math MAMMOTH

Grade 3-A Worktext

- **A**ddition and subtraction
- **M**ultiplication concept
- **M**ultiplication tables
- **C**lock
- **M**oney

Light Blue Series

By Maria Miller

Sample worksheet from
www.mathmammoth.com

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Foreword

Math Mammoth Grade 3-A and Grade 3-B worktexts comprise a complete math curriculum for third grade mathematics studies. This curriculum is aligned to the Common Core standards.

Third grade is a time for learning and mastering two (mostly new) operations: multiplication and division within 100. The student also deepens his understanding of addition and subtraction, and uses those in many different contexts, such as with money, time, and geometry.

The main areas of study in Math Mammoth Grade 3 are:

1. Students develop an understanding of multiplication and division of whole numbers through problems involving equal-sized groups, arrays, and area models. They learn the relationship between multiplication and division, and solve many word problems involving multiplication and division (chapters 2, 3, and 9).

2. Students develop an understanding of fractions, beginning with unit fractions. They use fractions along with visual fraction models and on a number line. They also compare fractions by using visual fraction models and strategies based on noticing equal numerators or denominators (chapter 10).

3. Students learn the concepts of area and perimeter. They relate area to multiplication and to addition, recognize perimeter as a linear measure (in contrast with area), and solve problems involving area and perimeter (chapter 7).

4. Students fluently add and subtract within 1,000, both mentally and in columns (with regrouping). They learn to add and subtract 4-digit numbers, and use addition and subtraction in problem solving (chapters 1 and 6).

Additional topics we study are time (chapter 4), money (chapter 5), measuring (chapter 8), and bar graphs and picture graphs (in various chapters).

This book, 3-A, covers addition and subtraction (chapter 1), multiplication concept (chapter 2), multiplication tables (chapter 3), time (chapter 4), and money (chapter 5). The rest of the topics are covered in the 3-B student worktext.

When you use these two books as your only or main mathematics curriculum, they are like a “framework,” but you still have a lot of liberty in planning your child's studies. While multiplication and division chapters are best studied in the order they are presented, feel free to go through the geometry, clock, measuring, and fraction sections in a different order. For geometry chapter, the child should already know the multiplication tables.

This might even be advisable if your child is “stuck” on some concept, or is getting bored. Sometimes the brain “mulls it over” in the background, and the concept he/she was stuck on can become clear after a break.

Math Mammoth aims to concentrate on a few major topics at a time, and study them in depth. This is totally opposite to the continually spiraling step-by-step curricula, in which each lesson typically is about a different topic from the previous or next lesson, and includes a lot of review problems from past topics.

This does not mean that your child would not need occasional review. However, when each major topic is presented in its own chapter, this gives you more freedom to plan the course of study *and* choose the review times yourself. In fact, I totally encourage you to plan your mathematics school year as a set of certain topics, instead of a certain book or certain pages from a book.

For review, the download version includes an html page called *Make_extra_worksheets_grade3.htm* that you can use to make additional worksheets for computation or for number charts. You can also simply reprint some already studied pages.

I wish you success in your math teaching!

Maria Miller, the author

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Chapter 1: Addition and Subtraction
Introduction

This first chapter of *Math Mammoth Grade 3-A* covers a lot of territory. We review and learn more about mental addition and subtraction strategies, review regrouping in addition and subtraction, learn to regroup twice in subtraction, and then study Roman numerals, rounding, the order of operations, and graphs.

Through it all, students solve lots of word problems and practice some algebra in disguise, where they use a symbol or a ? for the unknown thing in the problem.

I have included several lessons on mental math, including review of many of the strategies from second grade, so that even students who perhaps did not study mental math strategies in earlier grades can now catch up.

Students also learn and practice regrouping in addition and subtraction. In subtraction, the focus is on regrouping twice and regrouping with zero tens when subtracting three-digit numbers. The lessons illustrate the processes with the help of pictures that relate to base-ten blocks. You can also use physical manipulatives if you prefer. The basic idea of regrouping in subtraction is that a unit gets broken into 10 smaller units: a hundred into 10 tens or a ten into 10 ones, and that is what allows you to subtract. Make sure the student masters this topic.

This chapter also introduces rounding to the nearest ten, and parentheses with the order of operations as new topics. Then we study the connection between addition and subtraction with bigger numbers, which also aims to help children think algebraically.

Lastly, students get to practice their adding and subtracting skills in a practical way through reading a mileage chart and other types of graphs.

The Lessons in Chapter 1

	page	span
Mental Addition	10	*3 pages*
Review: Mental Subtraction	13	*3 pages*
More Mental Subtraction	16	*3 pages*
Ordinal Numbers and Roman Numerals	19	*3 pages*
More Mental Addition	22	*3 pages*
Mental Subtraction with Three-Digit Numbers.....	25	*3 pages*
Regrouping in Addition	28	*4 pages*
Review: Regrouping in Subtraction	32	*3 pages*
Regrouping Twice in Subtraction	35	*4 pages*
Regrouping Twice in Subtraction, Part 2	39	*3 pages*
Regrouping with Zero Tens	42	*3 pages*
Regrouping with Zero Tens, Part 2	45	*3 pages*

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Rounding 2-Digit Numbers to the Nearest Ten	48	*2 pages*
Rounding 3-Digit Numbers to the Nearest Ten	50	*3 pages*
The Connection with Addition and Subtraction	53	*4 pages*
Mileage Chart	57	*2 pages*
Order of Operations	59	*2 pages*
Graphs	61	*3 pages*
Review	64	*2 pages*

Helpful Resources on the Internet

Use these free online resources to supplement the "bookwork" as you see fit.

Number Puzzles
Place the numbers in the puzzle so that each side adds up to a given sum. Practices mental addition and logical thinking.
http://nlvm.usu.edu/en/nav/frames_asid_157_g_2_t_1.html

Callum's Addition Pyramid
Add the pairs of numbers to get a number on the next level and finally the top number.
Three difficulty levels.
http://www.amblesideprimary.com/ambleweb/mentalmaths/pyramid.html

Button Beach Challenge
Figure out what number the various colored buttons represent.
http://www.amblesideprimary.com/ambleweb/mentalmaths/buttons.html

Thinking Blocks
Thinking Blocks is an interactive math tool that lets students build diagrams similar to the bar diagrams used in this chapter. Choose the Addition and Subtraction section.
http://www.mathplayground.com/thinkingblocks.html

Base Blocks Addition
A virtual manipulative that shows regrouping in addition. You can either solve addition problems that are provided, or create your own. "Lasso" with a mouse ten units, ten tens, or ten hundreds to regroup them. Choose "Columns = 2" to restrict the work to two-digit numbers.
http://nlvm.usu.edu/en/nav/frames_asid_154_g_1_t_1.html?from=category_g_1_t_1.html

Base Blocks Subtraction
A virtual manipulative that helps teach borrowing in subtraction. Choose "Create Problem", then click on the red and blue blocks to create a problem. The number to be subtracted (the subtrahend) is illustrated by the RED blocks whereas the minuend is by the BLUE blocks. Click BEGIN problem to start solving. Drag a red block on top of a blue to "subtract" —they cancel each other. Drag bigger place values to the column on their right to "break them up"—in other words regroup or borrow.
http://nlvm.usu.edu/en/nav/frames_asid_155_g_1_t_1.html?from=category_g_1_t_1.html

Mr. Martini's Classroom: Long Addition
Practice regrouping in addition online. Click the x's to set the number of digits in the problems.
http://www.thegreatmartinicompany.com/longarithmetic/longaddition.html

Sample worksheet from
www.mathmammoth.com

Speed Grid Addition
Find numbers on the grid that add up to the given number. This uses both single-digit and two-digit numbers.
http://www.oswego.org/ocsd-web/games/SpeedGrid/Addition/urikares.html

Roman Numerals Tutorial
Good explanations of how numbers are formed using Roman numerals, such as when to "add" or "subtract" the symbols. The page allows interactivity where the student can self-check his/her understanding.
http://www.beaconlearningcenter.com/weblessons/romannumerals/default.htm

Roman Matching Game
Drag the Roman numerals to the corresponding Arabic numerals. If you win the next game will be faster. See if you can beat the clock!
http://sln.fi.edu/time/keepers/Silverman/html/RomanMatch.html

Roman Numerals Worksheets
Generate worksheets for converting Roman numerals to normal (Arabic) ones, or normal numbers to Roman numerals, or do easy addition and subtraction problems with Roman numerals.
http://www.homeschoolmath.net/worksheets/roman_numerals.php

Roman Numerals - Wikipedia
An article explaining the usage, origin, and a chart of Roman numerals.
http://en.wikipedia.org/wiki/Roman_numerals

Quia: Easy Roman Numerals
Translate Roman numerals into Arabic (covers I, V, and X only). Matching game, concentration, or word search.
http://www.quia.com/jg/66123.html

Roman Numerals - A Maths Webquest
A set of web pages where you can learn all about Roman numerals: how they originated, how to read and write the numerals, and places we still use the Roman number system today.
www.greatmathsgames.com/roman_numerals/roman_numerals.htm

Roman Sequence Game
See how fast you can put these Roman numerals in the correct sequence.
http://www.fi.edu/time/keepers/Silverman/html/RomanSequence.html

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Review: Mental Subtraction

1. Practice basic subtraction facts with this drill! Point to the problem and think of the answer.

a.	b.	c.	d.	e.
12 – 5	13 – 8	14 – 5	15 – 6	16 – 7
12 – 7	13 – 4	14 – 7	15 – 8	16 – 9
12 – 8	13 – 5	14 – 9	15 – 9	16 – 8
12 – 6	13 – 6	14 – 6	15 – 7	
12 – 4	13 – 9	14 – 8		f.
12 – 9	13 – 7			17 – 8
12 – 3				17 – 9

<u>Strategy 1:</u> Use known subtraction facts

Since 14 – 6 = 8, we know that the answer to 74 – 6 will end in 8, but it will be in the sixties (sixty-something). So it is 68.

Since 15 – 8 = 7, we know that the answer to 55 – 8 will end in 7, but it will be in the forties (forty-something). So it is 47.

2. Subtract.

a. 14 − 5 = _____	**b.** 12 − 8 = _____	**c.** 15 − 6 = _____
54 − 5 = _____	92 − 8 = _____	35 − 6 = _____

3. Subtract and compare the results!

a.	b.	c.	d.
14 − 7 = _____	12 − 8 = _____	16 − 7 = _____	15 − 7 = _____
34 − 7 = _____	42 − 8 = _____	56 − 7 = _____	75 − 7 = _____
64 − 7 = _____	82 − 8 = _____	156 − 7 = _____	675 − 7 = _____

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Strategy 2: First subtract to the *previous whole ten*, then subtract the rest.	
62 – 8 = 62 – 2 – 6 = 60 – 6 = 54 Subtract 8 in two parts: first 2, then 6.	72 – 6 = 72 – 2 – 4 = 70 – 4 = 66 Subtract 6 in two parts: first 2, then 4.

4. Subtract part-by-part: first to the previous whole ten, and then the rest.

a. 64 − 7 64 − 4 − 3 = _____	**b.** 72 − 8	**c.** 54 − 8
d. 75 − 7	**e.** 27 − 9	**f.** 43 − 5

Strategy 3: Subtract in parts: tens and ones	
Break the number being subtracted into its tens and ones. Subtract in parts.	
75 – 21 = 75 – 20 – 1 = 55 – 1 = 54 First subtract 20, then 1.	87 – 46 = 87 – 40 – 6 = 47 – 6 = 41 First subtract 40, then 6.

5. Subtract in parts: Break the second number into its tens and ones.

a. 89 – 26 89 – 20 – 6 = _____	**b.** 56 – 35 56 – ____ – ____ = _____	**c.** 75 – 51 75 – ____ – ____ = _____
d. 69 – 19	**e.** 67 – 36	**f.** 64 – 33

Strategy 4: Add.	
You can "add backwards". This works well if the two numbers are close to each other. Instead of subtracting, think how much you need to add to the number being subtracted (the subtrahend) in order to get the number you are subtracting from (the minuend).	
71 − 67 = ?? Think: 67 + ____ = 71	558 − 556 = ?? Think: 556 + ____ = 558

6. Subtract.

a. 78 − 75 = _____ 61 − 58 = _____	**b.** 112 − 108 = _____ 692 − 688 = _____	**c.** 505 − 499 = _____ 1000 − 994 = _____

7. You had $50. You purchased two bouquets of roses for $13 each.
How much do you have left after the purchase?

8. What if you bought <u>three</u> bouquets of roses for $13 each with your $50?
How much would you have left after the purchase?

9. Fifteen children were playing on the playground. Seven of them left.
Then, ten more children came. How many are playing on the playground now?

10. A lion chased an antelope for 400 feet, then another 200 feet, and lastly 200 feet more. Then the lion pounced on the antelope.
What was the total number of feet that the lion chased the antelope?

Puzzle Corner

What is this three-digit number? The tens digit is half of 10. The hundreds digit is double the ones digit. And the ones digit is half the amount of letters in the word "June."

That was the easy puzzle. Now comes the real one.

What is this three-digit number?
Here are the clues for the digits: September, October, November.

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Chapter 2: Multiplication Concept
Introduction

The second chapter of *Math Mammoth Grade 3-A Complete Worktext* covers the concept of multiplication. (However, memorizing and drilling "times tables" is postponed until chapter 3.)

The first lessons introduce the concept of multiplication as repeated addition of groups of the same size. Then the lesson *Multiplication as an Array* shows a different model for multiplication: objects arranged in rows and columns. This lesson teaches the student to think of the rows as groups, showing the fundamental unity of the two models. The whole lesson is presented in pictures.

Multiplication on a Number Line illustrates repeated addition as consecutive jumps or skips on a number line. The student learns to connect skip-counting with multiplication.

Multiplication in Two Ways concentrates on the fact that it does not matter in which order the factors appear (the *commutative property* of multiplication). Objects in an array illustrate this fact nicely: either the row or the column can be taken as the group being multiplied. This lesson also deals with jumping on the number line.

Multiplying By Zero is illustrated both with the group model (either several groups of zero size or zero groups of any size) and with the jump-on-a-number-line model (either several jumps of zero distance or zero jumps of any distance).

Understanding Word Problems shows how problems that involve multiplication have the idea of "each," "every," or "all." For example: *each* item does or has the same number of something. If students find these problems difficult, they can draw pictures to help, such as drawing flowers in pots, slices of pizza, *etc*.

The lesson *Order of Operations* teaches that multiplication is to be done before addition or subtraction and that addition and subtraction are to be done from left to right.

Understanding Word Problems, Part 2 gives more challenging problems. The word problems in traditional school texts are often so easy that students learn just to take the numbers in the problem and mechanically apply the operation that the lesson is about without really understanding what they're doing. If this lesson is too difficult, skip it for the time being and come back to it later. You can help your student to draw a picture for each problem.

