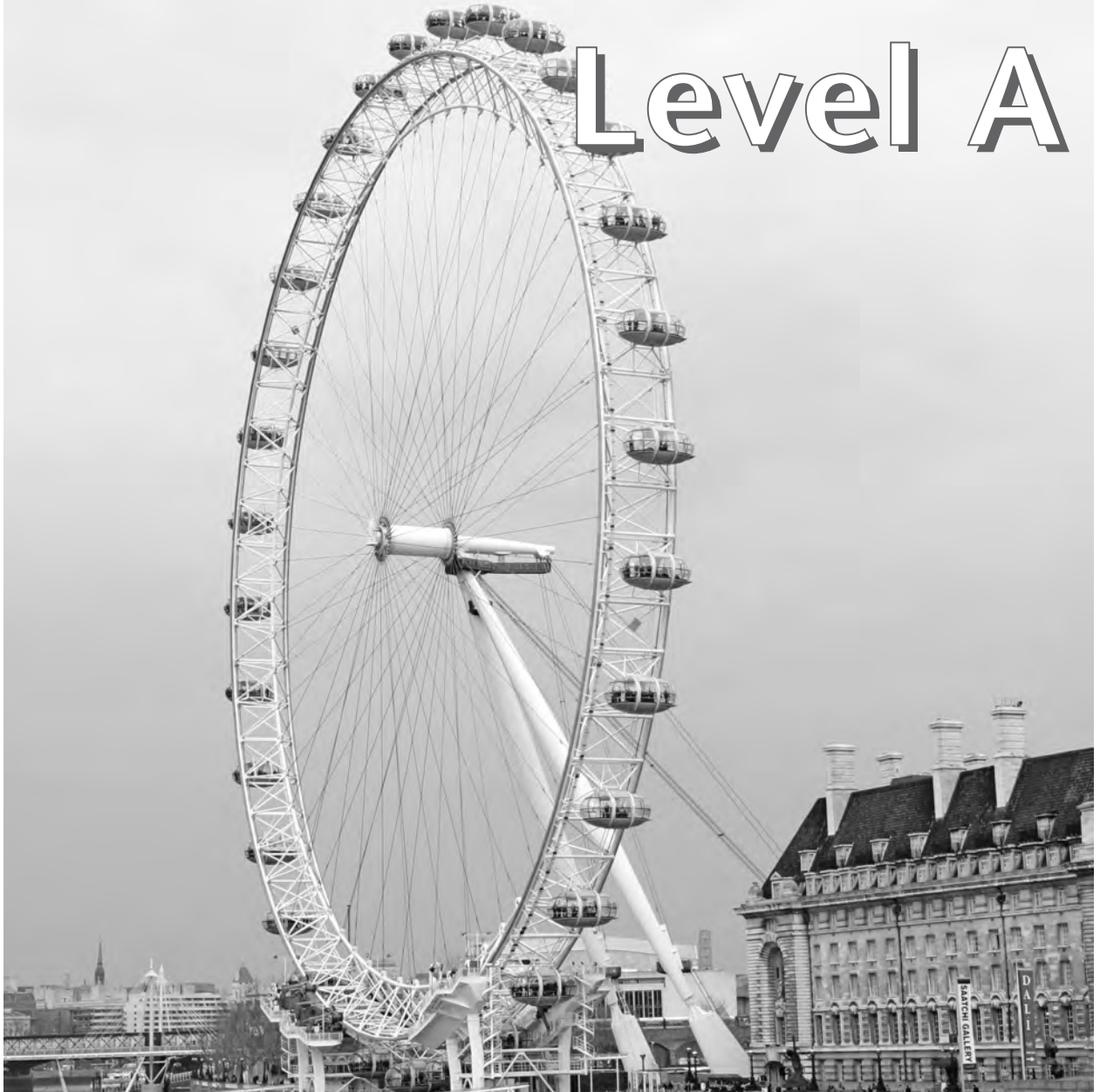


Liberty Mathematics

Level A

Copyright © 2004 Christian Liberty Press



TEACHER'S MANUAL

59511 R1/09

Copyright © 2004 Christian Liberty Press

2009 Printing

All rights reserved. No part of this teacher's manual may be reproduced or transmitted in any form or by any means, electronic or mechanical, without written permission from the publisher. Brief quotations embodied in critical articles or reviews are permitted.

