

math

# MAMMOTH

## Grade 3-A Worktext

**A**ddition and subtraction

**M**ultiplication  
concept

**M**ultiplication  
tables

**C**lock

**M**oney



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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 that meets and exceeds 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 teaching math!*

*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.

Throughout the chapter, 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 using 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 .....	11	3 pages
Review: Mental Subtraction .....	14	3 pages
More Mental Subtraction .....	17	3 pages
Ordinal Numbers and Roman Numerals .....	20	3 pages
More Mental Addition .....	23	3 pages
Mental Subtraction with Three-Digit Numbers.....	26	3 pages
Regrouping in Addition .....	29	4 pages
Review: Regrouping in Subtraction .....	33	3 pages
Regrouping Twice in Subtraction .....	36	4 pages
Regrouping Twice in Subtraction, Part 2 .....	40	3 pages
Regrouping with Zero Tens .....	43	3 pages
Regrouping with Zero Tens, Part 2 .....	46	3 pages

Rounding 2-Digit Numbers to the Nearest Ten .....	49	2 pages
Rounding 3-Digit Numbers to the Nearest Ten .....	51	3 pages
The Connection with Addition and Subtraction .....	54	4 pages
Mileage Chart .....	58	2 pages
Order of Operations .....	60	2 pages
Graphs .....	62	3 pages
Review .....	65	2 pages

## Helpful Resources on the Internet

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

### MENTAL MATH

#### 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>

#### Random Coins

Can you make \$1.00 from Random Coins? Drag and drop the coins.

<https://www.mathsisfun.com/money/random-coins.html>

#### Math Mahjong Subtraction

Play a mahjong game—subtraction version.

[http://www.sheppardsoftware.com/mathgames/mahjong/mahjong\\_subtraction.htm](http://www.sheppardsoftware.com/mathgames/mahjong/mahjong_subtraction.htm)

#### Monkey Drive Subtraction Up to 25

Drive through the barrels with numbers whose difference matches the number on your car.

<http://www.sheppardsoftware.com/mathgames/monkeydrive/subtraction/MDSubtract25.htm>

#### Puzzle Pics Subtraction

Click the tile with the right answer and a secret picture is revealed.

[http://www.mathplayground.com/puzzle\\_pics\\_subtraction.html](http://www.mathplayground.com/puzzle_pics_subtraction.html)

#### Speed Grid Addition

Find numbers on the grid that add up to the given number.

<http://www.oswego.org/ocsd-web/games/SpeedGrid/Addition/urikares.html>

#### Speed Grid Subtraction

Find numbers on the grid with a given difference.

<http://www.oswego.org/ocsd-web/games/SpeedGrid/Subtraction/urikasub2res.html>

## REGROUPING

### 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>

### Tic Tac Toe Addition

Solve three-digit addition problems while playing tic-tac-toe.

<http://www.funbrain.com/cgi-bin/ttt.cgi?A1=s&A2=11&A3=0>

### Subtraction by Splitting

Subtract numbers by “splitting” them—this shows how regrouping works. Choose the medium or advanced level.

<http://www.bbc.co.uk/skillswise/game/ma09subt-game-subtraction-by-splitting>

### 3-Digit Subtraction with Regrouping

Solve 3-digit subtraction problems with step-by-step guidance.

[http://www.softschools.com/math/subtraction/3\\_digit\\_subtraction/3\\_digit\\_subtraction\\_with\\_regrouping/](http://www.softschools.com/math/subtraction/3_digit_subtraction/3_digit_subtraction_with_regrouping/)

### Bowling Game

Solve 10 subtraction problems. After each problem, you get to bowl.

[http://www.learnalberta.ca/content/me3us/flash/lessonLauncher.html?lesson=lessons/07/m3\\_07\\_00\\_x.swf](http://www.learnalberta.ca/content/me3us/flash/lessonLauncher.html?lesson=lessons/07/m3_07_00_x.swf)

### Triple-Digit Subtraction Card Game

An easy card game with several variations to practice double and triple-digit subtraction.

<http://www.mathgamesandactivities.com/tag/math-games-that-involve-regrouping/>

### How Close Can You Get?

See how close you can get to the target number in this fun subtraction card game for the whole family.

<http://motionmathgames.com/3-subtraction-activities-for-family-fun-night/>

## ROMAN NUMERALS

### Roman Numerals Game

Arrange the letters to make the Roman numeral that matches the given number, and repair broken columns.

[http://www.abcya.com/roman\\_numerals.htm](http://www.abcya.com/roman_numerals.htm)

### Concentration — Roman Numerals

Practice Roman numerals from 1 to 100 with this simple concentration game.

<http://www.quia.com/cc/2186108.html>

### Roman Numerals Tutorial

Simple explanations of how numbers are formed using Roman numerals, such as when to “add” or “subtract” the symbols. The student can self-check his/her understanding.

<http://www.beaconlearningcenter.com/weblessons/romannumerals/default.htm>

### 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](http://www.homeschoolmath.net/worksheets/roman_numerals.php)

Sample worksheet from

[www.mathmammoth.com](http://www.mathmammoth.com)



### **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 where the Roman number system is used today.

[www.greatmathsgames.com/roman\\_numerals/roman\\_numerals.htm](http://www.greatmathsgames.com/roman_numerals/roman_numerals.htm)

## **ROUNDING**

### **Left Turn Otto Rounding**

Move Otto the bear to get the numbers that round to the number displayed on top of the screen.