The Lessons in Chapter 2

	page	span
Many Times the Same Group	68	*1 page*
Multiplication and Addition	69	*3 pages*
Multiplication on a Number Line	72	*3 pages*
Multiplication as an Array	75	*2 pages*
Order of Operations	77	*1 page*
Understanding Word Problems, Part 1	78	*3 pages*
Understanding Word Problems, Part 2	81	*2 pages*
Multiplication in Two Ways	82	*4 pages*

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Order of Operations	87	*2 pages*
Multiplying by Zero	89	*2 pages*
Mixed Review	91	*2 pages*
Review	93	*2 pages*

Helpful Resources on the Internet

Use these free online resources to supplement the "bookwork" as you see fit.

Math Dice Game for Addition and Multiplication
Instructions for three simple games with dice: one to learn the concept of multiplication, another to practice the times tables, and one more for addition facts.
http://www.teachingwithtlc.blogspot.com/2007/09/math-dice-games-for-addition-and.html

Explore the Multiplication Table
This applet visualizes multiplication as a rectangle.
http://www.mathcats.com/explore/multiplicationtable.html

Multiplication Number Lines
First choose a tile from the 10×10 grid to pose a problem, then you will see it illustrated on a number line.
http://www.ictgames.com/multinumberlines.html

Multiplication Memory Game
Click on corresponding pairs (the problem and its answer).
http://www.dositey.com/2008/addsub/memorymult.html

Multiplication Mystery
Drag the answer tiles to right places in the grid as they are given, and a picture is revealed
http://www.harcourtschool.com/activity/mult/mult.html

Multiplication.com Interactive Games
A bunch of online games just for the times tables.
http://www.multiplication.com/interactive_games.htm

Button Beach Challenge
Figure out what number the various colored buttons represent.
http://www.amblesideprimary.com/ambleweb/mentalmaths/buttons.html

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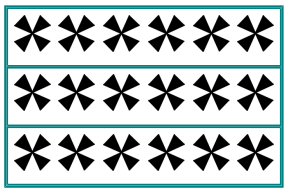
Multiplication as an Array

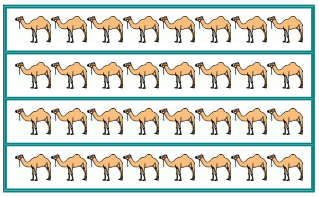
An **array** is an orderly arrangement of things in rows and columns.
When things are neatly aligned in an array, we can think of the *rows as groups*, so an array still pictures multiplication as repeated addition.



3 rows, 6 crosses in each row.

$6 + 6 + 6$

$3 \times 6 = 18$

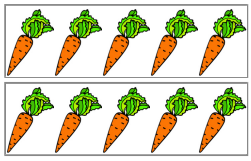


4 rows, 8 camels in each row.

$8 + 8 + 8 + 8$

$4 \times 8 = 32$

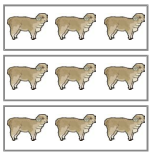
1. Fill in the missing numbers.



a. _____ rows, _____ carrots in each row.

_____ + _____

_____ × _____ = _____ carrots



b. _____ rows, _____ rams in each row.

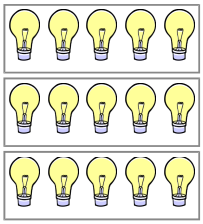
_____ + _____ + _____

_____ ×_____ = _____ rams

c. _____ rows, _____ bear in each row.

_____ + _____

_____ × _____ = _____ bears



d. _____ rows, _____ bulbs in each row.

_____ + _____+ _____

_____ × _____ = _____ bulbs

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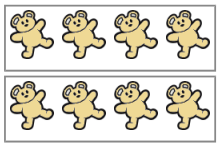
2. Write the addition and multiplication facts that the pictures are illustrating.
The box with a "T" is a ten.

a.

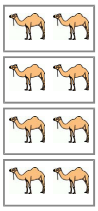
4 + 4 = _____

2 × 4 = _____

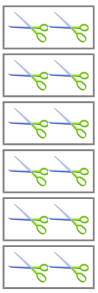


b.

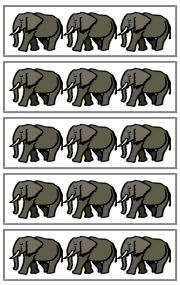
c.



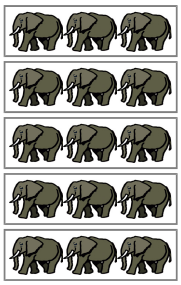
d.



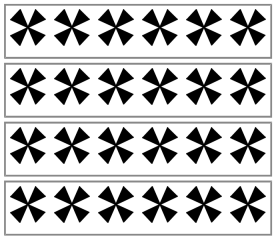
e.



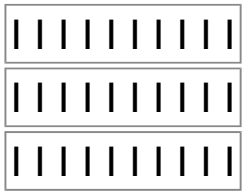
f.



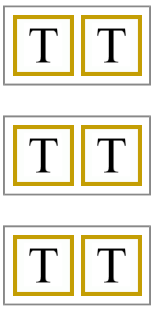
g.



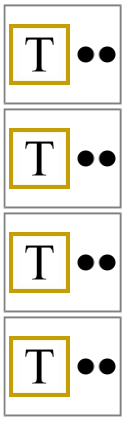
h.



i.



j.



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Chapter 3: Multiplication Tables
Introduction

In the third chapter we concentrate on memorizing the times tables.

How to Do Effective Oral Drilling

When you are doing memorization drills, be sure to explain to the student that the goal is to *memorize* the facts—to recall them from memory—and not to get the answers by counting or any other method. Just like your child has probably already memorized your address and phone number, now she or he is going to memorize some math facts. You can easily see if the student is trying to count because producing the answer by counting takes much more time. You should expect the child to answer immediately when you are drilling. If he or she doesn't know the answer by heart (from memory), then tell him or her the right answer.

Short drill sessions are usually best. For example, you might drill for five or ten minutes at a time, depending on the attention span of the child.

However, try to have at least two sessions during the day as your schedule permits. Research on how the brain learns has shown that new memories are forgotten soon and that new information is best retained when it is reviewed *within 4-6 hours* of the time it is initially learned. (By the way, this principle applies to *anything* new a person is learning.)

Pencil and paper activities alone that the student completes do not work well for memorizing facts because the child can get the answers by counting and not from memory. Proper drill requires an investment in time from the instructor. If you can, utilize older siblings, too, in the task of drilling. Moreover, computers are great drillmasters since they never get tired or bored and since you can usually choose a timed session in which the child must produce the answers quickly. Computer-based drilling can be very rewarding to children when they notice that they are truly learning the facts and are able to complete the drills successfully. They can actually come to enjoy the process of memorization. I have included a list of free online multiplication activities at the end of this introduction.

Here is a five-step method for memorization. Normally only a few of the steps would be included in any one session, depending on the child's concentration and ability.

Memorizing the table of 3 — in steps

Have the table to be learned already written on paper. Here we will use the table of three as an example. You can view a short video explaining the main points of the drill here: **http://www.youtube.com/watch?v=sZlBtMPrMyk**

1 x 3 = 3
2 x 3 = 6
3 x 3 = 9
4 x 3 = 12
5 x 3 = 15
6 x 3 = 18
7 x 3 = 21
8 x 3 = 24
9 x 3 = 27
10 x 3 = 30
11 x 3 = 33
12 x 3 = 36

1. The first task is to memorize the list of answers. Have your child study the first half of the skip-counting list (3, 6, 9, 12, 15, 18), saying the numbers aloud while pointing to the answers one by one with a finger or a pen. You may also use a number line. This technique uses the senses of seeing, hearing, and touch simultaneously to fix the information in the brain. After he has gone through the list a few times, ask him to repeat it from memory.

   Expect your child to answer, and don't give him the answers too easily, because ONLY by putting forth an effort will he memorize the facts. Just like the muscles, the mind needs exercise to become stronger.

   Require him to memorize the skip-counting list both forwards and backwards. Keep practicing until he can "rattle off" the first list of 3, 6, 9, 12, 15, 18. With some tables, like the tables of 2, 5, and 10, it helps to point out the pattern in them. The pattern in the table of 9 is more subtle but still useful.

2. Tackle the last half of the list: 21, 24, 27, 30, 33, 36. Do the same things you did with the first half of the list.

Sample worksheet from
www.mathmammoth.com

3. Next, work with the whole list of answers. Practice the list counting up *and* down until it goes smoothly and easily. These steps may be enough for one day, but *be sure to review* again later in the day.

4. Next, practice individual problems randomly. You can ask orally ("What is 5 times 3?"), point to the problems on the paper, or use flashcards. However, I would recommend reading the question aloud while simultaneously pointing to the problem or showing the flashcard because, again, using multiple senses helps to fix the information in the mind better.

   The goal at this stage is to associate each answer 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, with a certain multiplication fact (such as 7 x 3).

   You can also mix earlier tables that he already knows with these new problems, and drill both with flashcards.

5. The last step is to do this the other way around. Now *you* say the answer ("21"), and the student has to produce the problem ("3 × 7"). Keep the table handy, hide the problems, and point to the answers in a random order. This technique can also work the other way around, where the student says the answers, and you produce the problems. Give wrong answers sometimes, too, to check him out.

   As an extension, you can say answers from several tables that you have studied, and the student gives the corresponding problem. Sometimes there are several answers. For example, 36, 30, 24, and 20 are in several different times tables. This is an especially good exercise as it prepares for the concepts of division and factoring.

The memorization probably will not happen overnight. On subsequent days, you can mix drills 1-5 (hopefully you will not need to concentrate on steps 1 and 2). This kind of drilling takes a little time and effort from the teacher, but it can be very effective. Homeschoolers can obviously do some of it while going about other tasks, while traveling in the car, *etc*.

While you are doing this table by table, you can also try to teach the process to your child, so that he will learn how to do the memorization himself. He can hide the answers and try to reproduce the list in his mind.

Other helpful ideas

- Hang a **poster** with the 12×12 or 10×10 table on the wall. Remind your child to glance at it a few times a day. It can work wonders for visual students!
- Hang beside it another poster, with an empty grid, in which the child fills in those facts he has mastered.
- Recite the skip-counting lists or multiplication facts aloud just before going to bed. This can turn them into mastered facts by the next morning.

Are timed drills necessary?

I feel that timed drills are a tool among many, when it comes to learning math facts. Some children will "thrive" on them; in other words learn quickly when they are used. Perhaps they like racing against the clock or like the challenge. There are timed computer games that can work very well for drilling facts.

For example, Math Magician games has a simple 1-minute countdown, and if you answer 20 questions in that time, you get an award.
http://www.oswego.org/ocsd-web/games/Mathmagician/cathymath.html

Some of the games at the link below do not time you but give you more points the faster you go. That site is actually filled with several types of games just for math facts practice.
http://www.sheppardsoftware.com/math.htm

Yet for other children, timed drills may be counterproductive and end up in tears and frustration. The proof is in the pudding: just try it and see how it goes.

The Lessons in Chapter 3

	page	span
Multiplication Table of 2	99	*3 pages*
Multiplication Table of 4	102	*2 pages*
Multiplication Table of 10	104	*2 pages*
Multiplication Table of 5	106	*3 pages*
More Practice and Review (Tables of 2, 4, 5, and 10)	109	*3 pages*
Multiplication Table of 3	112	*3 pages*
Multiplication Table of 6	115	*2 pages*
Multiplication Table of 11	117	*3 pages*
Multiplication Table of 9	120	*4 pages*
Multiplication Table of 7	124	*2 pages*
Multiplication Table of 8	126	*3 pages*
Multiplication Table of 12	129	*2 pages*
Mixed Review	131	*2 pages*
Review	133	*3 pages*

Helpful Resources on the Internet

You can use these free online resources to supplement the "bookwork" as you see fit. As you can see, there are many resources available for drilling and practicing the tables online.

Multiplication Tables Structured Drill - video
This video of mine explains how to do a "structured drill" for multiplication tables, which is much more effective than a random drill.
www.youtube.com/watch?v=4bpq3Mqbwv0

Multiplication Grid
Drag the scrambled answer tiles into the right places in the grid as fast as you can!
http://www.mathcats.com/microworlds/multiplication_grid.html

Raging Rectangles and Multiple Madness (PDF)
Two fun printable board games for multiplication; Raging Rectangles is on page 2 and Multiple Madness is on page 6 of the download.
http://mathlearnnc.sharpschool.com/UserFiles/Servers/Server_4507209/File/Instructional%20Resources/G3WW21-24.pdf

Multiplication.com Interactive Games
A bunch of online games just for the times tables.
http://www.multiplication.com/interactive_games.htm

The Times Tables at Resourceroom.net
Fill in the multiplication chart—part of it or the whole thing—or take quizzes and get graded.
http://www.resourceroom.net/Math/1timestables.asp

Sample worksheet from
www.mathmammoth.com

Math Trainer - Multiplication
Multiplication table training online that responds to your answers and will improve your skills.
http://www.mathsisfun.com/games/math-trainer-multiply.html

Table Mountain
Climb the mountain with 20 questions from a selected table.
http://www.teachingtables.co.uk/tm/tmgame/tgame2.html

Multiplication Table Challenge
100 questions, timed.
http://www.programmingart.com/free/games/multiply/

Multiplication Mystery
Drag the answer tiles to the right places in the grid as they are given, and a picture is revealed
http://www.harcourtschool.com/activity/mult/mult.html

Mr. Taylor's Multiplication Facts Drill
Simple practice (click on the right answer) for the easy ones, the hard ones, the monsters, or all of them.
http://www.geocities.com/multiplicationfacts

Multiplication Memory Game
Click on corresponding pairs (problem-answer).
http://www.dositey.com/2008/addsub/memorymult.html

Quiz Hub - Multiplication game
Click on corresponding pairs (problem-answer).
http://quizhub.com/quiz/f-multiplication.cfm

Times tables from BBC Skillswise
Has printable factsheets, online quizzes, two grid games, and five printable worksheets.
http://www.bbc.co.uk/skillswise/numbers/wholenumbers/multiplication/timestables/index.shtml

Math Dice Game for Addition and Multiplication
Instructions for three simple games with dice; one to learn the concept of multiplication, another to practice the times tables, and one more for addition facts.
http://www.teachingwithtlc.blogspot.com/2007/09/math-dice-games-for-addition-and.html

Product Game
A fun, interactive two-player game that exercises your skill with factors and multiples.
http://illuminations.nctm.org/ActivityDetail.aspx?ID=29

Two Minute Warning
Solve as many problems as you can in two minutes.
http://www.primarygames.com/flashcards/multiplication/start.htm

Button Beach Challenge
Figure out what number the various colored buttons represent.
http://www.amblesideprimary.com/ambleweb/mentalmaths/buttons.html

Multiplication Table of 2

1. Skip-count by twos. Practice this pattern until you can say it from memory. Also practice it backwards (counting up and down). Notice these are *the even numbers*!

0, 2, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, 24

2. **a.** Fill in the table of 2. **b.** Fill in the missing factors. Then cover the answers. Choose problems in random order and practice. You may first practice only the part from 1 × 2 till 6 × 2, and the rest at a later time, such as the next day.

a.

1 × 2 = ____	7 × 2 = ____
2 × 2 = ____	8 × 2 = ____
3 × 2 = ____	9 × 2 = ____
4 × 2 = ____	10 × 2 = ____
5 × 2 = ____	11 × 2 = ____
6 × 2 = ____	12 × 2 = ____

b.