A publication of

Christian Liberty Press

502 West Euclid Avenue

Arlington Heights, Illinois 60004

www.christianlibertypress.com

Written by Edward J. Shewan

Copyediting by Diane Olson

ISBN 978-1-930367-63-0

1-930367-63-5

Printed in the United States of America

TABLE OF CONTENTS

	<i>Introduction</i>	<i>iv</i>
	<i>Setting Goals</i>	<i>v</i>
	<i>Components of a Daily Lesson</i>	<i>vi</i>
	<i>Hundred Chart</i>	<i>viii</i>
Unit 1	<i>Learning About Numbers 0–10, Ordinals, and Time</i>	1
Unit 2	<i>Learning About Place Value, Counting, Subtracting 0–2, Numerical Order, and Comparative Value</i>	5
Unit 3	<i>Learning to Subtract from 3–7, Subtracting Like Numbers, Subtracting All But One, and Doubles Facts</i>	8
Unit 4	<i>Learning to Subtract from 8–10, Clocks, Renaming as 10, and Tallies and Charts</i>	11
Unit 5	<i>Learning to Count by 10s, Place Value, Adding to 11 and 12, Adding on to 10, and Telling Time</i>	14
Unit 6	<i>Learning to Add to 13–15, and Learning About Money</i>	18
Unit 7	<i>Learning About Place Value—100s, Time, Seasons, Calendars, Adding to 16–18, and Families of Facts</i>	21
Unit 8	<i>Learning About > and <, Subtracting from 11–14, and Thermometers</i>	24
Unit 9	<i>Learning to Subtract from 15–18, and Adding More Than Two Numbers</i>	27
Unit 10	<i>Learning About Adding Two Columns, Carrying, and Borrowing</i>	30
Unit 11	<i>Learning About Shapes, Fractions, and Measures</i>	32
Unit 12	<i>Final Review</i>	34

Introduction

In the early years of a child's education, the parents' role is inescapable. Unable to read and write, and lacking in knowledge and experience, the very young learner depends upon his parents' love and guidance. Therefore, it is the goal of Christian Liberty Press not just to provide books, but to assist parents in the God-given task of bringing their children up in the nurture and admonition of the Lord. Books like *Liberty Mathematics Level A* and this teacher's manual are a means of communicating a small part of God's knowledge and wisdom to children.

The parent or teacher should realize that it is not enough for the student to simply complete the material in the workbook. *It is essential that he grasps the learning goals presented for each unit.* Ask yourself the following questions: "Does my student understand what he has learned?" "Can he complete the drills quickly?" "Is he frustrated by some of the concepts or requirements?" It is important for you to move slowly and carefully through the material, whenever necessary. You should also repeat a math concept if the student needs reinforcement. Do more drilling. (Use the *Liberty Mathematics Level A, Drill Book* as a resource.) Stop and take a few days' break, if necessary. It is better to build a good foundation, helping your student to understand and even enjoy math, than to finish in record time. If you have started working with a very young child, and you realize he is unable to comprehend the material, it might even be best to stop formal lessons for a few months. Perhaps playing some math games and continuing with some simple number drills would be more appropriate.

The student workbook is designed to give the student a reasonable amount of written work. However, *it is assumed that the teacher will do "classwork" with the student during each daily lesson.* (See "Components of a Daily Lesson" on page vi of this manual.) This manual presents specific learning goals (see "Setting Goals" next), drills, and games that will guide the teacher in what to cover in each day's lesson. In addition, "preparatory activities" provide the teacher with a means to introduce new material to the student before it appears in the workbook. Finally, "Unit Tests" (available from Christian Liberty Press) have been created to determine your student's progress. Note that students enrolled in CLASS do NOT submit these tests. Use these tools at your discretion to help with the ultimate goal of teaching your student the basic math concepts.