<http://www.mathnook.com/math/left-turn-otto-rounding.html>

### **Math Balloons Round the Numbers**

Make sets of three balloons that match in color by answering true/false rounding questions.

<http://www.mathnook.com/math/math-balloons-rounding.html>

### **Rounding Numbers Slot Machine Game**

Answer rounding questions correctly, and you get to play the slot machine.

<http://www.kidsmathtv.com/free/rounding-up-numbers-to-nearest-ten-game-for-3rd-grade-slot-machine-game/>

### **Estimate Where Numbers Are on a Number Line**

Click on the spot on a number line where you think the given number will be.

<http://www.oswego.org/ocsd-web/games/Estimate/estimate.html>

## **CHARTS, GRAPHS, AND MISC.**

### **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>

### **Mileage Charts**

This is a lesson about mileage charts with interactive exercises.

[http://www.cimt.org.uk/projects/mepres/book8/bk8i1/bk8\\_1i1.htm](http://www.cimt.org.uk/projects/mepres/book8/bk8i1/bk8_1i1.htm)

### **Free worksheets for the order of operations**

Generate printable and customizable worksheets for the order of operations. Choose from five operations and parentheses. You can choose the number range used, the number of problems, and more.

[http://www.homeschoolmath.net/worksheets/order\\_of\\_operations.php](http://www.homeschoolmath.net/worksheets/order_of_operations.php)

### **Bar Graph — Favorite Colors**

Answer multiple-choice questions about bar charts.

[http://www.softschools.com/math/data\\_analysis/bar\\_graph/activities/favourite\\_colors\\_bar\\_chart/](http://www.softschools.com/math/data_analysis/bar_graph/activities/favourite_colors_bar_chart/)

### **Graph Problems Quiz**

A 10-question quiz with a variety of word problems and plotting questions.

<http://www.thatquiz.org/tq-5/?-j50e0h-l3-p0>

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## Review: Mental Subtraction

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

<b>a.</b> $12 - 5$ $12 - 7$ $12 - 8$ $12 - 6$ $12 - 4$ $12 - 9$ $12 - 3$	<b>b.</b> $13 - 8$ $13 - 4$ $13 - 5$ $13 - 6$ $13 - 9$ $13 - 7$	<b>c.</b> $14 - 5$ $14 - 7$ $14 - 9$ $14 - 6$ $14 - 8$	<b>d.</b> $15 - 6$ $15 - 8$ $15 - 9$ $15 - 7$	<b>e.</b> $16 - 7$ $16 - 9$ $16 - 8$
				<b>f.</b> $17 - 8$ $17 - 9$

### Strategy 1: 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.

<b>a.</b> $14 - 5 =$ _____ $54 - 5 =$ _____	<b>b.</b> $12 - 8 =$ _____ $92 - 8 =$ _____	<b>c.</b> $15 - 6 =$ _____ $35 - 6 =$ _____
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3. Subtract and compare the results!

<b>a.</b> $14 - 7 =$ _____ $34 - 7 =$ _____ $64 - 7 =$ _____	<b>b.</b> $12 - 8 =$ _____ $42 - 8 =$ _____ $82 - 8 =$ _____	<b>c.</b> $16 - 7 =$ _____ $56 - 7 =$ _____ $156 - 7 =$ _____	<b>d.</b> $15 - 7 =$ _____ $75 - 7 =$ _____ $675 - 7 =$ _____
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**Strategy 2: First subtract to the *previous whole ten*, then subtract the rest.**

$$\begin{aligned} 62 - 8 \\ = 62 - 2 - 6 \\ = 60 - 6 = 54 \end{aligned}$$

Subtract 8 in two parts: first 2, then 6.

$$\begin{aligned} 72 - 6 \\ = 72 - 2 - 4 \\ = 70 - 4 = 66 \end{aligned}$$

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. $64 - 7$ $64 - 4 - 3 = \underline{\hspace{2cm}}$	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.

$$\begin{aligned} 75 - 21 \\ = 75 - 20 - 1 \\ = 55 - 1 = 54 \end{aligned}$$

First subtract 20, then 1.

$$\begin{aligned} 87 - 46 \\ = 87 - 40 - 6 \\ = 47 - 6 = 41 \end{aligned}$$

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. $56 - 35$ $56 - \underline{\hspace{1cm}} - \underline{\hspace{1cm}}$  = _____	c. $75 - 51$ $75 - \underline{\hspace{1cm}} - \underline{\hspace{1cm}}$  = _____
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:  $67 + \text{[yellow box]} = 71$

$558 - 556 = ??$

Think:  $556 + \text{[yellow box]} = 558$

### 6. Subtract.

a.  $78 - 75 = \underline{\hspace{2cm}}$

$61 - 58 = \underline{\hspace{2cm}}$

b.  $112 - 108 = \underline{\hspace{2cm}}$

$692 - 688 = \underline{\hspace{2cm}}$

c.  $505 - 499 = \underline{\hspace{2cm}}$

$1000 - 994 = \underline{\hspace{2cm}}$

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 three 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?

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.