____ × 2 = 2	____ × 2 = 14
____ × 2 = 4	____ × 2 = 16
____ × 2 = 6	____ × 2 = 18
____ × 2 = 8	____ × 2 = 20
____ × 2 = 10	____ × 2 = 22
____ × 2 = 12	____ × 2 = 24

3. Don't write the answers down. Use these problems for random drill practice.

6 × 2	7 × 2	2 × 3	2 × 7	2 × 8
9 × 2	2 × 2	2 × 11	2 × 4	3 × 2
4 × 2	8 × 2	2 × 9	2 × 6	2 × 5
2 × 1	12 × 2	2 × 12	8 × 2	10 × 2

4. Don't write the answers down. Use these problems for random drill practice.

☐ × 2 = 14	☐ × 2 = 12	☐ × 2 = 6	☐ × 2 = 12	☐ × 2 = 22
☐ × 2 = 18	☐ × 2 = 16	☐ × 2 = 18	☐ × 2 = 8	☐ × 2 = 10
☐ × 2 = 8	☐ × 2 = 24	☐ × 2 = 14	☐ × 2 = 20	☐ × 2 = 24
☐ × 2 = 16	☐ × 2 = 2	☐ × 2 = 22	☐ × 2 = 4	☐ × 2 = 6

Sample worksheet from
www.mathmammoth.com

5. Multiply.

a. 2 × 12 = _____ 7 × 1 = _____ 1 × 8 = _____	**b.** 8 × 2 = _____ 2 × 5 = _____ 6 × 2 = _____	**c.** 9 × 2 = _____ 3 × 0 = _____ 1 × 2 = _____	**d.** 2 × 11 = _____ 10 × 2 = _____ 0 × 7 = _____

6. Multiplying by two is the same as **doubling**. Write an addition sentence and multiply by two to double the number in each problem.

a. Double 8 8 + 8 = _____ 2 × 8 = _____	**b.** Double 13 ____ + ____ = _____ ____ × ____ = _____	**c.** Double 15 ____ + ____ = _____ ____ × ____ = _____
d. Double 25 ____ + ____ = _____ ____ × ____ = _____	**e.** Double 32 ____ + ____ = _____ ____ × ____ = _____	**f.** Double 45 ____ + ____ = _____ ____ × ____ = _____

7. Continue the multiplication table of 2 a little bit further. Notice that all the answers in the multiplication table of 2 are **even** numbers.

2 × 12 = _____	2 × 15 = _____	2 × 18 = _____	2 × 21 = _____
2 × 13 = _____	2 × 16 = _____	2 × 19 = _____	2 × 22 = _____
2 × 14 = _____	2 × 17 = _____	2 × 20 = _____	2 × 23 = _____

8. Underline or circle whether the number is even or odd. If the number is even, write it as "two times the number that was doubled." If the number is odd, don't do anything.

a. 14 is even/odd 2 × ____	**b. 7** is even/odd 2 × ____	**c. 18** is even/odd 2 × ____
d. 21 is even/odd 2 × ____	**e. 30** is even/odd 2 × ____	**f. 34** is even/odd 2 × ____

Sample worksheet from
www.mathmammoth.com

9. Solve. Write a multiplication or a combination of multiplication and addition for each problem.

a. How many feet do seven chickens have?

_____ × _____ = _____

b. How many feet do five chickens and one cow have?

_____ × _____ + _____ = _____

c. How many feet do two cows and one chicken have?

_____ × _____ + _____ = _____

d. How many feet do three cows and five chickens have?

_____ × _____ + _____ × _____ = _____

10. Write an animal feet problem to match this addition and multiplication:

$$8 \times 2 + 2 \times 4 = 24$$

You can also make animal feet problems for your friend/classmate!

11. Solve the word problems. Write a multiplication, addition, or a subtraction, or perhaps a combination of them, for each problem.

a. There were two trees, and seven birds in each tree. Then three of them flew away. How many birds stayed in the trees?

_____ × _____ – _____ = _____

b. John earns two dollars every time he helps with the yard work. He did yard work six times and saved all his money. Then he bought a book that cost eight dollars. How much money did he have left?

Fred had $11 in his piggy bank. Each week he saved $2 from the money he earned, for eight weeks. Then he had just enough money to buy an expensive model airplane. How much did the airplane cost?

Puzzle Corner

Sample worksheet from
www.mathmammoth.com

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Sample worksheet from
www.mathmammoth.com

Chapter 4: Telling Time
Introduction

This chapter covers reading the clock to the minute, finding time intervals (elapsed time), using the calendar, and making simple conversions between units of time.

First, we review the topic of reading the clock to the five-minute intervals, first using numbers in telling the time, such as 6:45 or 12:15. Then, children learn about quarter hours, such as a quarter till 6 or a quarter past 9. We also review the topic of using "past" and "till", such as in 20 till 6 or 10 past 11. Next we study elapsed time in more detail in the lesson "How Many Minutes Pass."

The lesson "Reading the Clock to the Minute" completes the topic (begun in earlier grades) of reading the clock, because the student will now be able to tell the complete time. From that point on, the focus switches to finding time intervals and other time-related calculations.

The next two lessons about calculating elapsed time emphasize dividing the time interval into easily-calculated parts: For example, to find the time elapsed from 10:30 AM to 7:00 PM, the student learns to find the elapsed time from 10:30 AM to 12:00 noon and then from 12:00 noon to 7 PM. The same principle is followed when the time-interval looks more complex. This chapter does not yet introduce the idea of adding or subtracting hours and minutes vertically in columns.

We also study using the calendar, and converting between time units, such as changing 2 hours to 120 minutes or changing 340 minutes to 5 hours 40 minutes.

The Lessons in Chapter 4

	page	span
Review: Reading the Clock	139	*2 pages*
Half and Quarter Hours	141	*2 pages*
Review: Till and Past	143	*2 pages*
How Many Minutes Pass	145	*3 pages*
Practice	148	*1 page*
Clock to the Minute	149	*3 pages*
Elapsed Time	152	*2 pages*
More on Elapsed Time	154	*4 pages*
Using the Calendar	158	*2 pages*
Mixed Review	160	*4 pages*
Review	162	*1 page*

Helpful Resources on the Internet

What Time Will it Be?
Move the hands on the clock to show what time it will be after a certain amount of minutes.
http://nlvm.usu.edu/en/nav/frames_asid_318_g_2_t_4.html

Match Clocks
Make the digital clock show the time given on an analog clock.
http://nlvm.usu.edu/en/nav/frames_asid_317_g_2_t_4.html

Sample worksheet from
www.mathmammoth.com

Analog and Digital Clocks
These clocks show you the current time, side by side. Useful for illustration.
http://nlvm.usu.edu/en/nav/frames_asid_316_g_2_t_4.html

Elapsed Time Worksheets
Generate printable worksheets for elapsed time. You can practice the elapsed time, finding the starting time, or finding the ending time. The time interval can be to the accuracy of 1 minute, 5 minutes, 10 minutes, 15 minutes, 30 minutes, or whole hours.
http://www.mathnook.com/elapsedtimegen.html

Flashcard Clock
Read the analog and type in the time in digital. Very clear clock and good fast response!
http://www.teachingtreasures.com.au/maths/FlashcardClock/flashcard_clock.htm

Telling Time Practice
Interactive online practice: you drag the hands of the clock to show the correct time.
http://www.worsleyschool.net/socialarts/telling/time.html

Teaching Time
Analog/digital clock games and worksheets. An interactive "class clock" to demonstrate time.
http://www.teachingtime.co.uk/

Time-for-time
Resource site to learn about time: worksheets, games, quizzes, time zones.
http://www.time-for-time.com/default.htm

A Matter of Time
Lesson plans for telling time, interactive activities, and some materials to print.
http://www.fi.edu/time/Journey/JustInTime/contents.html

Clockwise
Plug in a time, and the clock runs till it, or the clock runs to a time and you type in.
http://www.shodor.org/interactivate/activities/clock2/index.html

The Right Time
A couple of interactive exercises about reading the clock.
http://www.pitara.com/activities/math/time/time.asp?QNum=3

What Time Is It?
Look at the analog clock and pick the digital clock that shows the same time.
http://www.primarygames.com/time/start.htm

Calculating Time from BBC SkillsWise
Factsheets, worksheets, and an online game to practice time calculations.
http://www.bbc.co.uk/skillswise/numbers/measuring/time/calculatingtime/

Sample worksheet from
www.mathmammoth.com

That Quiz: Time
Online quizzes for all time-related topics: reading the clock, time passed, adding/subtracting with time, conversion of time units, and time zone practice. The quizzes have many levels, can be timed or not, and include lots of options for customization. Easy to use and set up.
www.thatquiz.org/tq-g/math/time

On Time
Set the clock's hands to the given time. Four different levels.
http://www.sheppardsoftware.com/mathgames/earlymath/on_time_game1.htm

Clock Shoot
A game where you need to click on the clock with the matching time (analog/digital). Three different levels: whole hours, half hours, or quarter hours.
http://www.sheppardsoftware.com/mathgames/earlymath/clock_shoot.htm

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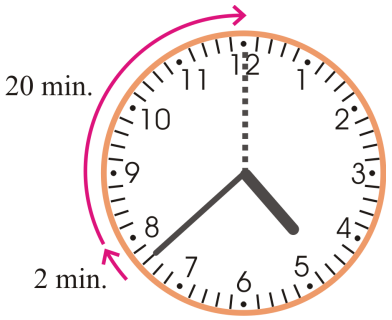
Sample worksheet from
www.mathmammoth.com

Elapsed Time

How many minutes is it till the next whole hour?

It is 4:38. The minute hand needs to go 2 minutes till the 40-minute point (number 8), and then 20 more minutes till the next whole hour. So it is 22 minutes till 5 o'clock.

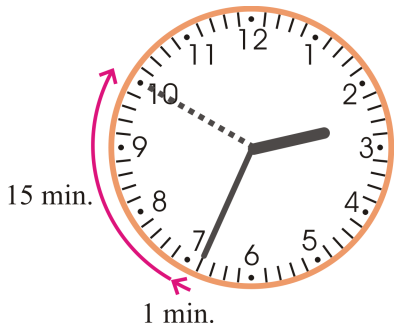
Or, you can subtract 38 minutes from 60 minutes:
60 − 38 = 22. Remember, a complete hour is 60 minutes.



It is 2:34. How many minutes is it till 2:50?

The hour is the same (2 hours) in both times, you can simply subtract the minutes: 50 − 34 = 16 minutes.

Or, add up from 34 till 50:
34 + **6** = 40
40 + **10** = 50.
You added 16 minutes.



Or, imagine the minute hand moving on the clock face: it moves 1 minute, and then another 15 minutes — a total of 16 minutes.

1. How many minutes is it till the next whole hour?

a. _____ minutes

b. _____ minutes

c. _____ minutes

d. _____ minutes

e. _____ minutes

f. _____ minutes

g. _____ minutes

h. _____ minutes

Sample worksheet from
www.mathmammoth.com

2. How many minutes is it from the time on the clock face till the given time?

till 12:40 **a.** _____ minutes	till 7:30 **b.** _____ minutes	till 10:45 **c.** _____ minutes	till 3:58 **d.** _____ minutes
till 1:00 **e.** _____ minutes	till 5:55 **f.** _____ minutes	till 12:50 **g.** _____ minutes	till 4:55 **h.** _____ minutes

3. How many minutes is it?

a. From 5:06 till 5:28	**b.** From 2:05 till 2:54	**c.** From 3:12 till 3:47
d. From 12:11 till 12:55	**e.** From 7:27 till 7:48	**f.** From 9:06 till 10:00

4. **a.** The pie needs to bake half an hour. Marsha's clock showed 4:22 when she put it into the oven. When should she take it out?

b. Juan notices that, "In 14 minutes class will end." If the class ends at 2 PM, what time is it now?

c. The sun rises at 5:49 AM. Marge wants to wake up 15 minutes before that. When should she wake up?

d. Edward was 8 minutes late to math class, and arrived at 1:53 PM. When did the class start?

Sample worksheet from
www.mathmammoth.com

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Sample worksheet from
www.mathmammoth.com

Chapter 5: Money
Introduction

This chapter of *Math Mammoth Grade 3-A Complete Worktext* teaches counting coins, making change, and solving simple problems about money.

The first lesson, *Using the Half-Dollar*, reviews counting coins, including half-dollars. In the lesson *Dollars*, the student writes dollar amounts using the "$" symbol and the decimal point.

The lesson *Making Change* explains two basic ways of making change: (1) counting up and (2) subtracting (finding the difference). This is all done with mental math. The following lesson, *Mental Math and Money Problems*, also uses mental math, this time in solving simple money problems.

The lesson *Solving Money Problems* introduces the concept of adding and subtracting amounts of money vertically in columns.

You can make free worksheets for counting coins at **http://www.homeschoolmath.net/worksheets/money.php**, or using the worksheets generator that comes with the supportive materials of this curriculum.

The Lessons in Chapter 5

	page	span
Using the Half-Dollar	165	*2 pages*
Dollars	167	*3 pages*
Making Change	170	*4 pages*
Mental Math and Money Problems	174	*3 pages*
Solving Money Problems	177	*4 pages*
Mixed Review	181	*2 pages*
Review	183	*1 page*

Helpful Resources on the Internet

Use these free online resources to supplement the "bookwork" as you see fit.

US Money Worksheets
Count common US coins or bills. You can choose which coins/bills will be used, and how many coins/bills are shown at most. Other currencies are available at www.homeschoolmath.net/worksheets
http://www.homeschoolmath.net/worksheets/money.php

Change Maker
Determine how many of each denomination you need to make the exact change. Good and clear pictures! Playable in US, Canadian, Mexican, UK, or Australian money.
http://www.funbrain.com/cashreg/index.html

Sample worksheet from
www.mathmammoth.com

Cash Out
Make the correct change by clicking on the bills and coins.
http://www.mrnussbaum.com/cashd.htm

Using Money
Drag the right amount of coins and bills (US) to the answer space to match a given amount. The pictures look a little fuzzy.
http://www.mathcats.com/microworlds/usingmoney.html

Counting Money Activity from Harcourt
Count the coin value, type it in the box, and click 'Check' to verify your answer.
http://www.hbschool.com/activity/counting_money/

Piggy bank
When coins fall from the top of the screen, choose those that add up to the given amount to fill up the piggy bank.
http://fen.com/studentactivities/Piggybank/piggybank.html

Coins and Medals from U.S. Mint
History and pictures of the circulating coins, commemorative coins, Native American $1 Coin Program, and the Presidential $1 Coin Program. Learn also how coins are made and take a virtual tour around the mint.
http://www.usmint.gov/kids/coinsMedals

Money Instructor
Exercises and worksheets for checkbook math. Includes a checkbook to print, a worksheet for writing dollars and cents, checking account deposits, checkbook transactions, and word problems.
http://www.moneyinstructor.com/checks.asp

Money Activities at the National Library of Virtual Manipulatives
Count the money shown, or make the given change, or make one dollar.
http://nlvm.usu.edu/en/nav/frames_asid_325_g_2_t_1.html

Making Change Game at MathPlayground.com
An interactive game where you figure out the change and then make it using the fewest possible bills and coins.
http://www.mathplayground.com/making_change.html

Sample worksheet from
www.mathmammoth.com

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Sample worksheet from
www.mathmammoth.com

Dollars

One dollar.