I would like to take this opportunity to thank God for His blessing during the planning, formulating, and writing of this course. I am also grateful to the teachers and home school parents who helped me to determine what would be most useful to include in the workbook. I praise the Lord as well for the talents of Ed and Belit Shewan, who worked so hard in the layout and formatting of the workbook.

This course is dedicated to my children, who taught me patience as I taught them during their early years of schooling. Children truly are a blessing from the Lord!

May God richly bless you as you endeavor to present these fundamentals of mathematics to your student. May students who complete these lessons seek to glorify God in their preparation to be our country's future leaders.

Wendy Kramer

"I can do all things through Christ who strengthens me" (Philippians 4:13).

Setting Goals

Before you begin to work with your student, consider what goals you should set for the math curriculum. *Liberty Mathematics Level A* formally covers the following learning goals:

- Numeral Recognition
- Story Problems
- Counting from 0 to 300
- Addition through the Family of Eighteen
- Subtraction through the Family of Eighteen
- Place Value—Ones, Tens, and Hundreds
- Counting by 1s, 2s, 3s, 5s, 10s, 25s, and 100s
- Time—Hour, Half Hour, Quarter Hour, Minutes, and Seconds
- Months, Weeks, and Days
- Calendars and Seasons
- Ordinal Numbers
- Measuring Objects
- Fractions

Your student may be new to formal learning, so each lesson should be directed by the teacher. Through number drills, math games, and real-life discussions, you should try to at least double the amount of time the student spends on his written math “lesson” each day. Review and drill. Count aloud using a number line. Count objects and use them to illustrate math facts. Discuss the meaning of place value, or odd and even numbers. Suggestions for drills and games will be made throughout the teacher’s manual.

The following is a list of the materials you may want to have on hand for this course:

- An abacus (a counting tool with objects that slide along rods)
- Dot cards or Dominoes (to learn numerals)
- Flashcards
- Coins (pennies, nickels, dimes, and quarters) and dollar bills
- Ruler with inches and centimeters
- “Judy” clock or toy clock with movable hands
- Miscellaneous manipulatives for counting (Popsicle sticks, toothpicks, etc.)

Flexibility is one of the blessings of a home school program. Adjust your math lessons to meet the learning needs of your child. This teacher’s manual will describe a variety of drills and games, and list learning objectives so that you can assess your child’s progress. Occasionally, peruse your child’s work and the learning goals for this course to make sure you are on track. Remember that mastering the material is the objective, not having fun, and certainly not just “getting finished.”

Components of a Daily Lesson

The workbook is a significant part of your student's daily work, but it is only *part* of his daily lesson. There are also concepts and skills that should be taught to your student during each lesson; they must be clearly mastered by him. Each unit in this manual lists the goals that are covered on the corresponding pages in the workbook. To reach these goals, each day's lesson should consist of the following components.

◆ Component 1—*Counting and Numbers*

Your student needs to practice counting by 1s, 2s, 3s, 5s, 10s, 25s, and 100s—as they are introduced in subsequent lesson plans. This can be accomplished in many ways, such as counting a jar of pennies, counting via a number line or the hundred chart (on the back cover of the workbook), and rehearsing the sequences orally. Counting exercises are especially helpful in preparing your student to understand the concepts of addition and subtraction, to compare numbers (*greater than, less than, or equal to*), and to count money. Ultimately, these counting exercises will help him memorize the multiplication tables in the second grade (e.g., the “times 2” facts follow readily once the student can count by 2s).

