Liberty Mathematics

Level K

TEACHER'S MANUAL

59501 R10/09

2009 Printing

A publication of

Christian Liberty Press

502 West Euclid Avenue

Arlington Heights, Illinois 60004

www.christianlibertypress.com

Written by Wendy Kramer

Layout and editing by Edward J. Shewan

ISBN 978-1-930367-61-6
1-930367-61-9

Printed in the United States of America

TABLE OF CONTENTS

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* 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 grasp the learning goals presented for each lesson. Ask yourself the following questions: "Does your child 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 lesson if the student needs reinforcement. Do more drilling. Stop and take a few days break, if necessary. It is better to build a good foundation, helping your child 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 lessons in the math workbook are designed to give the student a reasonable amount of written work. It is assumed that the teacher will do drill work with him. Each lesson has a box with some suggested work. This manual presents more teaching ideas, specific learning goals, and daily drills and games. Use these at your discretion to help with the ultimate goal of teaching your child the basic math concepts.

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

Setting Goals

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

- Numeral Recognition
- Counting from 0 to 100
- Addition through the Family of Ten
- Subtraction through the Family of Ten
- Place Value—Ones' and Tens'
- Counting by 1s, 2s, 5s, and 10s
- Time—Hour and Half Hour
- Ordinal Numbers

The end of the workbook also touches briefly on the topics of measuring objects, working with fractions, and solving story problems.

Because the student is new to formal learning, it is necessary that some, if not most, of each lesson 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. If your child is ready, teach him the days of the week, the months of the year, and the seasons. Each month, fill in a blank calendar,[1] and discuss special days or events. 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 (to learn numerals)
- Flashcards
- Popsicle sticks
- Coins (pennies, nickels, and dimes)
- Ruler
- "Judy" clock
- Miscellaneous manipulatives for counting

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 you child's progress. Occasionally, peruse your child's work and the course objectives to make sure you are on track. Remember that learning the material is the goal, not having fun and certainly not just getting finished.

1. You may make copies of the one found on page 233 in the student workbook.

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 3

Learning to Subtract—Families of 0–4

Pages 67–81

♦ Objectives:

- To teach the meaning of subtraction
- To teach the subtraction facts through the Family of 4

In addition:

- Continue counting on the hundred chart.
- Begin to teach counting by 2s. Note the *red* numbers on the chart on the back cover.
- Work on the days of the week and the months of the year.
- Introduce the meaning of "odd" and "even."

General Lesson Plan

♦ Suggested Drills:

- Depending on your student's progress, continue to count higher on the hundred chart.
- Beginning with 10, count backwards, from 10 to 0. Explain that each time you count down, or back, you are subtracting one. Illustrate with an abacus or manipulatives.
- As your student learns his subtraction facts, add corresponding flashcards to the pile he has learned. If he gets the answer to a flashcard wrong, have him use appropriate dot cards or an abacus to help him understand it. Drill with the flashcards each day.
- Recite the days of the week and the months of the year. Try to let your student say them on his own, only helping if he cannot remember.
- Count by 2s to 10, and then to 20.
- Make a copy of the calendar on page 233. Help your student to fill it out by copying from the calendar in your home. Discuss special days, like birthdays and holidays, and what day of the week they will be.

♦ Suggested Games

- Put ten (10) objects on the table. "Subtract" one at a time by removing them, and ask, "How many are left?" Explain that to "take away" is to *subtract*.[4]
- Continue using oral story problems.

Here are a few examples:

"If you see 4 cows in a field, and 2 cows go back to the barn, how many are left?"

"If you have 3 pencils, and you give 1 pencil to your sister, how many do you have left?"

- If you have a board game or computer game that teaches numbers, let your student play it. Explain how the game helps to teach about the orderly system of numbers God has given us.

Remember, if at any time your student is having difficulty, slow down. Go back and ask, "Where did he get lost?" and "Why?" Have him explain concepts and problems using manip-

4. If the objects are edible, end by eating the ones you take away.

ulatives, so you can see where he lacks in understanding. Stop if necessary and use another approach, or wait for a later time to cover the material. Above all, be patient.

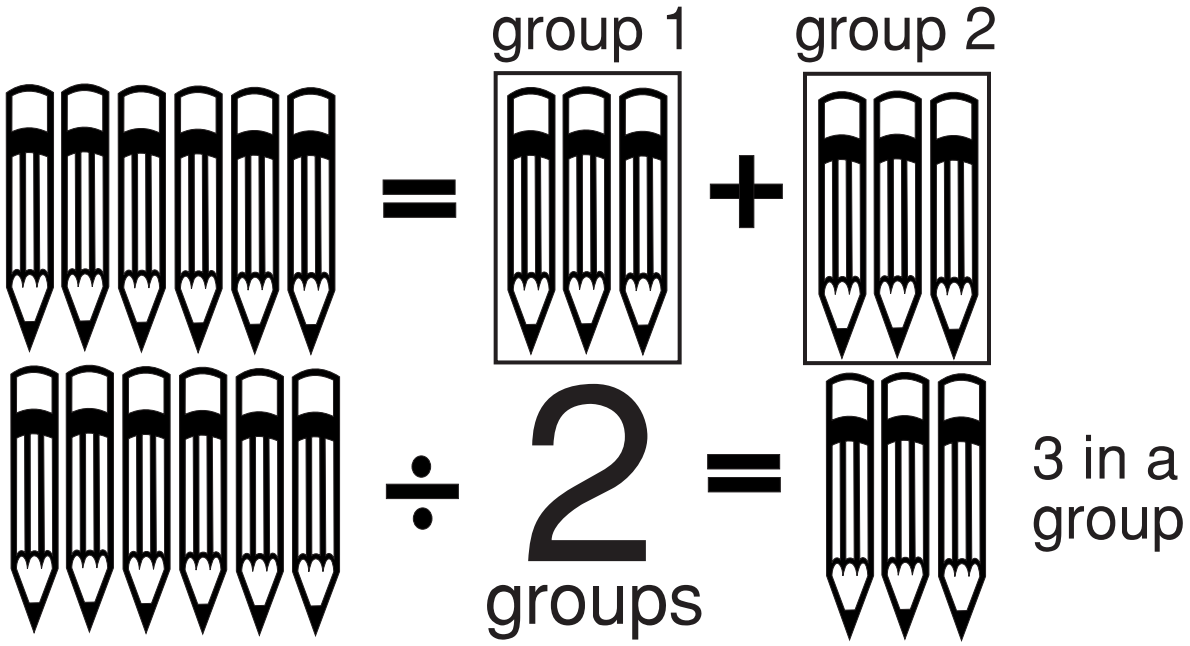
♦ New Material:

Does your student know the difference between *odd* and *even* numbers? If not, teach him this concept.

- *Even* numbers can be evenly divided,[5] or separated, in two equal groups. They include numerals 0, 2, 4, 6, 8, and 10. Ask your student, "Have you been counting by twos on the number line?" Explain that he has been counting the even numbers.
- *Odd* numbers include numerals 1, 3, 5, 7, and 9. They cannot be equally divided into two groups.

Try illustrating this concept with pairs of socks. Count a group of socks by twos; it should come out to an even number (e.g., 3 pairs of socks equal 6 individual socks). Take one sock away, and explain that now the number is odd. An even number will give you all the pairs of socks. An odd number will leave one sock without a partner.

You may also use pencils to teach this concept. Take six (6) pencils and separate (divide) them into two groups of three (3) pencils. This means six (6) divided by two (2) is equal to three (3), or 6 ÷ 2 = 3. Therefore, six is an even number which can be divided into two equal groups.



5. *Division* is a new concept that usually is not introduced until the second grade, therefore, you need not dwell on this idea unless your student is able to grasp it easily.

Unit 8

Counting by 1s, 2s, 5s, and 10s and Learning about Coins

Pages 192–205

♦ Objectives:

- To reinforce the student's understanding of number sequence
- To reinforce the idea of place value
- Counting by 1s, 2s, 5s, and 10s
- Understanding the value of pennies, nickels, and dimes

If you have been doing the drills suggested in this study guide, this unit should be easy!

General Lesson Plan

♦ Suggested Drills

- Use coins to do all of the counting drills you have been working on so far. Explain the value of pennies, nickels, and dimes beforehand.
- Using bundles of 10 craft sticks, count by 10s. Add single craft sticks to explain the ones' place.
- Using dimes, count by 10s. Add pennies to show the ones' place.
- Continue to review the days of the week and months of the year. Make another copy of the calendar found at the back of the workbook and have your student fill it in for the next month.
- Choose a spot on the number line and count backward.
- Give your student a number and ask him what number comes before it. Discuss the "tricky" ones, going down from 50 to 49 or 30 to 29, etc.[7]

♦ Suggested Games

- Ask your student to make up story problems for you.
- Hide objects in another room. Tell your student you have hidden, for example, three (3) keys and two (2) marbles. How many objects must he find? As he finds the objects, ask how many more he must find. Keep asking him questions as he finds more.

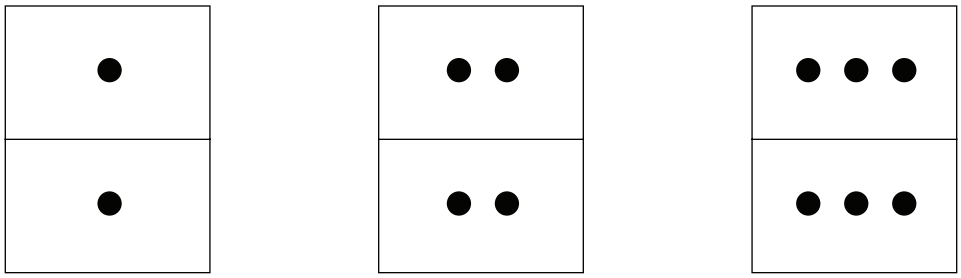
♦ New Material:

- Teach your student the *doubles* facts to 10.[8] The "doubles" facts are shown as follows:

$$\begin{array}{rrrrrr} 0 & 1 & 2 & 3 & 4 & 5 \\ +\,0 & +\,1 & +\,2 & +\,3 & +\,4 & +\,5 \\ \hline 0 & 2 & 4 & 6 & 8 & 10 \end{array} \quad \text{etc.}$$

7. For example, take one craft stick away from a group of ten craft sticks, that is, one less than 10. Now you have nine (9) craft sticks left, or 0 in the tens' column and 9 in the ones' column.

- Add the correct flashcards for daily drilling.[9] Make up special dot cards to illustrate the "doubles," as shown below.



If your student learns the "doubles" facts very well, other facts will be simpler. For example, if he knows that 4 + 4 = 8, then 3 + 4 = 7 and 4 + 5 = 9 should be easy!

8. *Doubles* facts are math facts that add the same numeral to itself. If you have been counting by twos, this should be easy.
9. Make your own if you go beyond the facts taught in the workbook.