$1 or $1.00

Five dollars.
$5 or $5.00.

Write the "$" symbol in front of dollar amounts.

Write first the dollars, then a decimal point, and then the cents.

$1.51

$5.30

1. How much money? Write the amount.

a. $_____

b. $_____

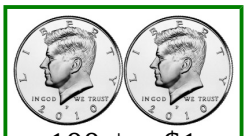
c. $_____

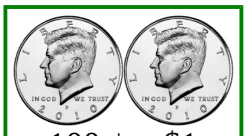
d. $_____

e. $_____

f. $_____

If you have 100 cents, they make <u>a dollar</u>.





Total $2.32

Total $2.10

2. How much money? Write the amount.

a. $_____

b. $_____

c. $_____

Remember to put 0 into the dollar's place if you have a total cent amount that is less than 100.

40 cents = $0.40 82 cents = $0.82 9 cents = $0.09

3. Write as dollar amounts.

a. $_____

b. $_____

three nickels
and a dime

c. $_____

eight dimes

d. $_____

seven pennies
and a nickel

e. $_____

three quarters
and two dimes

f. $_____

4. Write the cent amounts as dollar amounts, and vice versa.

a. 56 ¢ = $_____	**b.** 6 ¢ = $_____	**c.** 425 ¢ = $_____
d. _____ ¢ = $5.69	**e.** _____ ¢ = $0.30	**f.** _____ ¢ = $3.06

5. Mark opened his piggy bank and counted the coins. He had 245 cents.
He also had $5 in his wallet. How much money does Mark have in total?

6. The picture shows how much money you have. Write how much you will have left if you buy the items listed.

If I buy:	I will have left:
a. a puzzle for $5.20	$
b. a book for $7.35	$

If I buy:	I will have left:
c. a book for $4.20 and a magazine for $1.50	$
d. two brushes for $3.35 each	$

If I buy:	I will have left:
e. a pen ($0.60) and an eraser ($0.50)	$
f. three pencils for $0.40 each	$

Sample worksheet from
www.mathmammoth.com

math MAMMOTH

Grade 3-B Worktext

- **P**lace value with thousands
- **G**eometry
- **M**easuring
- **D**ivision
- **F**ractions

Light Blue Series

By Maria Miller

Sample worksheet from
www.mathmammoth.com

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Sample worksheet from
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Sample worksheet from
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Foreword

Math Mammoth Grade 3-A and Grade 3-B worktexts comprise a complete math curriculum for third grade mathematics studies. This curriculum is aligned to the Common Core standards.

Third grade is a time for learning and mastering two (mostly new) operations: multiplication and division within 100. The student also deepens his understanding of addition and subtraction, and uses those in many different contexts, such as with money, time, and geometry.

The main areas of study in Math Mammoth Grade 3 are:

1. Students develop an understanding of multiplication and division of whole numbers through problems involving equal-sized groups, arrays, and area models. They learn the relationship between multiplication and division, and solve many word problems involving multiplication and division (chapters 2, 3, and 9).

2. Students develop an understanding of fractions, beginning with unit fractions. They use fractions along with visual fraction models and on a number line. They also compare fractions by using visual fraction models and strategies based on noticing equal numerators or denominators (chapter 10).

3. Students learn the concepts of area and perimeter. They relate area to multiplication and to addition, recognize perimeter as a linear measure (in contrast with area), and solve problems involving area and perimeter (chapter 7).

4. Students fluently add and subtract within 1,000, both mentally and in columns (with regrouping). They learn to add and subtract 4-digit numbers, and use addition and subtraction in problem solving (chapters 1 and 6).

Additional topics we study are time (chapter 4), money (chapter 5), measuring (chapter 8), and bar graphs and picture graphs (in various chapters).

This book, 3-B, covers place value and 4-digit numbers (chapter 6), geometry (chapter 7), measuring (chapter 8), division (chapter 9), and fractions (chapter 10). The rest of the topics are covered in the 3-A student worktext.

When you use these two books as your only or main mathematics curriculum, they are like a "framework," but you still have a lot of liberty in planning your child's studies. While multiplication and division chapters are best studied in the order they are presented, feel free to go through the geometry, clock, measuring, and fraction sections in a different order. For geometry chapter, the child should already know the multiplication tables.

This might even be advisable if your child is "stuck" on some concept, or is getting bored. Sometimes the brain "mulls it over" in the background, and the concept he/she was stuck on can become clear after a break.

Math Mammoth aims to concentrate on a few major topics at a time, and study them in depth. This is totally opposite to the continually spiraling step-by-step curricula, in which each lesson typically is about a different topic from the previous or next lesson, and includes a lot of review problems from past topics.

This does not mean that your child would not need occasional review. However, when each major topic is presented in its own chapter, this gives you more freedom to plan the course of study *and* choose the review times yourself. In fact, I totally encourage you to plan your mathematics school year as a set of certain topics, instead of a certain book or certain pages from a book.

For review, the download version includes an html page called *Make_extra_worksheets_grade3.htm* that you can use to make additional worksheets for computation or for number charts. You can simply reprint some already studied pages.

I wish you success in your math teaching!

Maria Miller, the author

Sample worksheet from
www.mathmammoth.com

Chapter 6: Place Value with Thousands
Introduction

This chapter of *Math Mammoth Grade 3* covers 4-digit numbers (numbers with thousands), and adding and subtracting them. We also study rounding and estimating, which are very important skills for everyday life.

First, students learn 4-digit numbers, place value—breaking numbers such as 3,498 into thousands, hundreds, tens, and ones—and comparing 4-digit numbers. Next, they practice some mental addition and subtraction with 4-digit numbers. The lesson stresses the similarities between adding and subtracting 4-digit numbers and adding and subtracting smaller numbers. Practicing mental math also helps to build number sense.

We also study regrouping in addition and subtraction, using 4-digit numbers. If you purchased the download version, you can make more worksheets for addition and subtraction using the accompanying worksheet maker.

The last major topics in this chapter are rounding numbers to the nearest hundred and estimating. Students also get to do some more word problems in one lesson.

The Lessons

	page	span
Thousands	8	*4 pages*
Four-Digit Numbers and Place Value	12	*4 pages*
Which Number is Greater?	16	*2 pages*
Mental Adding and Subtracting	18	*4 pages*
Add 4-Digit Numbers with Regrouping	22	*2 pages*
Subtract 4-Digit Numbers with Regrouping	24	*4 pages*
Rounding to the Nearest Hundred	28	*3 pages*
Estimating	31	*3 pages*
Word Problems	34	*3 pages*
Mixed Review	37	*2 pages*
Review	39	*2 pages*

Sample worksheet from
www.mathmammoth.com

Helpful Resources on the Internet

Base Blocks from National Library of Virtual Manipulatives
Place enough thousand cubes, hundred-flats, ten-sticks, and one-blocks in the work area to show the given numbers. Choose "Columns = 4" to restrict the program to four-digit numbers.
http://nlvm.usu.edu/en/nav/frames_asid_152_g_1_t_1.html?from=category_g_1_t_1.html

Maths Teacher's Toolkit
Use the place value calculator for this level to practice place value with 4-digit numbers. Some of the other tools are too easy for the focus of this chapter.
http://www.crick.northants.sch.uk/Flash%20Studio/cfsmaths/Toolkit/Toolkit.htm

Cookie Dough
Practice naming big numbers.
http://www.funbrain.com/numwords/index.html

Can you say really big numbers?
Enter a really big number, try to say it out loud, and see it written.
http://www.mathcats.com/explore/reallybignumbers.html

Line Dry Game
Fill in a missing number on the clothesline based on different skip-counting patterns.
http://www.fuelthebrain.com/Game/play.php?ID=15

Maximum Capacity
Drag as many gorillas as you can into the elevator without exceeding the weight capacity of the elevator. You will have to use your quick addition, estimation, and number sense skills.
http://www.mrnussbaum.com/maximumcapacity.htm

Place value puzzler
Place value or rounding game. Choose "easy" place value or "easy" rounding for this level. You will need to click on the required place value in a number, or type in the answer for rounding.
http://www.funbrain.com/tens/index.html

Rounding Sharks
You will be asked to round numbers in the thousands to the nearest hundred. Click on the shark that has the number rounded correctly.
http://www.aaamath.com/B/est.htm

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Sample worksheet from
www.mathmammoth.com

Four-Digit Numbers and Place Value

Here the numbers 2467, 1090, and 5602 are written as a *sum* of their different place values.

It is like writing each part of the number out in full: the thousands, the hundreds, the tens, and the ones. **Notice the zeros!** When there are *no* hundreds, or tens, or ones, we write a zero.

thou-sands	hund-reds	tens	ones
2	4	6	7

2000 + 400 + 60 + 7

thou-sands	hund-reds	tens	ones
1	0	9	0

1000 + 0 + 90 + 0

thou-sands	hund-reds	tens	ones
5	6	0	2

5000 + 600 + 0 + 2

1. Fill in the blanks, and write the numbers as a sum of the different place values.

a. 1,034 = ____ thousand ____ hundreds ____ tens ____ ones

= 1000 + ___0___ + __3 0__ + _4_

b. 5,670 = ____ thousand ____ hundreds ____ tens ____ ones

= 5000 + _____ + _____ + _____

c. 3,508 = ____ thousand ____ hundreds ____ tens ____ ones

= _____ + _____ + _____ + _____

d. 8,389 = ____ thousand ____ hundreds ____ tens ____ ones

= _____ + _____ + _____ + _____

e. 9,007 = ____ thousand ____ hundreds ____ tens ____ ones

= _____ + _____ + _____ + _____

f. 7,214 = ____ thousand ____ hundreds ____ tens ____ ones

= _____ + _____ + _____ + _____

Sample worksheet from
www.mathmammoth.com

2. Fill in the table.

a. five thousand nine hundred ninety T H T O ☐ ☐ ☐ ☐	**b.** Six thousand sixteen T H T O ☐ ☐ ☐ ☐	**c.** Six thousand three hundred three T H T O ☐ ☐ ☐ ☐
d. Eight thousand seven hundred T H T O ☐ ☐ ☐ ☐	**e.** Nine thousand two hundred forty-five T H T O ☐ ☐ ☐ ☐	**f.** Ten thousand ten thou-sands T H T O 1 0 0 0 0

3. These numbers are written as sums. Write them in the normal way.

a. 2000 + 90 = _____ 3000 + 200 = _____	**b.** 8000 + 5 = _____ 1000 + 80 + 7 = _____
c. 8000 + 200 + 20 = _____ 2000 + 500 + 90 + 8 = _____	**d.** 4000 + 50 = _____ 2000 + 800 + 7 = _____

4. What part of these numbers is missing?

a. 5000 + 80 + _____ = 5,083	**b.** 7000 + _____ + 5 = 7,605
c. _____ + 3000 = 3,050	**d.** _____ + 700 + 1 = 2,701

5. Write the numbers immediately after and before the given number.

a. _____ 6,049 _____ **b.** _____ 2,324 _____

c. _____ 1,800 _____ **d.** _____ 8,809 _____

e. _____ 7,385 _____ **f.** _____ 9,244 _____

Sample worksheet from
www.mathmammoth.com

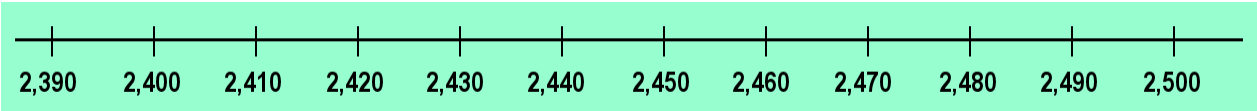
6. These numbers are written as sums, but in a scrambled order! Write them as normal numbers.

a. 4000 + 900 + 7 = _____	**b.** 80 + 500 + 8000 + 6 = _____
c. 2 thousand 7 ones 4 tens	**d.** 2 tens 6 hundred 4 thousand
e. 7 thousand 8 hundred 8 ones	**f.** 5 thousand 6 tens
g. 3 thousand 4 ones	**h.** 5 hundred 9 thousand

7. What part of these numbers is missing?

a. 900 + 2 + _____ = 8,902	**b.** 5000 + 40 + _____ = 5,046
c. _____ + 6000 + 40 = 6,540	**d.** _____ + 4000 + 300 = 4,340

8. Here is a number line from 2,390 to 2,500 with tick-marks for every 10.



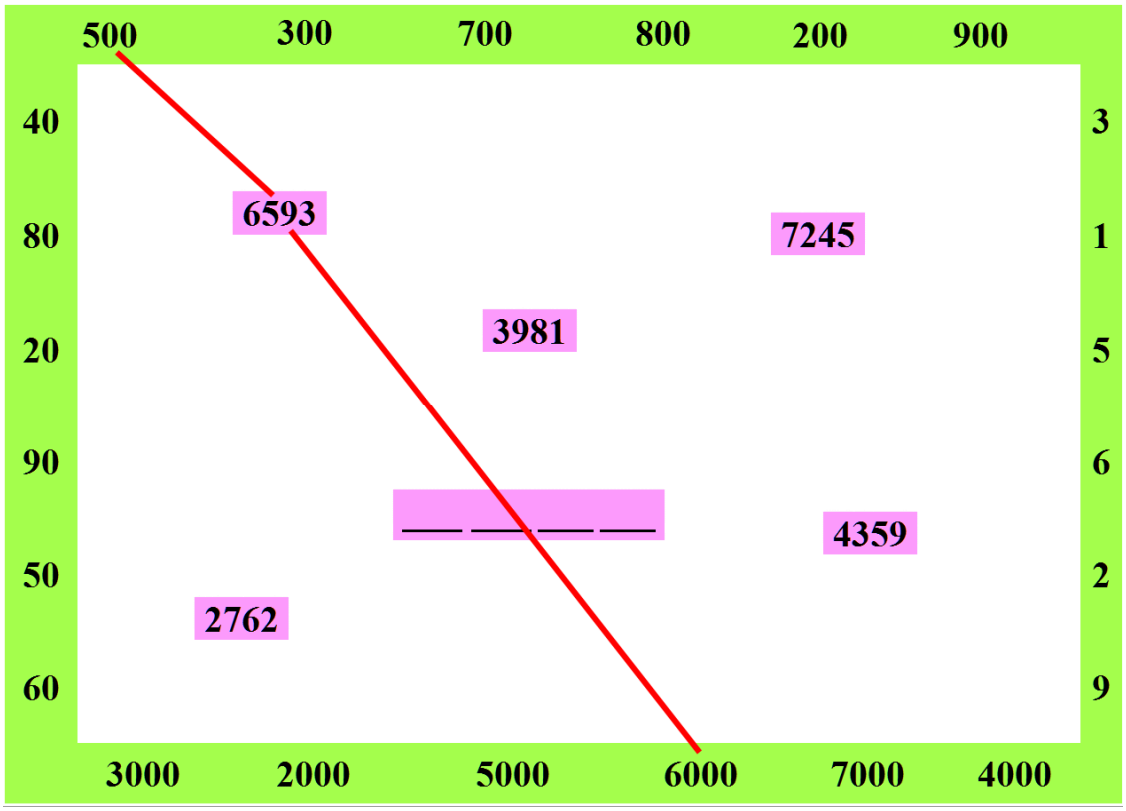
Mark these numbers on the number line (approximately):
2415 2398 2441 2476 2483 2499.