◆ Component 2—*Math Facts*

The term “math facts” is used in this course for the organization of addition and subtraction facts. ***These math facts must be memorized up to 18.*** Rehearsing the facts may be accomplished in different ways—reciting the facts, writing the facts, singing the facts, demonstrating them with manipulatives, answering random quiz questions on the facts, working with flashcards, and posing “missing number” problems. Be creative, but be thorough and consistent. ***These math facts are a core part of this course,*** and they need to be rehearsed each day.

◆ Component 3—*Lesson Goals*

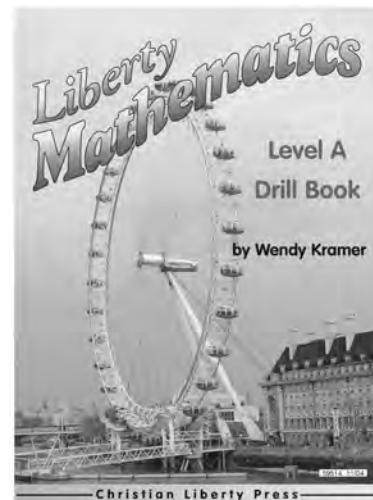
Each unit in this manual lists goals that correspond to the material covered in the student workbook. These goals will guide you in what you teach each day. They will help you to achieve the overall objectives of this course. If *place value*, for example, is one of the learning goals for a particular lesson, then practice and discussion of this goal should be a part of your teaching time.

◆ Component 4—*Drills and Tests*

To review the math facts, introduce and administer the **Drill Sheets** and **Speed Drills** that appear in a separate publication, *Liberty Mathematics Level A, Drill Book*. To reinforce these math facts, you should frequently use the appropriate Drill Sheet in structuring your lessons. When a particular drill should be used is indicated by the phrase: “Complete after page [e.g., 14]”; this is found in the upper right hand corner of each drill.

Also, there are Speed Drills that will test your student's **speed** and **accuracy**; additionally, they will teach your student how to take **timed tests**. Speed Drills appear periodically throughout the *Drill Book*.

Finally, **Unit Tests** for each division of the student workbook are available from Christina Liberty Press; they should be given at the end of each unit.



◆ Component 5—*Workbook Assignment*

When you have worked through the first four components of your daily lesson with your student, he should now be equipped to complete the workbook page(s). Initially, it will probably be necessary to sit beside your student as he works through the problems, reading the questions and giving general guidance. *The goal, however, is to eventually permit him to do part of this work independently.*

Each lesson should consist of “classwork,” where you, the teacher, are instructing the student; but there should also be “seatwork,” in which the student works independently to complete all or part of the workbook page. Of course, you could use other related material for the “seatwork” time. When your student completes these exercises, you should discuss them with him and review any facts or concepts that he needs to work on.

Conclusion

The “Unit Goals” and “General Lesson Plans” in this manual are constructed with the above five components in view. Let them be your guide as you teach each daily lesson. These goals and plans answer the following questions: “What will I teach my student(s)?” “In what order?” and “How will I teach?” Be creative and flexible as you prayerfully seek to answer these questions. And remember, these lesson plans are not rigid assignments that must be precisely followed but guidelines to help you achieve the overall objectives of this course.

Looking Ahead

The *preparatory activities* are designed to introduce concepts before your student is required to work with them in the textbook. The ideas will not be entirely new, so the lessons should be easier to explain and complete.

Note: On page 11 of the student workbook, all the answers to the *9s math facts* should obviously be 9 (not 8, as listed). Please correct these facts for your student.

Hundred Chart

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Unit 1

Learning About Numbers 0–10, Ordinals, and Time

Pages 1–23

This unit covers the basic learning goals that are listed below. Most importantly, the basic *addition facts up to 10* are taught, and they must be memorized by your student. Essentially, the first twenty-three pages of the workbook are a review of *Liberty Mathematics Level K*. If your student knows these concepts well, have him do pages 7 and 14 only to test his understanding. (Keep in mind that *even and odd numbers* and *shapes* are also covered in these initial pages.) Then start working on pages 15 to 23 to refresh his memory about *ordinal numbers* and *clocks*. Otherwise, proceed from the beginning with the **general lesson plan** outlined below.