Basic Concepts

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## Chapter 2: Multiplication Concept Introduction

The second chapter of *Math Mammoth Grade 3-A* 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. *Multiplication on a Number Line* illustrates repeated addition as consecutive jumps or skips on a number line. The child learns to connect skip-counting with multiplication.

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.

The order of operations is studied in two lessons. In the first one, students learn that multiplication is to be done before addition or subtraction and that addition and subtraction are to be done from left to right. Later, in the second lesson, we also use parentheses.

*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.

*Understanding Word Problems, Part 2* gives problems that are more challenging. The word problems in traditional school texts are often so easy that children learn just to take the numbers in the problem and mechanically apply the operation that the lesson is about without really understanding what they are 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.

*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).

### The Lessons in Chapter 2

	page	span
Many Times the Same Group .....	70	1 page
Multiplication and Addition .....	71	3 pages
Multiplication on a Number Line .....	74	3 pages
Multiplication as an Array .....	77	2 pages
Order of Operations .....	79	1 page
Understanding Word Problems, Part 1 .....	80	3 pages
Understanding Word Problems, Part 2 .....	83	2 pages

Multiplication in Two Ways .....	85	4 pages
Order of Operations .....	89	2 pages
Multiplying by Zero .....	91	2 pages
Mixed Review .....	93	2 pages
Review .....	95	2 pages

## Helpful Resources on the Internet

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

### Under the Sea Board Game

Roll two dice to find the number of groups and the number of items in each group. Then drag the blue circle to show the corresponding array on a grid, and your piece will move on the board.

[http://www.learnalberta.ca/content/me3us/flash/lessonLauncher.html?lesson=lessons/08/m3\\_08\\_00\\_x.swf](http://www.learnalberta.ca/content/me3us/flash/lessonLauncher.html?lesson=lessons/08/m3_08_00_x.swf)

### Match Multiplication Arrays

Match each multiplication fact to the correct array, pictured by dots.

<https://www.studyladder.com/resources/activity/fullscreen?id=20521>

### Gordon's Multiplication

Click on a picture to give a context to a multiplication question. Choose either problems that show the answer or problems where you work out the answer.

<http://www.topmarks.co.uk/Flash.aspx?f=multiplication>

### Multiplication Array Frame

Fill in the multiplication sentences to match the arrays shown.

<http://www.snappymaths.com/multiplication/earlymult/interactive/arrays/arraysframe.htm>

### Carl's Cookie Capers

Multiplication problems with pictures. Choose level 1.

<http://www.multiplication.com/games/play/carls-cookie-capers>

### Camel Times Tables

Easy multiplication questions to solve, illustrated with pictures.

<http://www.bbc.co.uk/bitesize/ks1/maths/multiplication/play/>

### Multiplication Number Lines

First choose a tile from the  $10 \times 10$  grid to pose a problem, then you will see it illustrated on a number line.

<http://www.ictgames.com/multinumberlines.html>

### Multinumberlines

Click on a square in the multiplication grid to get a problem. Then click on the square after the equals sign to see the problem 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>



### **Fish Shop Multiplication**

Choose “easy”, then a few tables to practice (such as tables of 1, 2, and 3). Solve easy multiplication questions while serving customers in a fish shop.

<http://www.multiplication.com/games/play/fish-shop-multiplication>

### **Math Wash Up**

Help the window washer wash his way to the very top of the skyscraper. (Choose level 0-5)

<http://www.multiplication.com/games/play/math-wash>

### **Under the Sea Multiplication Activities**

Practice various topics related to the concept of multiplication. Finish all the topics to unlock a treasure!

<http://www.learnalberta.ca/content/me3us/flash/index.html?goLesson=8&launch=true>

### **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>

### **Math Word Problems: Fun With Animals**

A set of five word problems with mixed operations to solve.

<http://www.syvum.com/cgi/online/fillin.cgi/kwps1/ksmat6b.tdf?0>

### **Bracket Basics**

Drag the numbers to the correct spaces to make a problem that will equal the target number.

<http://www.bracketbasics.co.uk/activity/>

### **Free worksheets for order of operations**

Generate printable and customizable worksheets for order of operations. Choose from five operations and parentheses. You can choose the number range used, number of problems, and more.

[http://www.homeschoolmath.net/worksheets/order\\_of\\_operations.php](http://www.homeschoolmath.net/worksheets/order_of_operations.php)

### **Button Beach Challenge**

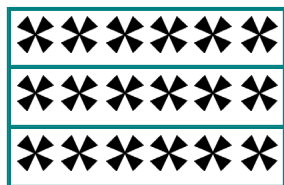
Figure out what number the various colored buttons represent.

<http://www.amblesideprimary.com/ambleweb/mentalmaths/buttons.html>

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# Multiplication as an Array

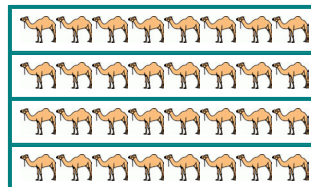
An **array** is an orderly arrangement of things in rows and columns. When things are neatly aligned in an array, we can think of the *rows as groups*, so an array still pictures multiplication as repeated addition.