9. Draw a number line from 7,650 to 7,800 with tick marks at every 10.

Mark these numbers on the number line (approximately):
7659, 7672, 7745, 7758, 7777, 7796

Sample worksheet from
www.mathmammoth.com

10. Connect each number inside the puzzle to its whole thousands, hundreds, tens, and ones that it contains. For example, 6,593 is connected to 6,000 and to 500 (for starters).
Add the unused numbers from the border to form the missing number inside.



11. Solve the puzzle. Think of breaking the numbers into thousands, hundreds, tens, and ones.

	+		+		+		=	5206
+		+		+		+		
	+		+		+		=	3078
+		+		+		+		
	+		+		+		=	1925
+		+		+		+		
	+		+		+		=	432
=		=		=		=		
5022		3235		1408		976		

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Sample worksheet from
www.mathmammoth.com

Chapter 7: Geometry
Introduction

The seventh chapter of *Math Mammoth Grade 3* deals with geometry. The emphasis is on two new concepts: area and perimeter.

First, we study and review shapes in one lesson where the student divides shapes into new ones, and also encounters some tilings (a.k.a. tessellations). Next, we study in more detail about some quadrilaterals, namely squares, rectangles, and rhombi (plural of rhombus).

Then comes the focus of this chapter: perimeter and area. Students find perimeters of polygons, including finding the perimeter when the side lengths are given, and finding an unknown side length when the perimeter is given.

They learn about area, and how to measure it in either square inches, square feet, square centimeters, square meters, or just square units if no unit of length is specified.

Students also relate area to the operations of multiplication and addition. They learn to find the area of a rectangle by multiplying the side lengths, and to find the area of rectilinear figures by dividing them into rectangles and adding the areas.

We also study the distributive property "in disguise." This means using an area model to represent $a \times (b + c)$ as being equal to $a \times b$ plus $a \times c$. The expression $a \times (b + c)$ is the area of a rectangle with side lengths a and $(b + c)$, which is equal to the areas of two rectangles, one with sides a and b, and the other with sides a and c.

Multiplying by Whole Tens is a lesson about multiplication such as 3×40 or 90×7. It is put here so that students can then use their multiplication skills to calculate areas of bigger rectangles.

Then we solve many area and perimeter problems. That is necessary so that students learn to distinguish between these two concepts. They also get to see rectangles with the same perimeter and different areas or with the same area and different perimeters.

Lastly we touch on solids, such as cube, rectangular prism, pyramids, cone, and cylinder, and study their faces, edges, and vertices. You can make paper models for them from the printouts provided in the curriculum. Alternatively you can buy them, usually made in plastic. Search on the internet for "geometric solids."

Sample worksheet from
www.mathmammoth.com

The Lessons

	page	span
Shapes	45	*4 pages*
Some Special Quadrilaterals	50	*3 pages*
Perimeter	53	*3 pages*
Problems with Perimeter	57	*3 pages*
Getting Started with Area	60	*2 pages*
More About Area	62	*4 pages*
Multiplying by Whole Tens	66	*4 pages*
Area Units and Problems	70	*4 pages*
Area and Perimeter Problems	74	*2 pages*
More Area and Perimeter Problems	76	*3 pages*
Solids	79	*2 pages*
Mixed Review	81	*2 pages*
Geometry Review	83	*2 pages*

Helpful Resources on the Internet

Use these online resources as you see fit to supplement the main text.

SHAPES

Shape Cutter
Draw any shape (polygon), cut it, and manipulate the cut pieces. You can have the computer mix them up, and then try to recreate the original shape.
http://illuminations.nctm.org/ActivityDetail.aspx?ID=72

Patch Tool
An online activity where the student designs a pattern using geometric shapes.
http://illuminations.nctm.org/ActivityDetail.aspx?ID=27

Polygon Playground
Drag various colorful polygons to the work area to make your own creations!
http://www.mathcats.com/explore/polygons.html

Interactive Quadrilaterals
Drag the corners to play with squares, rectangles, rhombi, and more.
http://www.mathsisfun.com/geometry/quadrilaterals-interactive.html

Shapes Identification Quiz from ThatQuiz.org
An online quiz in a multiple-choice format, asking to identify common two-dimensional shapes. You can modify the quiz parameters to your liking.
www.thatquiz.org/tq-f/math/shapes/

Sample worksheet from
www.mathmammoth.com

Tangram puzzles for kids
Use the seven pieces of the Tangram to form the given puzzle.
Complete the puzzle by moving and rotating the seven shapes.
http://www.abcya.com/tangrams.htm

Interactive Tangram Puzzle
Place the tangram pieces so they form the given shape.
http://nlvm.usu.edu/en/nav/frames_asid_112_g_2_t_1.html

Tangram set
Cut out your Tangram set by folding paper
http://tangrams.ca/fold-set

Online Kaleidoscope
Create your own kaleidoscope creation with this interactive tool.
http://www.zefrank.com/dtoy_vs_byokal/

AREA AND PERIMETER

Everything you wanted to know about area and perimeter
Short explanations of how to find the perimeter of simple shapes and the area of rectangles, followed by quizzes on three levels. In perimeter, level two, some side lengths are not given. In level three, you calculate the perimeter of compound shapes. In area of rectangles, level 1 has just rectangles, and levels 2 and 3 have compound shapes made of rectangles.
www.bgfl.org/custom/resources_ftp/client_ftp/ks2/maths/perimeter_and_area/index.html

Shape Explorer
Find the perimeter and area of odd shapes on a rectangular grid.
http://www.shodor.org/interactivate/activities/ShapeExplorer/

Math Playground: Measuring the Area and Perimeter of Rectangles
Amy and her brother, Ben, explain how to find the area and perimeter of rectangles and show you how changing the perimeter of a rectangle affects its area. After the lesson, you will use an interactive ruler to measure the length and width of 10 rectangles, and to calculate the perimeter and area of each.
http://www.mathplayground.com/area_perimeter.html

Math Playground: Party Designer
You need to design areas for the party, such as a crafts table, food table, seesaw, and so on, so that they have the given perimeters and areas.
http://www.mathplayground.com/PartyDesigner/PartyDesigner.html

BBC Bitesize - Perimeter
A simple revision (review) “bite” for perimeter that includes short explanations and a few quiz questions.
http://www.bbc.co.uk/schools/ks3bitesize/maths/measures/perimeter/revise1.shtml

BBC Bitesize - Area
Brief revision (review) “bites”, including a few interactive questions, about area: counting squares, area of rectangles, area of triangles, parallelograms, and of compound shapes. Includes an activity and a test.
http://www.bbc.co.uk/schools/ks3bitesize/maths/measures/area/revise1.shtml

Sample worksheet from
www.mathmammoth.com

Geometry Area/Perimeter Quiz from ThatQuiz.org
An online quiz, asking either the area of perimeter of rectangles, triangles, and circles. You can modify the quiz parameters to your liking, for example to omit the circle, or instead of solving for area, you solve for an unknown side when the perimeter/area is given.
http://www.thatquiz.org/tq-4/?-j201v-lc-m2kc0-na-p0

Perimeter Game from Cyram.org
A simple online quiz for finding the perimeter of rectangles, triangles, or compound rectangles where not all side lengths are given.
http://www.cyram.org/Projects/perimetergame/index.html

FunBrain: Shape Surveyor Geometry Game
A simple and easy game that practices finding either the perimeter or area of rectangles.
http://www.funbrain.com/poly/index.html

Area of Rectangle
Drag the corners of the rectangle and see how the side lengths and areas change.
http://illuminations.nctm.org/ActivityDetail.aspx?ID=46

XP Math: Find Perimeters of Parallelograms
This online quiz shows you parallelograms and rectangles, and you need to calculate the perimeter, including typing in the right unit, and not using the altitude of the parallelogram.
http://www.xpmath.com/forums/arcade.php?do=play&gameid=10

SOLIDS

Identify solids
Select the name and drop it on the correct solid.
http://www.softschools.com/math/geometry/shapes/solids/games/

Geometric Solids
Manipulate various geometric solids. Color the solid to investigate properties such as the number of faces, edges, and vertices.
http://illuminations.nctm.org/ActivityDetail.aspx?ID=70

2-D and 3-D Shapes
Learn about different solids and see them rotate.
http://www.bgfl.org/bgfl/custom/resources_ftp/client_ftp/ks2/maths/3d/index.htm

Identify solids
Click to identify the partially buried 3-dimensional shapes.
http://www.primaryresources.co.uk/online/longshape3d.html

Space Blocks
Build with blocks to illustrate three-dimensional shapes.
http://nlvm.usu.edu/en/nav/frames_asid_195_g_2_t_2.html

Sample worksheet from
www.mathmammoth.com

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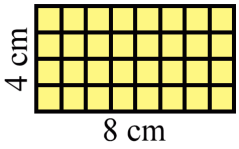
Sample worksheet from
www.mathmammoth.com

Area and Perimeter Problems

Sometimes it's easy to confuse perimeter and area.

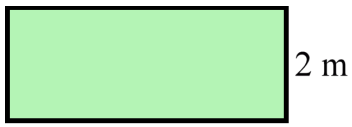
- AREA has to do with covering the shape with squares. Your answer will be in square centimeters, square inches, square feet, square meters, or just square units.
- PERIMETER has to do with "going all the way around." Your answer will be in some unit of length, such as centimeters, meters, inches, or feet.



Area: 4 cm × 8 cm = 32 cm^2.

Perimeter:
4 cm + 8 cm + 4 cm + 8 cm = 24 cm

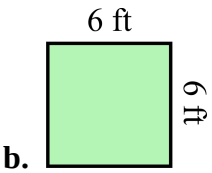
1. Find the area and perimeter of the rectangles.



a.

Perimeter = _____

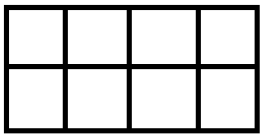
Area = _____



b.

Perimeter = _____

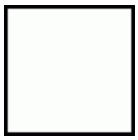
Area = _____



c. 4 in. wide, 2 in. tall

Perimeter = _____

Area = _____



d. A square with 3 cm sides

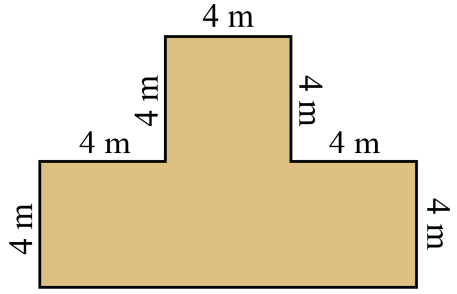
Perimeter = _____

Area = _____

2. Find the area and perimeter of this shape. Notice that one side length is not given. You need to figure that out.

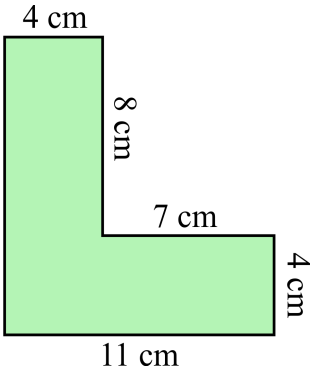
Area

Perimeter



Sample worksheet from
www.mathmammoth.com

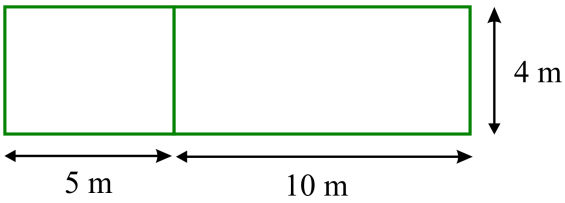
3. Find the area and perimeter of this shape.
Notice that one side length is not given.
You need to figure that out.



Area

Perimeter

4. This is a two-part lawn.



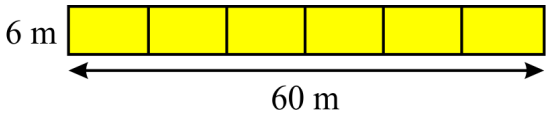
a. Find the areas of the two parts.

_____ and _____

b. Find the total area.

c. Find the perimeter.

5. Find the total area of this rectangle,
and also the area of each little part.

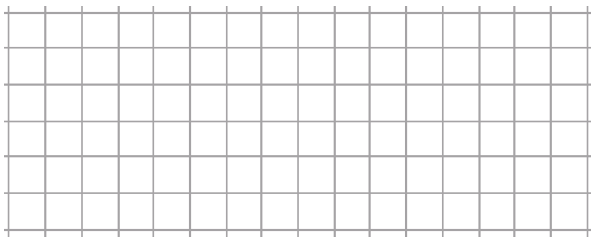


Area of each part:

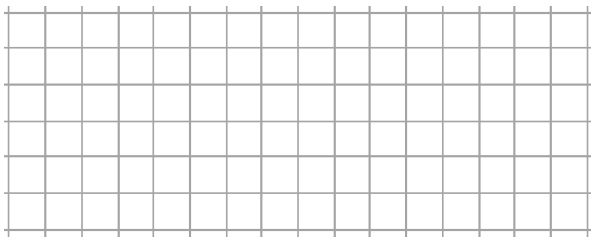
Total area:

Puzzle Corner

Can you draw these rectangles? Guess and check!



a. Draw a rectangle with an area of 39 squares, and a perimeter of 32 units.



b. Draw a rectangle with an area of 56 squares, and a perimeter of 36 units.

Sample worksheet from
www.mathmammoth.com

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Sample worksheet from
www.mathmammoth.com

Chapter 8: Measuring
Introduction

The eighth chapter of *Math Mammoth Grade 3* covers measuring-related topics. Both the metric system and the customary system are covered.

First, students learn about units of length. We start the chapter by measuring to the nearest quarter of an inch. Since most rulers measure to the eighth or sixteenth part of an inch, it is helpful to cut out a ruler from the lesson that only has tick marks for every fourth of an inch, and tape that onto an existing ruler.

Next, students measure using centimeters and millimeters. They also create line plots from measurement data where the horizontal scale is marked off in quarters of an inch.

The next two lessons help students become familiar with feet, yards, miles, meters, and kilometers—the units for measuring medium and long distances.

Then it is time to measure weight. The first lesson deals with pounds and ounces, and the next one with grams and kilograms. It is very helpful if you can use a kitchen scale for these lessons, perhaps borrow one if you don't have one.

Lastly we study liquid volume, first of all the customary units (cup, pint, quart, gallon) and then the metric units (liter and milliliter). The emphasis is on becoming familiar with the customary units of volume and measuring volume in milliliters.