◆ Unit Goals:

- To recognize the numerals 0–10 and the words for the numerals (*one is 1, two is 2, etc.*)
- To understand the relationship between abstract words (e.g., *one*) and physical objects
- To recite numbers 0–10 on a number line and to write them properly
- To count on the hundred chart on the back cover of the workbook (or page viii of this manual)
- To count up to 50 without a number line or chart
- To memorize the addition facts up to 10
- To count by 1s, 2s, 5s, and 10s
- To begin to distinguish between *even* and *odd* numbers
- To learn the shapes of a circle, square, triangle, rectangle, and pentagon
- To learn the ordinal numbers (numbers of order) and identify objects so ordered
- To tell time by hour and half hour

General Lesson Plan

Each day your math lesson should include a variety of drills and games during class time; the student should also complete two pages in his workbook, or more if he is able. Since the first 23 pages are a review of *Liberty Mathematics Level K*, your student may quickly go over these pages. During later lessons, completion of two pages will be enough.

◆ Suggested Drills:

- Ask your student to count from 1 to 10 and count backwards from 10 to 1 on the number line. Note that this activity will help your student understand subtraction in the next unit.
- Count to 10 using dot cards,¹ placing each in order on the table. Then scramble them and have him put them in order.
- Say a number and have your student pick the right one on the hundred chart.
- If you have a *Liberty Mathematics Level A, Drill Book*, complete the drills suggested for pages 1–23 of the workbook; this would be pages 1–7 of the *Drill Book*. Note that the Speed Drill is introduced on page 6; carefully read the instructions on page 5. Be sure to record your student's score on page vi of the *Drill Book*.

1. *Dot cards* are easy to make. Cut blank index cards in half. Make *dots* on one side and the corresponding *numeral* on the backside.

- Practice writing numerals 0–10, as they are covered in the workbook. Use the number cards² to reinforce each number word with its corresponding numeral (*zero* ⇒ 0, *one* ⇒ 1, etc.).

Note: The concept of math facts is not expressly taught until halfway through the course; however, you will notice that from the very beginning they have been introduced. Have your student memorize the “families” of math facts as they appear. For example, the “family of 2” math facts appear on page 3 of the workbook, the “family of 3” math facts appear on page 4, etc.

- Count from 1 to 20 on the hundred chart on the back of the workbook (or page viii of this manual), two or three times. Start this drill, and the next, after page 14.
- Count from 1 to 20 using number cards. Eventually move on to 30, 40, 50, and so on.

◆ Suggested Games:³

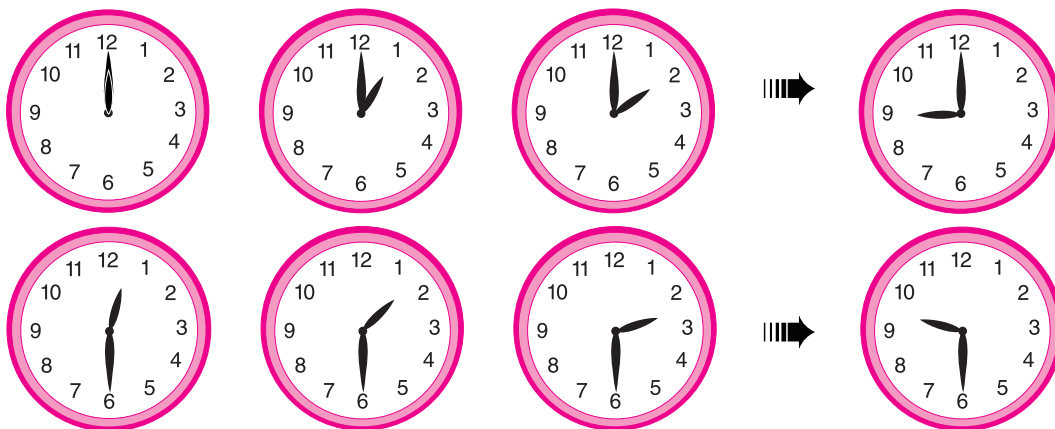
- Have your student count 10 bright candies like M&Ms™ or Skittles™. If he does it correctly, let him eat them. Say, “Since the candies are all gone, we have *zero* candies left.”
- Play dominoes.
- When you are walking or driving, see who can count the most cars, bicycles, cows, etc.
- Have your student play “Follow the Leader” with siblings or friends. Take turns being first. Ask, “Who is second?” “Who is third?” etc.
- Line up toys and have your student use *ordinal numbers* to identify their order. Have him change the order and ask, “Which is first now?” “Which is second?” etc.