3 rows, 6 crosses in each row.

$$6 + 6 + 6$$

$$3 \times 6 = 18$$



4 rows, 8 camels in each row.

$$8 + 8 + 8 + 8$$

$$4 \times 8 = 32$$

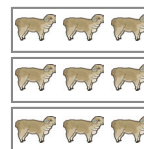
1. Fill in the missing numbers.



a. \_\_\_\_\_ rows, \_\_\_\_\_ carrots in each row.

$$\underline{\quad} + \underline{\quad}$$

$$\underline{\quad} \times \underline{\quad} = \underline{\quad} \text{ carrots}$$



b. \_\_\_\_\_ rows, \_\_\_\_\_ rams in each row.

$$\underline{\quad} + \underline{\quad} + \underline{\quad}$$

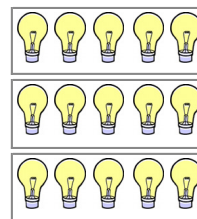
$$\underline{\quad} \times \underline{\quad} = \underline{\quad} \text{ rams}$$



c. \_\_\_\_\_ rows, \_\_\_\_\_ bear in each row.

$$\underline{\quad} + \underline{\quad}$$

$$\underline{\quad} \times \underline{\quad} = \underline{\quad} \text{ bears}$$

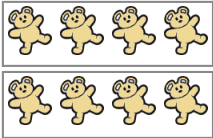

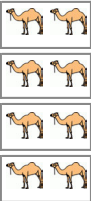
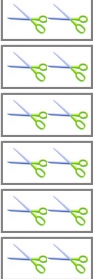
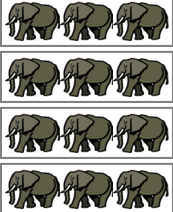
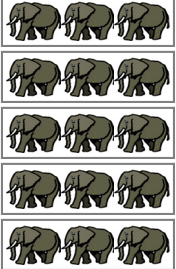
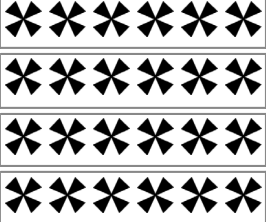
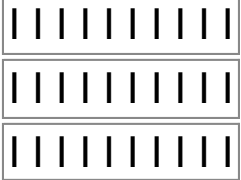
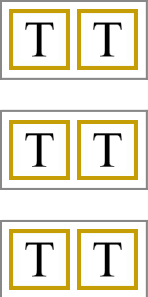
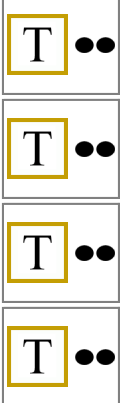


d. \_\_\_\_\_ rows, \_\_\_\_\_ bulbs in each row.

$$\underline{\quad} + \underline{\quad} + \underline{\quad}$$

$$\underline{\quad} \times \underline{\quad} = \underline{\quad} \text{ bulbs}$$

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

<p>a.</p> $4 + 4 = \underline{\hspace{2cm}}$ $2 \times 4 = \underline{\hspace{2cm}}$ 	<p>b.</p> 
<p>c.</p> 	<p>d.</p> 
<p>e.</p> 	<p>f.</p> 
<p>g.</p> 	<p>h.</p> 
<p>i.</p> 	<p>j.</p> 

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# Chapter 3: Multiplication Tables

## Introduction

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

### Tips for 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 as 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 fairly quickly when you are drilling. If the child doesn't know the answer by heart, then tell the child 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, about 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. (This principle applies to *anything* new that a person is learning.)

Pencil and paper activities alone 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, have older siblings help with the task of drilling. Moreover, computers are great drillmasters; they never get tired or bored and 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.

### Structured Drilling of the Table of 3—in steps

Write on paper or on the board the times table to be learned. We will use the table of 3 as an example. You can view a video explaining the main points of the drill here:

[http://www.mathmammoth.com/lessons/multiplication\\_tables.php](http://www.mathmammoth.com/lessons/multiplication_tables.php)

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

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 their 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 the student has gone through the list a few times, ask the student 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 easily recite the first list of 3, 6, 9, 12, 15, 18. With some tables, such as 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.
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 session, but *be sure to review* again later in the day.
4. In this stage, the goal is to associate each answer 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, with a certain multiplication fact (such as  $7 \times 3$ ). So, keep the whole table visible (without the answers) and practice individual problems randomly by pointing to them. Ask orally (“What is 5 times 3?”), while pointing to the problem—again, using both the sense of hearing and seeing (multiple senses).
5. The next step is to do this the other way around. Now *you* say the answer (“21”), and the student has to produce the problem (“ $3 \times 7$ ”). Keep the table handy, but hide the *problems* from sight, 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. Be sure to give wrong multiplication facts occasionally to check the student’s accuracy.

As an optional 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.

6. The last step is totally random drilling using flash cards, oral problems, or computer programs.

The memorization probably will not happen overnight. On subsequent days, you can mix steps 1-5 (normally you will not need to concentrate too much on steps 1 and 2 after the initial practice). 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, such as traveling in the car and so on.