Many of the lessons in this chapter also have an optional section about conversions between measuring units, such as changing three meters into centimeters, or two feet into inches. Converting between units is beyond the Common Core standards for third grade (it is actually included in the 4th and 5th grade standards), but I have included some easy conversion problems here because I feel many third graders are ready for them.

We all use various measuring units in our everyday lives, and using them is the key to remembering what they are, how big they are, and what the conversion factors are. Naturally, people in the United States do not use the metric system a lot, while people elsewhere do not use the customary system. The units your child is not using are likely to be forgotten easily. So encourage the student(s) to have free play time with measuring devices such as a scale, measuring cups, measuring tapes, and rulers.

The Lessons

	page	span
Measuring to the Nearest Fourth-Inch	87	*4 pages*
Centimeters and Millimeters	91	*4 pages*
Line Plots and More Measuring	95	*3 pages*
Feet, Yards, and Miles.....	98	*2 pages*
Meters and Kilometers	100	*2 pages*
Pounds and Ounces	102	*4 pages*
Grams and Kilograms	106	*4 pages*

Sample worksheet from
www.mathmammoth.com

Cups, Pints, Quarts, and Gallons	110	*3 pages*
Milliliters and Liters	113	*2 pages*
Mixed Review	115	*2 pages*
Review	117	*2 pages*

Helpful Resources on the Internet

The Ruler Game
Choose between whole inches, half-inches, quarters, eighths, or sixteenth parts of an inch to measure. Click on the given measurement on a ruler. Timed or not timed versions available.
http://www.rickyspears.com/rulergame

Measure It!
Practice measuring lines with either centimeters or inches. Multiple choice questions.
http://www.funbrain.com/measure

Sal's Sub Shop
Customers order subs, and you need to cut them to the given measurements - sometimes in metric units, sometimes in inches.
http://www.mrnussbaum.com/sal.htm

Reading a Tape Measure Worksheets
Worksheet generator - you can choose to which accuracy to measure, inches, or inches and feet.
http://themathworksheetsite.com/read_tape.html

Measurement Game for Kids
Measure the length and weight of various parcels using the interactive scales and ruler so you can give them a stamp with the correct postage rate. Uses grams and centimeters.
http://www.kidsmathgamesonline.com/geometry/measurement.html

Reading Scales
You can illustrate a variety of measuring devices, such as scales, measuring cup, thermometer, and speedometer, and how to read them. Generate examples using different scales on different devices at the press of a button.
http://www.teacherled.com/2008/01/28/reading-scales

Reading Scales
Weigh objects on this virtual balance scale, using weights of 10 g, 50 g, 250 g, and 500 g.
http://www.teacherled.com/resources/oldscales/oldscalesload.html

Measures
An online activity about metric measuring units and how to read scales, a measuring cup, and a ruler. Uses British spelling.
http://www.bgfl.org/bgfl/custom/resources_ftp/client_ftp/ks2/maths/measures

Sample worksheet from
www.mathmammoth.com

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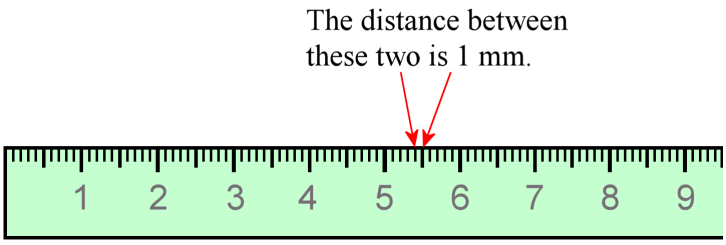
Sample worksheet from
www.mathmammoth.com

Centimeters and Millimeters

This ruler measures in centimeters.
The numbers signify whole centimeters.
All of the shorter lines between those are for millimeters.

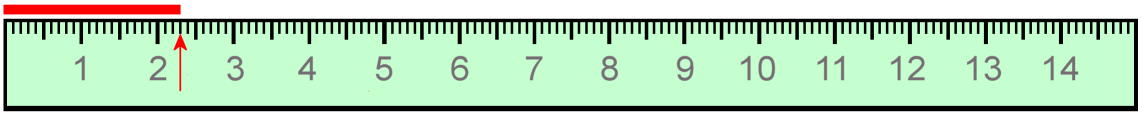


The distance from one short line to the next line is 1 millimeter. We write 1 mm. Millimeters are very tiny!

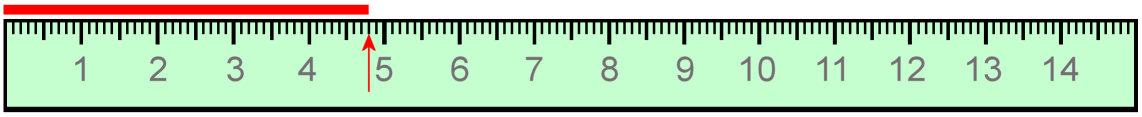
Look at the ruler: there are 10 millimeters in each centimeter.

Measuring lines

First see how many whole centimeters long the line is. Then count how many millimeter-lines beyond that it reaches.



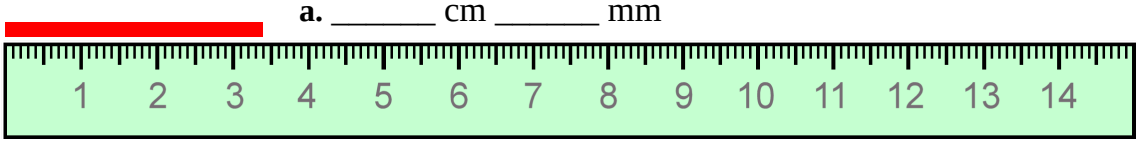
This line is 2 cm 3 mm long.



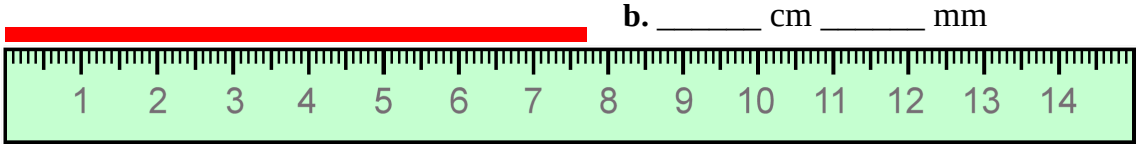
This line is 4 cm 8 mm long.

1. Measure the lines using the ruler.

a. _____ cm _____ mm



b. _____ cm _____ mm



Sample worksheet from
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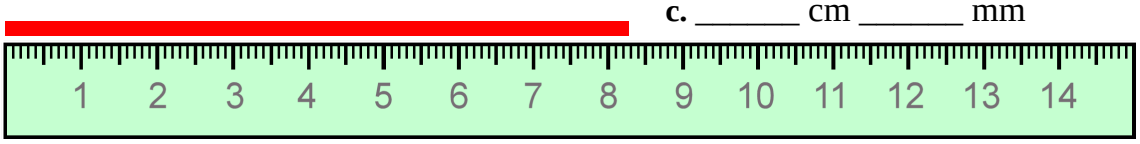
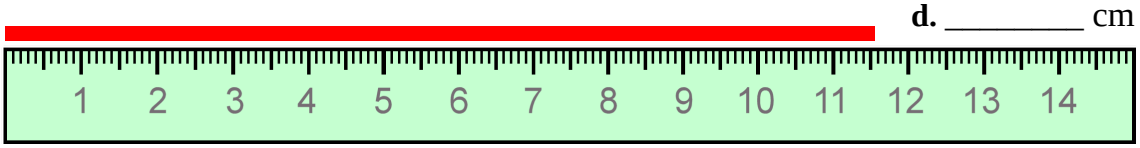
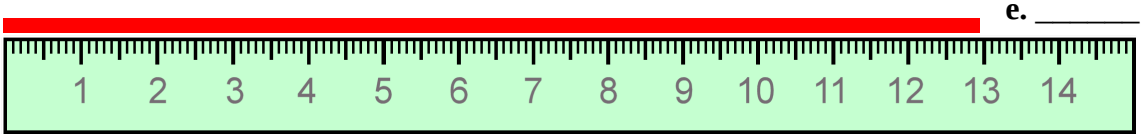
c. _____ cm _____ mm



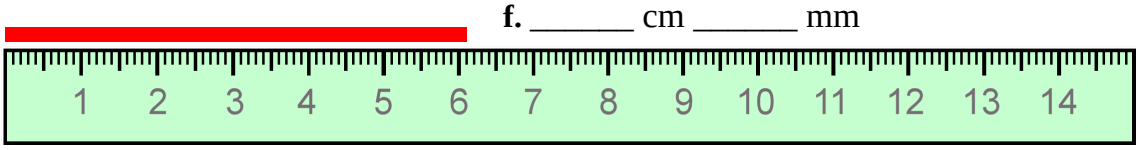
d. _____ cm _____ mm



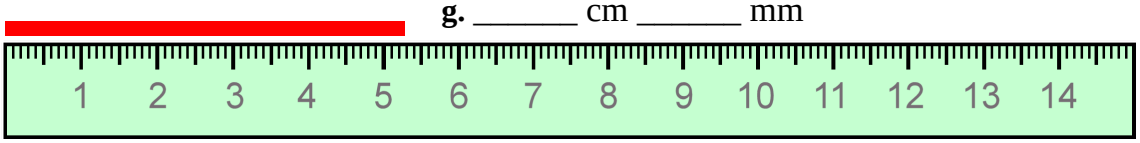
e. _____ cm _____ mm



f. _____ cm _____ mm



g. _____ cm _____ mm



2. Draw lines using a ruler.

a. 7 cm 8 mm

b. 10 cm 5 mm

c. 1 cm 4 mm

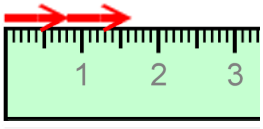
d. 12 cm 6 mm

Sample worksheet from
www.mathmammoth.com

3. Measure items you can find at home, using a centimeter-millimeter ruler.
If the item is not exactly as long as the markers on the ruler, choose the nearest mark.

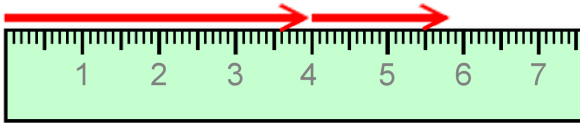
Item	Length
	_____ cm _____ mm

The first arrow is 8 mm. The second arrow is 8 mm too.
End-to-end, they measure together 16 mm *OR* 1 cm 6 mm.



8 mm + 8 mm = 16 mm = 1 cm 6 mm

The first arrow is 4 cm. The second arrow is
1 cm 8 mm. Together they measure 5 cm 8 mm.



4 cm + 1 cm 8 mm = 5 cm 8 mm

You can add centimeters with centimeters, and millimeters with millimeters. But whenever you have 10 or more millimeters, remember that 10 millimeters makes 1 centimeter.

9 mm + 6 mm = 15 mm = 1 cm 5 mm

8 cm 4 mm + 3 cm 7 mm = 11 cm 11 mm = 12 cm 1 mm

4. Figure out these "line additions".

a. 1 cm 5 mm + 5 mm = _____ cm ____ mm

b. 8 mm + 9 mm = _____ cm ____ mm

c. 5 mm + 5 cm 8 mm = _____ cm ____ mm

d. 15 mm + 14 mm = _____ cm ____ mm

e. 5 cm 2 mm + 7 cm 4 mm = _____ cm _____ mm

f. 10 cm 8 mm + 7 cm 7 mm = _____ cm _____ mm

g. 13 cm 9 mm + 50 cm 2 mm = _____ cm _____ mm

h. 9 mm + 17 mm + 2 cm 2 mm = _____ cm _____ mm

Sample worksheet from
www.mathmammoth.com

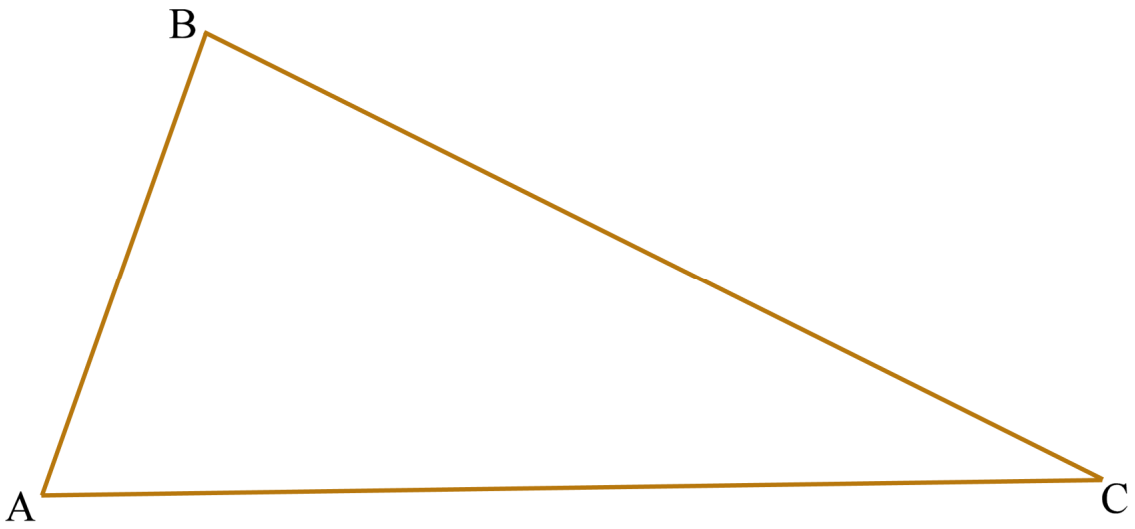
5. Change between centimeters and millimeters.

a.	b.	c.
1 cm = _____ mm	1 cm 1 mm = *11* mm	4 cm 5 mm = _____ mm
2 cm = _____ mm	1 cm 2 mm = _____ mm	2 cm 5 mm = _____ mm
5 cm = _____ mm	1 cm 8 mm = _____ mm	7 cm 8 mm = _____ mm
8 cm = _____ mm	2 cm 3 mm = _____ mm	10 cm 4 mm = _____ mm

6. Change between millimeters and centimeters.

a.	b.	c.
70 mm = _____ cm	12 mm = ____ cm _____ mm	89 mm = ____ cm _____ mm
100 mm = _____ cm	45 mm = ____ cm _____ mm	102 mm = ____ cm _____ mm

7. Measure the sides of this triangle, and find the perimeter.



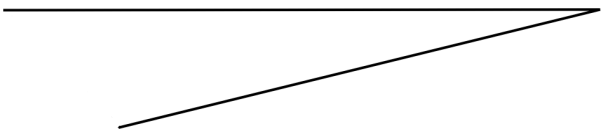
Side AB: _____ cm _____ mm

Side BC: _____ cm _____ mm

Side CA: _____ cm _____ mm

Perimeter _____ cm _____ mm

8. Draw the third side of this triangle. Then find its perimeter.



Sample worksheet from
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Chapter 9: Division
Introduction

The ninth chapter of *Math Mammoth Grade 3* covers the concept of division, basic division facts that are based on the multiplication tables, and the concept of remainder. The aim is to lay a good foundation for the concept of division, cementing the link between multiplication and division.