◆ Preparatory Activities:

Since your student knows most of the math concepts covered in this unit, you should use this opportunity to introduce the following activities, especially the first three.

1. Introduce Telling Time

- Use a toy clock, a “Judy Clock,” or even a real watch or clock to explain telling time. Tell your student that the short hand, or **hour hand**, tells you the hour. It moves from one number to the next in one hour. Likewise, the long hand, or **minute hand**, tells the minutes. Show your student which direction the hands move. This is called “clockwise.” Show your student the clock’s position at 12:00, 1:00, 2:00, and so on; also show the clock’s position at 12:30, 1:30, 2:30, and so on. Illustrate how these times would be written on a digital clock.



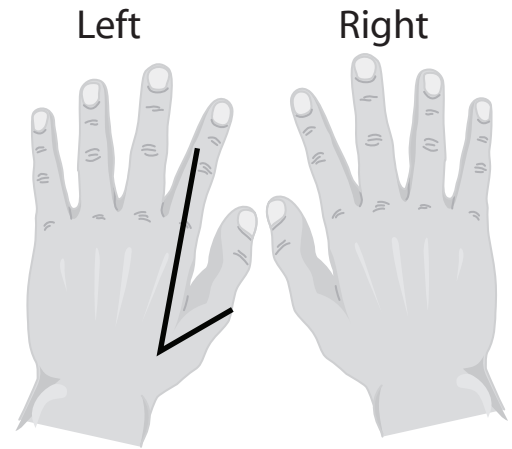
2. *Number cards* may also be made from index cards. For each number, write a *numeral* on one side and its corresponding *number word* on the backside (0 ⇒ *zero*, 1 ⇒ *one*, etc.).
3. In the everyday activities of life, find opportunities to discuss the importance of numbers and counting with your student.

Note: The above activity should be used in your first few lessons, since clocks are introduced at the end of this unit. When you come to page 21 of the workbook, you may want to introduce *5-minute* intervals of time by means of counting by 5s in preparation for unit 4.

2. Teach Distinguishing Left from Right

If your student does not know *left* from *right*, teach him the distinction. This will help him comprehend addition, subtraction, and numerical order.

- Discuss the concept of “left” and “right” with your student. Say: “Raise your right hand.” “Cover your left ear.” “Hop on your right foot.”
- If he is right-handed, use this approach: Say, “Think about which hand you would put a pencil in to write. You are right-handed, so you have chosen your right hand. This is the right side.” If your student is left-handed, use the same approach, only changing the appropriate terms. If he still needs another hint, say: “Hold your hands out open in front of you, with your thumbs pointing at each other and your fingers turned up. The one that forms an *L* is your *left* hand.”
- Use a number line and ask the following questions: “What number is *after* 3? What number is to the *right* of 3?” and “What number is *before* 2? What number is to the *left* of 2?”