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

### Other helpful ideas

- Hang a **poster** with the  $12 \times 12$  or  $10 \times 10$  table on the wall. Remind your child to glance at it a few times a day. It can work wonders for students who learn best by visualizing things!
- Hang another poster beside it, with an empty grid, in which the child fills in the 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 just one tool among many when it comes to learning math facts. Some children will thrive on them; in other words, they will learn quickly when they are used. Perhaps they like the challenge of racing against the clock. There are a number of timed computer games that can work very well for drilling facts. Here are two online ones:

- <http://www.oswego.org/ocsd-web/games/Mathmagician/cathymath.html>  
This site has a simple 1-minute countdown, and if you answer 20 questions in that time, you get an award.
- <http://www.sheppardsoftware.com/math.htm>  
Sheppard Software is filled with several types of games just for math facts practice, including timed practice. Some of the games there don’t time you but give you more points the faster you go.

For other children, timed drills may be counterproductive and end up in tears and frustration. Try the drills and see how it goes. Use your your judgment as to its usefulness as a learning tool.

### Should one table be memorized before going on to the next?

The basic idea is to stay on one table until it is mastered. That can take a varying amount of days depending on the child, the number of practice sessions, and other constraints on the child's time. It is best to practice each table at least two times a day (because the brain will memorize things much quicker that way), but each session doesn't have to take a long time.

However, the child can also study other math concepts, such as geometry, measuring, addition, or clock, at the same time, as long as these other topics do not rely heavily on multiplication tables (for example, division does).

Also, incorporate games to keep the learned facts fresh in their mind. The old idiom "use it or lose it" comes into play here. As the student masters more facts, he or she will probably enjoy playing multiplication games, whether online, on the computer, or card and board games.

### The Lessons in Chapter 3

	page	span
Multiplication Table of 2 .....	102	3 pages
Multiplication Table of 4 .....	105	2 pages
Multiplication Table of 10 .....	107	2 pages
Multiplication Table of 5 .....	109	3 pages
More Practice and Review (Tables of 2, 4, 5, and 10) .....	112	3 pages
Multiplication Table of 3 .....	115	3 pages
Multiplication Table of 6 .....	118	2 pages
Multiplication Table of 11 .....	120	3 pages
Multiplication Table of 9 .....	123	4 pages
Multiplication Table of 7 .....	127	2 pages
Multiplication Table of 8 .....	129	3 pages
Multiplication Table of 12 .....	132	2 pages
Mixed Review .....	134	2 pages
Review .....	136	3 pages



## Helpful Resources on the Internet

*You can use these free online resources to supplement the “bookwork” as you see fit.*

### **Multiplication Tables - Structured Drill Videos**

A series of videos by the author to help children learn the multiplication tables. Each video lesson teaches and practices a particular skip-counting pattern, then the corresponding multiplication table, and lastly the table backwards. The series also includes “interludes” - short videos with multiplication patterns, puzzles, and word problems.

[http://www.mathmammoth.com/videos/multiplication\\_tables.php](http://www.mathmammoth.com/videos/multiplication_tables.php)

### **How to Help Students with Multiplication Tables**

An article and video of mine explaining how to do a “structured drill” for the multiplication tables.

[http://www.mathmammoth.com/lessons/multiplication\\_tables.php](http://www.mathmammoth.com/lessons/multiplication_tables.php)

### **Learn ‘Em Forwards and Backwards**

An online multiplication facts trainer that uses the same sequence for learning the tables as Math Mammoth.

<http://mathwithoutborders.com/learn-em-forwards-and-backwards>

### **Multiplication worksheets**

Regular, printable multiplication worksheets for the multiplication tables.

<http://www.homeschoolmath.net/worksheets/grade3/multiplication.php>

### **A list of multiplication games**

Improve your multiplication skills with these fun games!

<http://www.multiplication.com/games/all-games>

### **Math Trainer - Multiplication**

Reinforce multiplication skills and focus on improving weaknesses in this multiplication workout that responds to your answers.

<http://www.mathsisfun.com/numbers/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>

### **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>

### **Cone Crazy—Flurry of Flavors**

Practice multiplication facts while serving ice cream to customers. You can choose which tables you want to practice.

<http://www.multiplication.com/games/play/flurry-flavors>

### **Multiplication Snake**

Move the snake so that it “eats” the answers to the given multiplication problems. You can choose which tables you want to practice.

[http://www.mathplayground.com/multiplication\\_snake.html](http://www.mathplayground.com/multiplication_snake.html)

### **Fruit Shoot Multiplication**

Click the fruit with the correct answer to the given multiplication problem. You can choose which tables to practice.

[http://www.sheppardsoftware.com/mathgames/fruitshoot/fruitshoot\\_multiplication.htm](http://www.sheppardsoftware.com/mathgames/fruitshoot/fruitshoot_multiplication.htm)

### **Times Tables Grid**

Find the answers in the grid.

<http://www.bbc.co.uk/skillswise/game/ma13tabl-game-tables-grid-find>

### **Meteor Multiplication**

Shoot the meteor with the matching multiplication problem.

<http://www.arcademics.com/games/meteor/meteor.html>

### **Balloon Pop Math — Multiplication Level 1**

Pop the balloons in the ascending order of the answers.

[http://www.sheppardsoftware.com/mathgames/numberballoons/NumberBalloons\\_times\\_level1.htm](http://www.sheppardsoftware.com/mathgames/numberballoons/NumberBalloons_times_level1.htm)

### **Clear It Multiplication**

Click on number tiles that, when multiplied, give the target number. Your aim is to clear the board!

[http://www.abcya.com/clear\\_it\\_multiplication.htm](http://www.abcya.com/clear_it_multiplication.htm)

### **Multiplication Blocks**

Find the numbers, when multiplied, equal the target number, while trying to clear the board of blocks.