The concept of division in itself is not difficult—after all, it is like backwards multiplication. From that follows that the student needs to know the multiplication tables well as a prerequisite for this chapter. The student can start studying the lessons in this chapter even if he still needs some practice with the multiplication tables, but if he is a long ways from mastering them, he should not study this chapter yet.

There are basically two ways to illustrate division with concrete objects. The first way is equal sharing: we divide or share items equally between people. For example, the problem 12 ÷ 3 would mean, "If you share 12 bananas equally among 3 people, how many bananas does each one get?"

The second way has to do with grouping. The problem 12 ÷ 3 would be: "If you have 12 items, how many groups of three items can you make?" These two interpretations of division are important to understand so that the student can solve real-life and mathematical problems involving division.

We also study division by zero. From studying that lesson, students should recognize that division by zero "does not work." I realize that in higher forms of mathematics, division by zero may be defined (such as having the value infinity), but for now, this is the understanding that a third grader should get.

Lastly we study the concept of the "remainder", or division that is not exact. First, the students find the remainder using visual models (you could also use manipulatives). After that follows the explanation of how to find the remainder by calculating. This concept will be studied again in fourth grade.

The Lessons

	page	span
Division as Making Groups	122	*4 pages*
Division and Multiplication	126	*4 pages*
Division and Multiplication Facts	130	*3 pages*
Dividing Evenly into Groups	133	*4 pages*
Division Word Problems	137	*3 pages*
Zero in Division	140	*3 pages*
When Division is not Exact	143	*3 pages*
More Practice with the Remainder	146	*2 pages*
Mixed Review	148	*2 pages*
Review	150	*2 pages*

Sample worksheet from
www.mathmammoth.com

Helpful Resources on the Internet

Rectangle Division
Practice division with remainders using a rectangle model.
http://nlvm.usu.edu/en/nav/frames_asid_193_g_2_t_1.html

Mr. Martini's Classroom: Multiplication and Division Inequalities
Compare expressions involving basic multiplication and division. The first number from the left (below the screen) lets you control the maximum number in the problems.
http://www.thegreatmartinicompany.com/inequalities/multiplicationdivinequality.html

Mystery Picture Game
Using division and addition.
http://www.dositey.com/2008/math/m/mystery2AD.htm

Fun 4 the Brain
Practice your basic facts with these simple games that appeal to kids.
http://www.fun4thebrain.com/division.html

Math Magician games
Flashcard problems in all four operations. Answer 20 questions in one minute.
http://www.oswego.org/ocsd-web/games/Mathmagician/cathymath.html

Cross the Swamp
Help Little Ron move from log to log across the swamp and practice multiplication/division or addition/subtraction.
http://www.bbc.co.uk/schools/starship/maths/crosstheswamp.shtml

Arithme-Tiles
Use the four operations and numbers on neighboring tiles to make target numbers.
http://www.primarygames.com/math/arithmetiles/index.htm

Math Games at Sheppard Software
A bunch of different games to practice addition, subtraction, multiplication, and division facts: Fruit Shoot, Pop Up Math, Math MahJong, Matching games, Make 24, and many more. The site also has games for place value, coins, fractions, and other topics.
http://www.sheppardsoftware.com/math.htm

Arcademic Skill Builders
Website with fun, arcade-type games to practice the four basic operations. Both single- and multi-user games.
http://www.arcademicskillbuilders.com

MathCar Racing
Keep ahead of the computer car by thinking logically, and practice any of the four operations at the same time.
http://www.funbrain.com/osa/index.html

Sample worksheet from
www.mathmammoth.com

Tux Math
A free software. This is a versatile arcade game for math facts with many options. Includes all operations. You need to shoot falling comets that can damage penguins' igloos.
http://sourceforge.net/projects/tuxmath
Read also my review at http://homeschoolmath.blogspot.com/2011/05/tux-math.html

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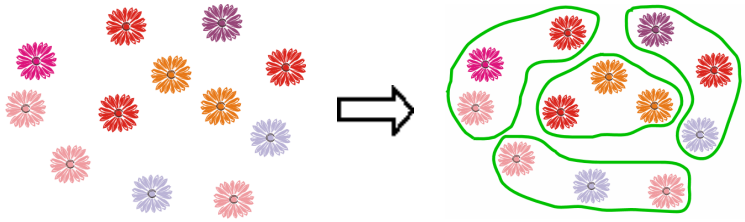
Sample worksheet from
www.mathmammoth.com

Division as Making Groups

There are 12 daisies. Make groups of 3.



How many groups? *Four groups.*

How many 3's are there in 12? *Four.*

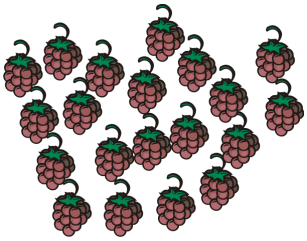
1. Divide into groups.

a. There are 15 carrots. Make groups of 5.

How many groups? _____

How many 5's are there in 15? _____

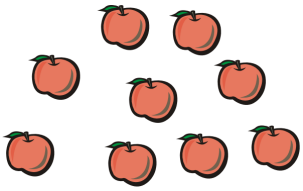
b. There are _____ berries. Make groups of 4.



How many groups? _____

How many 4's are there in _____? _____

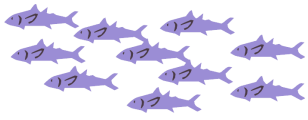
c. There are _____ apples. Make groups of 3.



How many groups? _____

How many 3's are there in _____? _____

d. There are _____ fish. Make groups of 2.



How many groups? _____

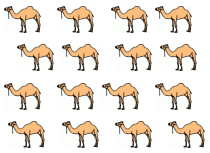
How many 2's are there in _____? _____

e. There are _____ daisies. Make groups of 6.

How many groups? _____

How many 6's are there in _____? _____

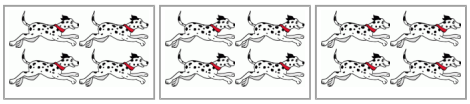
f. There are _____ camels. Make groups of 4.



How many groups? _____

How many 4's are there in _____? _____

Sample worksheet from
www.mathmammoth.com



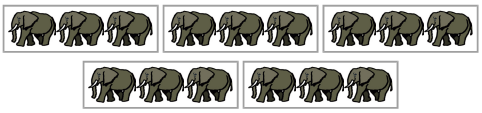
DIVIDE... 12 dogs into groups of **four**.

How many groups? *Three*

How many 4's in 12? _____

12 ÷ 4 = 3

"Twelve divided by four is three."



DIVIDE... 15 elephants into groups of **three**.

How many groups? _____

How many 3's in 15? _____

15 ÷ 3 = 5

"Fifteen divided by three is five."

18 ÷ 6 = ? *Think*: If you DIVIDE 18 into groups of six, how many groups are there? How many groups of six are there in 18? How many sixes are there in 18?

Since 6 + 6 + 6 = 18, there are THREE sixes in 18. So, 18 ÷ 6 = 3

2. Write a division sentence to fit the pictures in exercise 1.

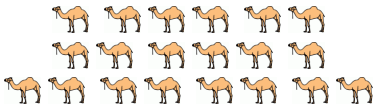
a. _____ ÷ _____ = _____	**b.** _____ ÷ _____ = _____	**c.** _____ ÷ _____ = _____
d. _____ ÷ _____ = _____	**e.** _____ ÷ _____ = _____	**f.** _____ ÷ _____ = _____

3. Make a division sentence.

a. Divide 10 rams into groups of two. How many groups?

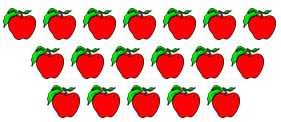
_____ ÷ _____ = _____

b. Divide _____ camels into groups of four. How many groups?



_____ ÷ _____ = _____

c. Divide _____ apples into groups of six. How many groups?

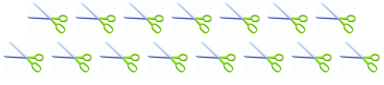


_____ ÷ _____ = _____

d. Divide _____ books into groups of three. How many groups?

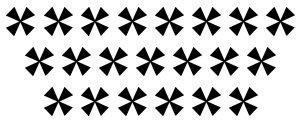
_____ ÷ _____ = _____

e. Divide _____ scissors into groups of five. How many groups?



_____ ÷ _____ = _____

f. Divide _____ crosses into groups of three. How many groups?



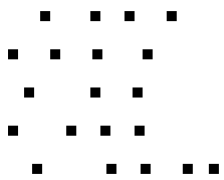
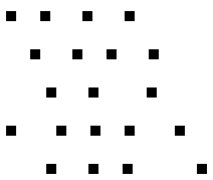
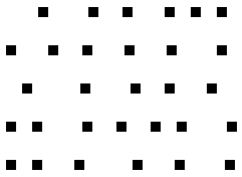
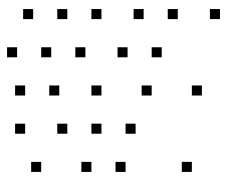
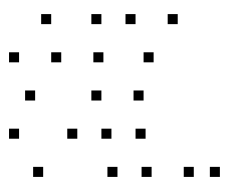
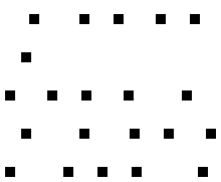
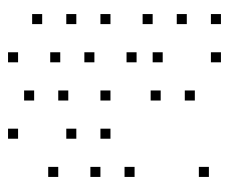
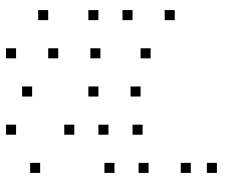
_____ ÷ _____ = _____

Sample worksheet from
www.mathmammoth.com

4. Draw sticks. Divide them into groups to fit the division sentence.

a. 18 ÷ 3 = _____	**b.** 24 ÷ 2 = _____
c. 21 ÷ 3 = _____	**d.** 25 ÷ 5 = _____
e. 15 ÷ 5 = _____	**f.** 24 ÷ 8 = _____

5. Make groups by circling dots and write a division sentence.

a. Make groups of 4  _____ ÷ 4 = _____	**b.** Make groups of 2  _____ ÷ 2 = _____	**c.** Make groups of 6  _____ ÷ 6 = _____	**d.** Make groups of 3  _____ ÷ 3 = _____
e. Make groups of 5  _____ ÷ 5 = _____	**f.** Make groups of 7  _____ ÷ 7 = _____	**g.** Make groups of 6  _____ ÷ 6 = _____	**h.** Make groups of 10  _____ ÷ 10 = _____

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6. Solve the word problems. Write a division or a multiplication for each problem.

The box ☐ is for the × or ÷ symbol.

a. The class has 20 students. You can fit five students into a van. How many vans are needed? _____ ☐ _____ = _____	**b.** Ken placed 30 marbles in rows of 5. How many rows did he get? _____ ☐ _____ = _____
c. Erica packed hairpins in bags. She put 20 pins in each bag and filled four bags. How many pins were there? _____ ☐ _____ = _____	**d.** Kelly packaged 28 T-shirts in bags. She put four shirts in each bag. How many bags did she use? _____ ☐ _____ = _____
e. Brian has 16 poster boards. He needs four of them to make a big poster board. How many big ones can he make? _____ ☐ _____ = _____	**f.** Marlene studied three hours each day for seven days. How many hours did she spend studying in total? _____ ☐ _____ = _____

7. Solve. You can draw to help. Can you find a pattern?

a.	**b.**	**c.**
4 ÷ 2 = _____	20 ÷ 10 = _____	10 ÷ 5 = _____
6 ÷ 2 = _____	30 ÷ 10 = _____	15 ÷ 5 = _____
8 ÷ 2 = _____	40 ÷ 10 = _____	20 ÷ 5 = _____
10 ÷ 2 = _____	50 ÷ 10 = _____	25 ÷ 5 = _____
12 ÷ 2 = _____	_____ ÷ 10 = _____	_____ ÷ 5 = _____
14 ÷ 2 = _____	_____ ÷ 10 = _____	_____ ÷ 5 = _____
16 ÷ 2 = _____	_____ ÷ 10 = _____	_____ ÷ 5 = _____
_____ ÷ 2 = _____	_____ ÷ 10 = _____	_____ ÷ 5 = _____
_____ ÷ 2 = _____	_____ ÷ 10 = _____	_____ ÷ 5 = _____

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Chapter 10: Fractions
Introduction

The last chapter of *Math Mammoth Grade 3* deals with a few elementary fraction concepts: the concepts of a fraction and of a mixed number, fractions on a number line, equivalent fractions, and comparing fractions.

First, the student learns to identify fractions in visual models, and to draw "pie models" for some common fractions. You can also use manipulatives or the fraction cutouts provided. In the download version they are found in their separate folder, and in the printed version they are appended to the answer key.

Next, students represent fractions on a number line diagram by partitioning the interval from 0 to 1 into equal parts. They also study fractions on number lines that go up to 3 and learn to write whole numbers as fractions.

The lesson about mixed numbers relies on visual models and number lines. I strongly feel that students first need to understand fraction operations and concepts with the help of visual models or manipulatives, and not introducing the various rules for calculations too soon. Students match fractions and mixed numbers, and even convert mixed numbers back into fractions using visual models. The actual rule for the conversion is not introduced on this level.

Next we study equivalent fractions. Students recognize and generate simple equivalent fractions using visual models and number lines.

Lastly, students compare fractions in special cases, such as when they have the same numerator or the same denominator, or when the comparison can be made from visual models. They also learn that comparisons are valid only when the two fractions refer to the same whole.