3. Explain Odd and Even Numbers

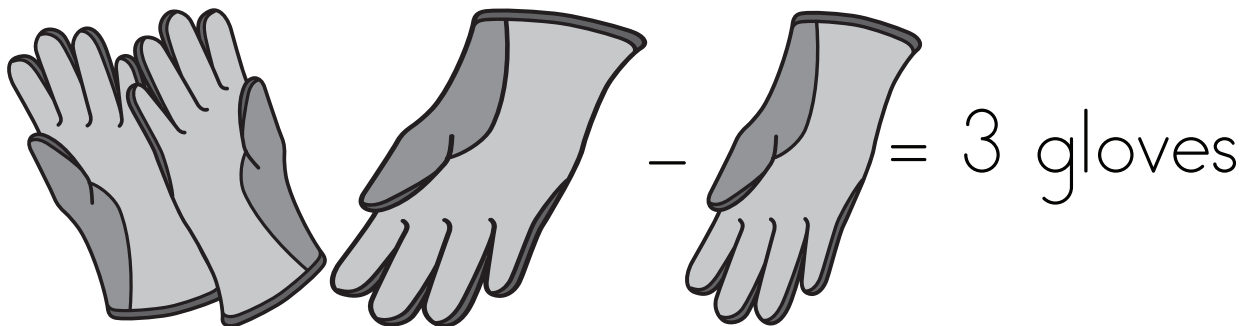
This unit introduces **odd** and **even numbers**.

- Explain that *even* numbers can be evenly divided, or separated, in two equal groups. They include numerals 0, 2, 4, 6, 8, and 10. Teach your student how to count by 2s on the number line. Explain that he is counting the even numbers.
- Explain that *odd* numbers include numerals 1, 3, 5, 7, and 9. They cannot be equally divided into two groups.
- Explain that you can tell if a number is odd or even by the ones column.

Note: If these math concepts are too difficult for your student to grasp, come back to them later.

Try illustrating this concept with pairs of gloves.

Count pairs of gloves by 2s; it should come out to an *even number* (e.g., 2 pairs of gloves equal 4 individual gloves; $2 + 2 = 4$). Take 1 glove away, and explain that now the number is *odd* ($4 - 1 = 3$). An *even number* will tell you how many pairs of gloves you have. An *odd number* will leave 1 glove without a partner.



4. Learn Place Value

In the next unit, your student will begin to learn about **place value**. If you discuss this concept now, helping your student to comprehend it, he will have less difficulty with future lessons.⁴

The following is a fairly complete discussion of place value. *You do not need to give your student this much detail*; but, for clarity's sake, it has been spelled out.



- Say, "Our number system uses **Arabic numerals**—0, 1, 2, 3, 4, 5, 6, 7, 8, and 9. All of our *numbers* are formed from these *numerals*. Individually, these numerals correspond to the **ones' place**. That is, the numeral 1 represents *one* item, and the numeral 8 represents *eight* items."
- Explain that when we reach the number 10, the numeral 1 has moved to the **tens' place**. Now the 1 represents *ten* items; that is, *one* ten.
- The first column on the right is the **ones column**. The second column on the left is the **tens column**. A numeral in the *ones column* represents ones. A numeral in the *tens column* represents groups of ten.

Tens	Ones
	1
	8
1	0

Craft sticks are excellent manipulatives⁵ for teaching *place value*. They can be bundled easily. Have your student count out ten groups of 10 craft sticks each, and tie each group up with a string or rubber band. Talk a little bit about *place value*. Have your student count to 100 by 10s, using these bundles. Show how one bundle of 10 sticks is different than 1 stick.⁶

5. Learn the Value of Money

Teach what a penny, nickel, and dime are worth, in preparation for unit 2.

- Have your student examine both sides of each coin, so he can recognize them either way.
- If your student is ready, have him practice counting these coins by 1s, 5s, and 10s.



On completing this unit, your student should take Test 1.⁷

4. This *preparatory activity* should be introduced after page 12 of the workbook has been completed.
5. *Manipulatives* are small objects that can easily be picked up and moved.
6. You may use dimes and pennies for the same illustration, but these coins are not introduced until the next unit.
7. Unit Tests are available for purchase from Christian Liberty Press.