[http://www.mathplayground.com/multiplication\\_blocks.html](http://www.mathplayground.com/multiplication_blocks.html)

### **Multiplication Word Problems: Fun with Animals**

Solve five word problems and get your score.

<http://www.syvum.com/cgi/online/fillin.cgi/kwps1/ksmat4b.tdf?0>

### **Multiplication Facts Quiz Game**

Select the matching pairs of cards with multiplication problems from the tables of 6, 7, 8, and 9.

<http://quizhub.com/quiz/free/f-multiply.cfm>

### **Factor Family Reunion**

Make sure the members of the factor families are seated at the correct table. Practices missing factors.

<http://mrnussbaum.com/factor-family-reunion-2/>

### **Multiples Frenzy**

Find and click on multiples of the number picked as they appear on the screen.

[http://www.sheppardsoftware.com/mathgames/multiple/multiple\\_frenzy.htm](http://www.sheppardsoftware.com/mathgames/multiple/multiple_frenzy.htm)

### **Acing Math (PDF)**

A large collection of math games for grades K-6 that you can play with a standard deck of cards.

[http://www.pepnonprofit.org/uploads/2/7/7/2/2772238/acing\\_math.pdf](http://www.pepnonprofit.org/uploads/2/7/7/2/2772238/acing_math.pdf)

### **Raging Rectangles and Multiple Madness (PDF)**

Dozens of printable board games for multiplication, division, and other third grade math topics. Check out especially the games Raging Rectangles on page 8, and Multiple Madness on page 9.

[http://maccess.ncdpi.wikispaces.net/file/view/3rdgrade\\_GAMES\\_3.21.14.pdf](http://maccess.ncdpi.wikispaces.net/file/view/3rdgrade_GAMES_3.21.14.pdf)

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# Multiplication Table of 3

1. Skip-count by threes. Practice this pattern until you can say it from memory. Also practice it backwards (up-down). You may practice one-half of it at first, and the other half later.

0, 3, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, 36

2. **a.** Fill in the table of 3. **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  $1 \times 3$  till  $6 \times 3$ , and the rest at a later time, such as the next day.

<b>a.</b>	$1 \times 3 = \underline{\quad}$	$7 \times 3 = \underline{\quad}$	<b>b.</b>	$\underline{\quad} \times 3 = 3$	$\underline{\quad} \times 3 = 21$
	$2 \times 3 = \underline{\quad}$	$8 \times 3 = \underline{\quad}$		$\underline{\quad} \times 3 = 6$	$\underline{\quad} \times 3 = 24$
	$3 \times 3 = \underline{\quad}$	$9 \times 3 = \underline{\quad}$		$\underline{\quad} \times 3 = 9$	$\underline{\quad} \times 3 = 27$
	$4 \times 3 = \underline{\quad}$	$10 \times 3 = \underline{\quad}$		$\underline{\quad} \times 3 = 12$	$\underline{\quad} \times 3 = 30$
	$5 \times 3 = \underline{\quad}$	$11 \times 3 = \underline{\quad}$		$\underline{\quad} \times 3 = 15$	$\underline{\quad} \times 3 = 33$
	$6 \times 3 = \underline{\quad}$	$12 \times 3 = \underline{\quad}$		$\underline{\quad} \times 3 = 18$	$\underline{\quad} \times 3 = 36$

**Note:** the fact  $2 \times 3 = 6$  or  $3 \times 2 = 6$  is in both the table of three and the table of two.

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

$6 \times 3$	$7 \times 3$	$3 \times 3$	$3 \times 7$	$3 \times 8$
$9 \times 3$	$2 \times 3$	$3 \times 11$	$3 \times 4$	$3 \times 3$
$4 \times 3$	$8 \times 3$	$3 \times 9$	$3 \times 6$	$3 \times 5$
$3 \times 1$	$12 \times 3$	$3 \times 12$	$8 \times 3$	$10 \times 3$

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

$\blacksquare \times 3 = 15$	$\blacksquare \times 3 = 12$	$\blacksquare \times 3 = 27$	$\blacksquare \times 3 = 36$	$\blacksquare \times 3 = 30$
$\blacksquare \times 3 = 33$	$\blacksquare \times 3 = 36$	$\blacksquare \times 3 = 33$	$\blacksquare \times 3 = 3$	$\blacksquare \times 3 = 6$
$\blacksquare \times 3 = 9$	$\blacksquare \times 3 = 24$	$\blacksquare \times 3 = 27$	$\blacksquare \times 3 = 18$	$\blacksquare \times 3 = 21$

5. Continue the patterns.

**a.**

$$12 \times 2 = \underline{\quad}$$
$$13 \times 2 = \underline{\quad}$$
$$14 \times 2 = \underline{\quad}$$
$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$
$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$
$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$
$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$
$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$
$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$
$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$

**b.**

$$1 \times 2 - 1 = \underline{\quad}$$
$$2 \times 2 - 2 = \underline{\quad}$$
$$3 \times 2 - 3 = \underline{\quad}$$
$$\underline{\quad} \times \underline{\quad} - \underline{\quad} = \underline{\quad}$$
$$\underline{\quad} \times \underline{\quad} - \underline{\quad} = \underline{\quad}$$
$$\underline{\quad} \times \underline{\quad} - \underline{\quad} = \underline{\quad}$$
$$\underline{\quad} \times \underline{\quad} - \underline{\quad} = \underline{\quad}$$
$$\underline{\quad} \times \underline{\quad} - \underline{\quad} = \underline{\quad}$$
$$\underline{\quad} \times \underline{\quad} - \underline{\quad} = \underline{\quad}$$
$$\underline{\quad} \times \underline{\quad} - \underline{\quad} = \underline{\quad}$$

6. Solve the word problems.

**a.** John takes care of his neighbor's cat when the neighbor is away. He earns \$3 each day. John wants to buy a toy train that costs \$14. How many days will he have to work so he can buy it?