The Lessons

	page	span
Understanding Fractions	155	*4 pages*
Fractions on a Number Line	159	*4 pages*
Mixed Numbers	163	*4 pages*
Equivalent Fractions	167	*3 pages*
Comparing Fractions 1	170	*3 pages*
Comparing Fractions 2	173	*2 pages*
Mixed Review	175	*2 pages*
Fractions Review	177	*3 pages*

Sample worksheet from
www.mathmammoth.com

Helpful Resources on the Internet

Conceptua Fractions: Identify Fractions
A visual tool that shows fractions or mixed numbers using a pie, a bar, dots, and a number line.
http://www.conceptuamath.com/fractions.html#IdentifyingFractions

Visualizing Fractions
This tool shows you a fraction, and you divide the pie and color the pieces.
http://nlvm.usu.edu/en/nav/frames_asid_103_g_2_t_1.html

Pattern Blocks - Parts as Wholes
Click on the "Activities" in the top menu, and click on arrows until you find the "Parts as Wholes" activity.
http://nlvm.usu.edu/en/nav/frames_asid_170_g_2_t_3.html

Fraction Model
Adjust the the numerator and the denominator, and the applet shows the fraction as a pie/rectangle/set model, as a decimal, and as a percent.
http://illuminations.nctm.org/ActivityDetail.aspx?ID=44

Clara Fraction's Ice Cream Shop
Convert improper fractions into mixed numbers and scoop the right amount of ice cream flavors onto the cone.
http://www.mrnussbaum.com/icecream/index.html

Equivalent Fractions from National Library of Virtual Manipulatives (NLVM)
See the equivalency of two fractions as the applet divides the whole into more pieces.
http://nlvm.usu.edu/en/nav/frames_asid_105_g_2_t_1.html

Equivalent Fractions
Construct two other, equivalent fractions to the given fraction using a circle or a square. Use the sliders to divide your shape into a certain amount of parts, then click on the parts to color some of them. Click the check mark to check if you got the equivalent fractions right. The fractions are also shown on the number line.
http://illuminations.nctm.org/ActivityDetail.aspx?ID=80

Conceptua Math: Equivalent Fractions
A visual tool to illustrate the equivalency of fractions. You can use pie, rectangular, or number line model. Divide each shape into parts using the sliders. Click on parts to color or uncolor them. Use two or three fractions. Free registration required.
http://www.conceptuamath.com/fractions/equivalent-fractions.html

Conceptua Math: Order Fractions on a Number Line
First create fractions using the button on the top right, then lock them. Use the "dot" button to see them placed on the number line. Then you can use the buttons on the left to see the fractions represented in different ways. Lastly, drag the fractions under the number line dots, and press the check mark.
http://www.conceptuamath.com/fractions/ordering-fractions-number-line.html

Sample worksheet from
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Fraction Games at Sheppard Software
Many games for fraction math. For this level, use the first four games: simple fractions matching, mixed fractions matching, equivalent fractions matching, and comparing fractions balloon pop.
http://www.sheppardsoftware.com/math.htm#fractions

Visual Fractions
Great site for studying all aspects of fractions: identifying, renaming, comparing, addition, subtraction, multiplication, division. Each topic is illustrated by either a number line or a circle with a Java applet. Also a couple of games, for example: make cookies for Grampy.
http://www.visualfractions.com/

Who Wants pizza?
Explains the concept of a fraction, teaches addition and multiplication with a pizza example, then has some interactive exercises.
http://math.rice.edu/~lanius/fractions/index.html

Fractioncity
Make "fraction streets" and help children with comparing fractions, equivalent fractions, addition of fractions of like and unlike denominators while they drive toy cars on the streets. This is not an online activity but has instructions of how to do it at home or at school.
http://www.teachnet.com/lesson/math/fractioncity.html

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Sample worksheet from
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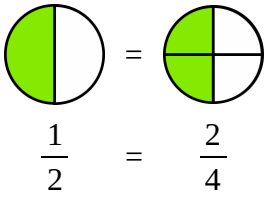
Equivalent Fractions

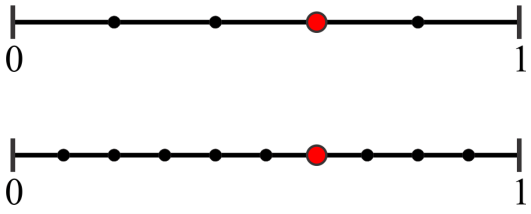
If you eat half of a pizza, or 2/4 of a pizza, you have eaten the same amount. The two fractions are ***equivalent***.

We can write an equal sign between them: $\frac{1}{2} = \frac{2}{4}$.

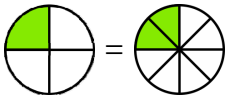


$\frac{1}{2} = \frac{2}{4}$

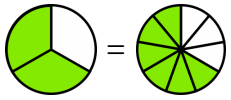
The dot for $\frac{3}{5}$ is in the same place on the number line as the dot for $\frac{6}{10}$. Again, the two fractions are *equivalent*. We can write $\frac{3}{5} = \frac{6}{10}$.



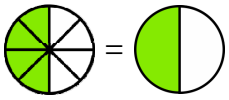
1. Write the equivalent fractions.



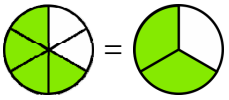
a. ☐/☐ = ☐/☐



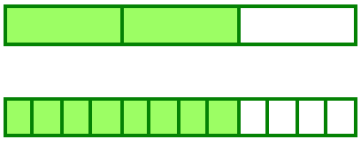
b. ☐/☐ = ☐/☐



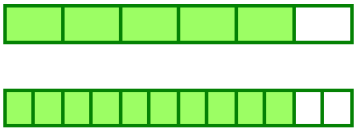
c. ☐/☐ = ☐/☐



d. ☐/☐ = ☐/☐

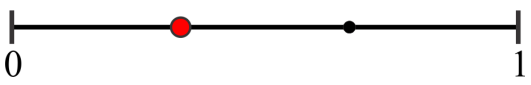


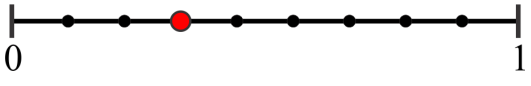
e. ☐/☐ = ☐/☐



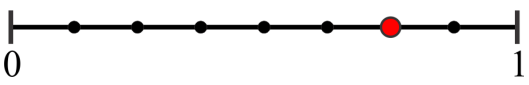
f. ☐/☐ = ☐/☐

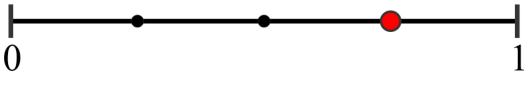
2. Write the equivalent fractions.





a. ☐/☐ = ☐/☐





b. ☐/☐ = ☐/☐

Sample worksheet from
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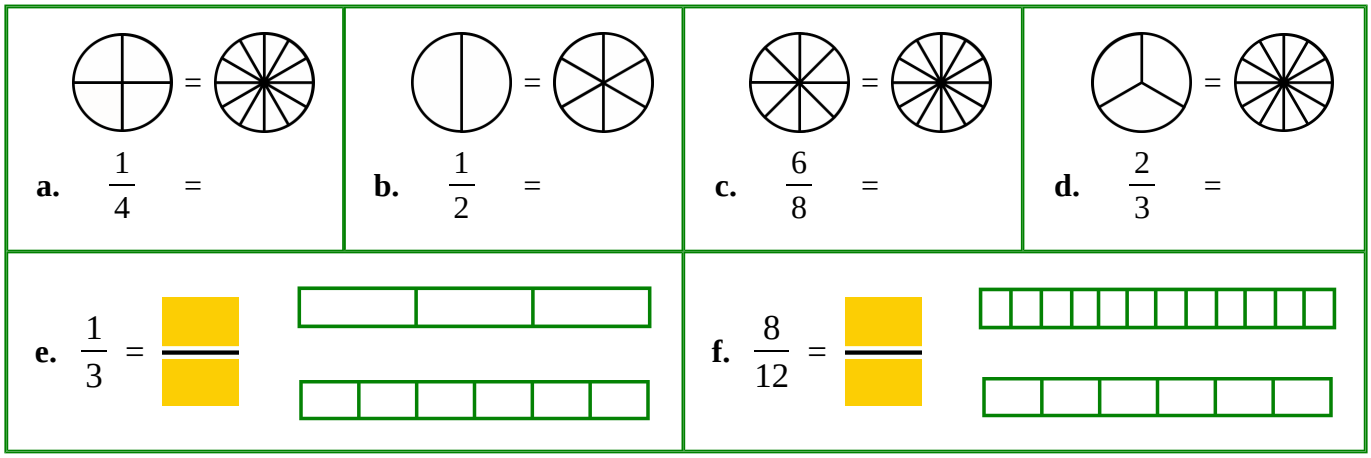
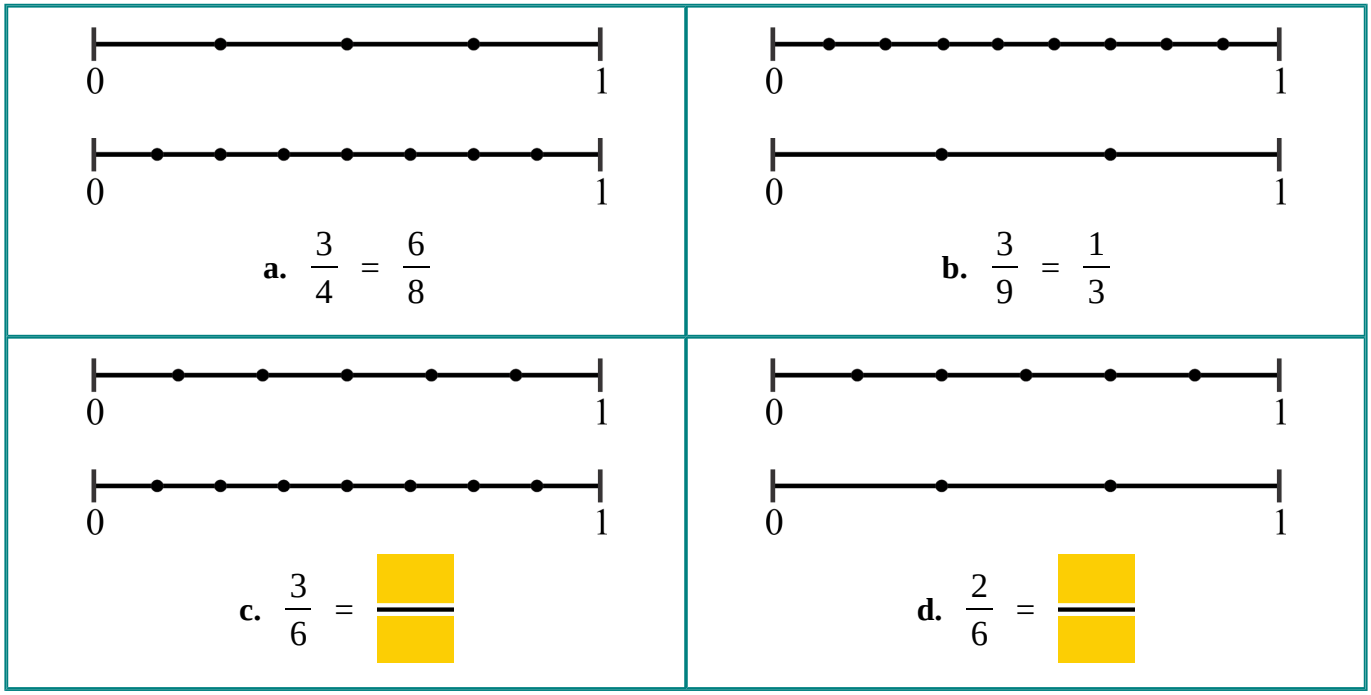
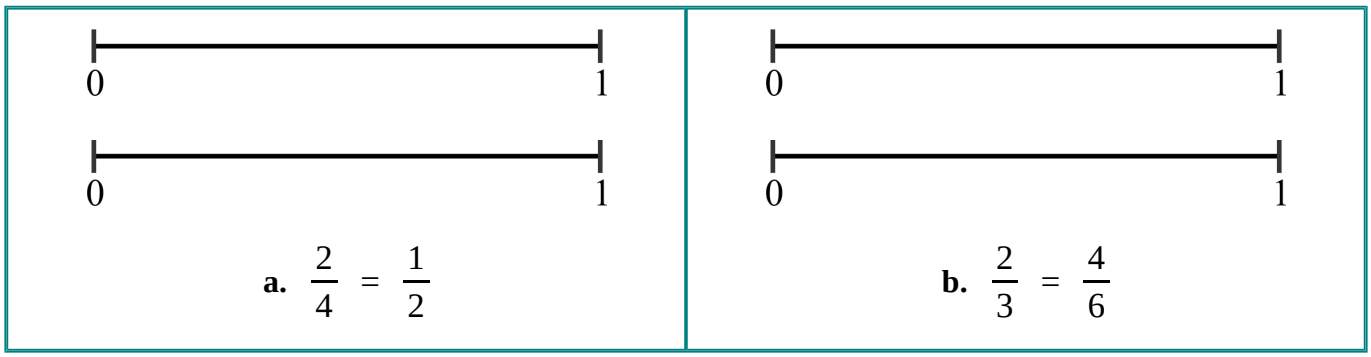
3. Shade the parts for the first fraction. Shade the same *amount* in the second picture. Write the second fraction.



4. Mark the equivalent fractions on the number lines.



5. Mark the equivalent fractions on the number lines. This time, you need to first divide each number line into equal parts.



Sample worksheet from
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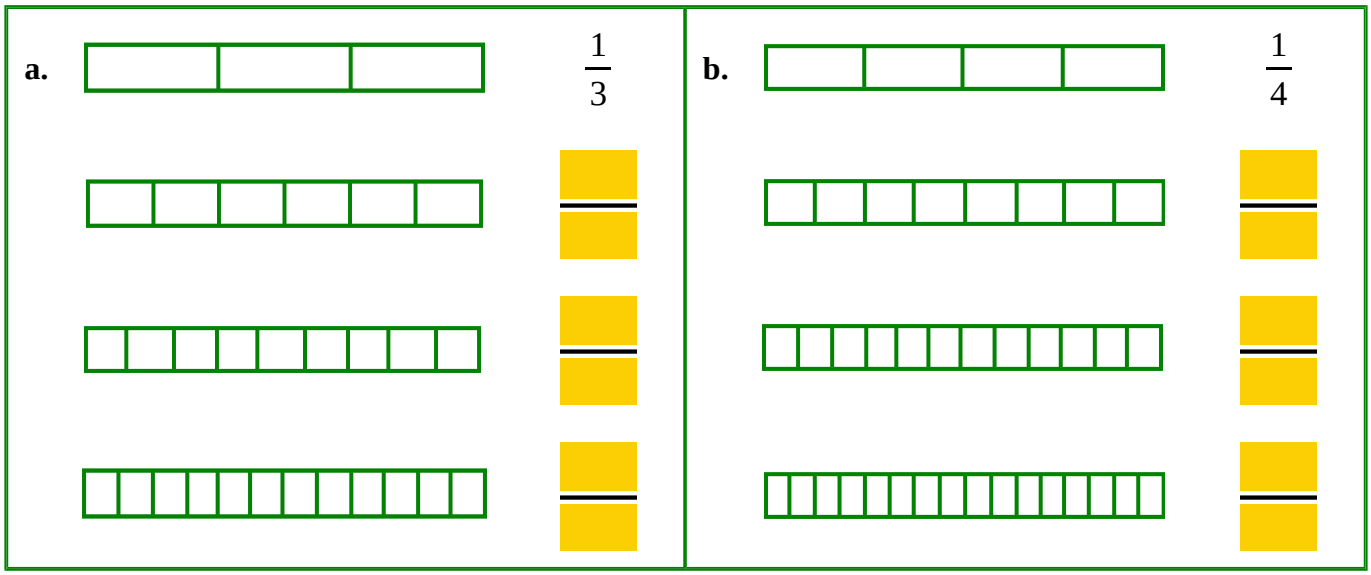
6. Color and write many fractions that are equivalent to the first fraction.



7. Four children have a chocolate bar to share. Cassy says, "Let's divide it into four equal pieces, and everybody gets one piece." Hannah says, "No, let's divide it into twelve equal pieces and everybody gets three pieces."

Whose idea lets everybody get a fair share?

8. Draw a picture to show that 1/2 = 4/8.

9. **a.** Half of the pie is left. Show in the picture how three persons can share it equally.

b. What two equivalent fractions can you write from your "cutting"?

10. Are 5/5 and 4/4 equivalent fractions?
Why or why not?

Puzzle Corner

Which is longer, a line that is 3 1/2 inches long or a line that is 3 1/4 inches long?
How much longer is it?

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