**b.** John took care of the cat for five days. Then his Grandpa gave him \$5 as a present. How much money does John have now?

So, he bought the 14-dollar train. How much money does he have left now?

**c.** John has \$6. Then he takes care of the neighbor's cat for four days. Does he now have enough money to buy a book about nesting birds that costs \$16?

d. Roses are sold in bunches of three. Dad bought eleven bunches and one extra rose for Mom's birthday—a rose for each year. How old is Mom?

e. How many bunches of roses and extra roses would Dad need to buy if Mom was 31 years old?

f. How about *your* mom? How many bunches of roses and extra roses would you need to buy for your mom?

7. Fill in the parts of the multiplication table that we have studied.

×	0	1	2	3	4	5	6	7	8	9	10	11	12
0													
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													

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# 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.

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 .....	142	2 pages
Half and Quarter Hours .....	144	2 pages
Review: Till and Past .....	146	2 pages
How Many Minutes Pass .....	148	3 pages
Practice .....	151	1 page
Clock to the Minute .....	152	3 pages
Elapsed Time .....	155	2 pages
More on Elapsed Time .....	157	4 pages
Using the Calendar .....	161	2 pages
Mixed Review .....	163	4 pages
Review .....	165	1 page



## Helpful Resources on the Internet

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

### **Clock - Teaching Tool**

An interactive clock that you can use to demonstrate telling time or elapsed time.

<http://mrcrammond.com/games/clock.swf>

### **Interactive Teaching Clock**

Play around with the controls—you can do all kinds of demonstrations with this clock!

<http://www.visnos.com/demos/clock>

### **Flashcard Clock**

Read the analog clock and type in the time in digital format.

[http://www.teachingtreasures.com.au/maths/FlashcardClock/flashcard\\_clock.htm](http://www.teachingtreasures.com.au/maths/FlashcardClock/flashcard_clock.htm)

### **ClockWorks**

Choose “advanced” level for 3rd grade practice. Move the hands of the clock to the given time by clicking on the tick marks on the clock.

<http://mrnussbaum.com/clockworks/>

### **Stop the Clock 4!**

Drag the five digital times to the correct analog clocks, and then press STOP THE CLOCK button.

<http://resources.oswego.org/games/StopTheClock/sthec4.html>

### **Bang On Time**

Read the time in words and then stop the clock when the hands are in the matching position.

<http://www.oswego.org/ocsd-web/games/BangOnTime/clockwordres.html>

### **Matching Pairs: Time**

A matching game—choose “5 minute intervals” for this grade level.

<http://www.topmarks.co.uk/Flash.aspx?f=matchingpairstimev3>

### **On Time**

Click and drag the hands of the clock to the correct time. This can be challenging!

[http://www.sheppardsoftware.com/mathgames/earlymath/on\\_time\\_game4.swf](http://www.sheppardsoftware.com/mathgames/earlymath/on_time_game4.swf)

### **Quarter Hours Interactive Mad Math**

Write the time shown on the analog clock. Includes “quarter to” and “quarter past”.

<http://www.snappymaths.com/other/measuring/time/interactive/quarterhours/quarterhoursimm/quarterhoursimm.htm>

### **Time Matching Game**

Match the analog clocks with the correct English phrases.

<http://www.math-play.com/time-matching-game.html>

### **That Quiz: Time**

Online quizzes for reading the clock, time passed, adding/subtracting with time, conversion of time units, and time zones. The quizzes have many levels, can be timed or not, and include lots of options.

<http://www.thatquiz.org/tq-g/math/time>

### **Time-for-time**

Resource site to learn about time: worksheets, games, quizzes, and time zones.

<http://www.time-for-time.com/default.htm>

## ELAPSED TIME

### Difference Between Two Times

Work out the difference between two given times. A time line may help.

[http://www.bgfl.org/bgfl/custom/resources\\_ftp/client\\_ftp/ks2/maths/timetables/index.htm](http://www.bgfl.org/bgfl/custom/resources_ftp/client_ftp/ks2/maths/timetables/index.htm)

### Elapsed Time

Click “New Time”. Then click the buttons that advance the time on the clock, until the time matches the “End” time. Choose difficulty levels 1 and 2 for this grade level.

<http://www.shodor.org/interactivate/activities/ElapsedTime/>

### Time Difference

Demonstrate elapsed time. Set the start and end times on the two clocks. Then, click the step-counters (“1 hr”, “5 mins”, and “1 min”) and the first clock will go ahead and keep track of elapsed time.

<http://mathszone.webspace.virginmedia.com/mw/time/Time%20Difference.swf>

### Elapsed Time Worksheets

Generate printable worksheets for elapsed time. You can practice the elapsed time, finding the starting time, or finding the ending time.

<http://www.mathnook.com/elapsedtimegen.html>

### Find the Start Time

Word problems about starting times with multiple-choice answers. Choose “full screen”, then “Find the start time”. Next, choose option 4 or 5.

[http://mathsframe.co.uk/en/resources/resource/119/find\\_the\\_start\\_time](http://mathsframe.co.uk/en/resources/resource/119/find_the_start_time)

### Time for Crime—Elapsed Time Mystery

A single mystery problem which can be solved by thinking of the elapsed time: who is the thief?

<http://teacher.scholastic.com/maven/timefor/index.htm>

### ThatQuiz—Elapsed time

A ten-question quiz on Elapsed Time

<http://www.thatquiz.org/tq-g/?-j4-14-p0>

### Adding Time Word Problems

Read the time and then answer a word problem involving adding a given time.

[http://mathsframe.co.uk/en/resources/resource/118/adding\\_time\\_word\\_problems](http://mathsframe.co.uk/en/resources/resource/118/adding_time_word_problems)

## CALENDAR

### Calendar Clowns

Answer questions about the calendar by clicking on the correct date.

<http://mrnussbaum.com/calendarclowns/>

### Using the Calendar—Questions

Locate information on a calendar, use a calculator to calculate time intervals, and answer questions about next month using this month’s calendar.

<http://mathsframe.co.uk/en/resources/resource/261>

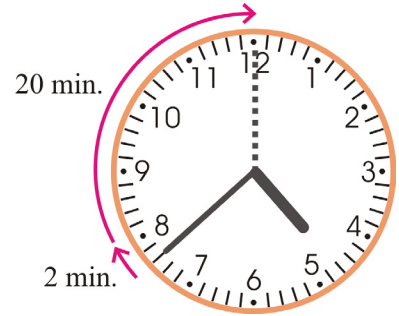
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# Elapsed Time

## 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.

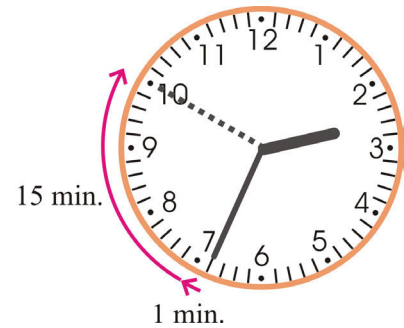
Or, add up from 34 till 50:

$$34 + 6 = 40$$

$$40 + 10 = 50.$$

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

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

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

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?

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## 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, customizable worksheets for counting common US coins and bills at <http://www.homeschoolmath.net/worksheets/money.php>

These worksheets are also available for other currencies (Canadian, British, Australian, Euro, South African) — check [www.homeschoolmath.net/worksheets](http://www.homeschoolmath.net/worksheets).

#### The Lessons in Chapter 5

	page	span
Using the Half-Dollar .....	168	2 pages
Dollars .....	170	3 pages
Making Change .....	173	4 pages
Mental Math and Money Problems .....	177	3 pages
Solving Money Problems .....	180	4 pages
Mixed Review .....	184	2 pages
Review .....	186	1 page

#### Helpful Resources on the Internet

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

##### 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/](http://www.hbschool.com/activity/counting_money/)

##### Coin Count Game

Drag the coins to the table that equal the target amount, using the correct number of coins.

<http://www.mathnook.com/math/coin-count.html>

### **Counting Money Intermediate**

Click on the various denominations in the cash drawer so they add up to the correct answer.

<http://www.mathnook.com/math/countingmoneyint.html>

### **Coin Combo**

Click on the falling coins to match the target amounts.

<http://www.tvokids.com/games/coincombo>

### **Change Maker**

Determine how many of each denomination you need to make the exact change. The pictures are very clear! Playable in US, Canadian, Mexican, UK, or Australian money.

<http://www.funbrain.com/cashreg/index.html>

### **Cash Out**

Make the correct change by clicking on the bills and coins.

<http://www.mrnussbaum.com/cashd.htm>

### **Lunch Lady**

The lunch lady must total the prices of eight students in three minutes, before the next class comes crashing in. Practices mental additions of money amounts.

<http://mrnussbaum.com/lunchlady/>

### **Money Master**

Drag the various denominations to the work area to give correct change. Choose “Give change” at the bottom for 3rd grade work.

<https://www.mathsisfun.com/money/money-master.html>

### **Money Game — Problems to Solve**

Click on the denominations in the cash register to answer the word problems.

<http://www.math-play.com/money-game-3/Money-Game.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.

<https://www.usmint.gov/kids/coinsMedals/>



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# 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 a dollar.



Total \$2.32



Total \$2.10

2. How much money? Write the amount.



a. \$ \_\_\_\_\_



b. \$ \_\_\_\_\_



c. \$ \_\_\_\_\_

Remember to put 0 into the dollars place if your total cent amount 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. $56\text{¢} = \$$ _____	b. $6\text{¢} = \$$ _____	c. $425\text{¢} = \$$ _____
d. _____ $\text{¢} = \$5.69$	e. _____ $\text{¢} = \$0.30$	f. _____ $\text{¢} = \$3.06$

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	\$