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# Foreword

Math Mammoth Grade 3 comprises a complete math curriculum for the third grade mathematics studies. The curriculum meets and exceeds the Common Core standards.

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 compare fractions by using visual 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. They also learn to add and subtract 4-digit numbers, and use addition and subtraction in problem solving in many contexts, such as with money, time, and geometry.

Additional topics we study are time, money, measuring, and bar graphs and picture graphs.

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.

Some important points to keep in mind when using the curriculum:

- The two books (parts A and B) are like a “framework”, but you still have a lot of liberty in planning your child’s studies. While addition and subtraction topics are best studied in the order they are presented, feel free to go through the sections on shapes, measurement, clock, and money in any order you like.

This is especially advisable if your child is either “stuck” or is perhaps getting bored with some particular topic. Sometimes the concept the child was stuck on can become clear after a break from the topic.

- Math Mammoth is mastery-based, which means it concentrates on a few major topics at a time, in order to study them in depth. However, you can still use it in a *spiral* manner, if you prefer. Simply have your child study in 2-3 chapters simultaneously. This type of flexible use of the curriculum enables you to truly individualize the instruction for your child.
- Don’t automatically assign all the exercises. Use your judgment, trying to assign just enough for your child’s needs. You can use the skipped exercises later for review. For most children, I recommend to start out by assigning about half of the available exercises. Adjust as necessary.
- For review, the curriculum includes a worksheet maker (Internet access required), mixed review lessons, additional cumulative review lessons, and the word problems continually require usage of past concepts. Please see more information about review (and other topics) in the FAQ at <https://www.mathmammoth.com/faq-lightblue.php>

I heartily recommend that you view the full user guide for your grade level, available at <https://www.mathmammoth.com/userguides/>

And lastly, you can find free videos matched to the curriculum at <https://www.mathmammoth.com/videos/>

*I wish you success in teaching math!*

*Maria Miller, the author*

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# Chapter 6: Place Value with Thousands

## Introduction

This chapter 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 place value, writing 4-digit numbers in expanded form, and comparing. 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. This helps build number sense. We also study regrouping in addition and subtraction.

The last major topics in this chapter are rounding numbers to the nearest hundred and estimating. Students also do some problem solving in one lesson.

I advise that you do not assign all the exercises by default. Use your judgment, and strive to vary the number of assigned exercises according to the student's needs. See the user guide at

<https://www.mathmammoth.com/userguides/> for more guidance on using and pacing the curriculum.

<b>The Lessons</b>	page	span
Thousands .....	8	<i>4 pages</i>
Four-Digit Numbers and Place Value .....	12	<i>4 pages</i>
Which Number Is Greater? .....	16	<i>2 pages</i>
Mental Adding and Subtracting .....	18	<i>4 pages</i>
Add 4-Digit Numbers with Regrouping .....	22	<i>2 pages</i>
Subtract 4-Digit Numbers with Regrouping .....	24	<i>4 pages</i>
Rounding to the Nearest Hundred .....	28	<i>3 pages</i>
Estimating .....	31	<i>3 pages</i>
Word Problems .....	34	<i>3 pages</i>
Mixed Review Chapter 6 .....	37	<i>2 pages</i>
Review Chapter 6 .....	39	<i>2 pages</i>

### Helpful Resources on the Internet

#### Base Ten Blocks

Interactive base ten blocks for illustrating numbers up to 10,000. You can also solve problems.

<http://www.hoodamath.com/mobile/games/basetenblocks.html>

#### Cookie Dough

Practice either spelling big numbers, or writing the numbers from the words.

<http://www.funbrain.com/cgi-bin/nw.cgi?A1=s&A2=10000&A3=1&A12=0>

<http://www.funbrain.com/cgi-bin/nw.cgi?A1=s&A2=10000&A3=1&A12=1>

#### Sea Life Place Value - Expanded Form

Practice adding numbers in expanded form with this fun, interactive game. With each correct answer, you get to add another beautiful plant or animal to the sea floor!

<http://www.free-training-tutorial.com/place-value/sealife/sl-expanded-form.html>

**Sample worksheet from**  
[www.mathmammoth.com](http://www.mathmammoth.com)

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## 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 + 30 + 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  
 = \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_

2. Fill in the table.

<p><b>a.</b> Five thousand nine hundred ninety</p> <p>T    H    T    O</p> <table border="1"> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>					<p><b>b.</b> Six thousand sixteen</p> <p>T    H    T    O</p> <table border="1"> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>					<p><b>c.</b> Six thousand three hundred three</p> <p>T    H    T    O</p> <table border="1"> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>								
<p><b>d.</b> Eight thousand seven hundred</p> <p>T    H    T    O</p> <table border="1"> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>					<p><b>e.</b> Nine thousand two hundred forty-five</p> <p>T    H    T    O</p> <table border="1"> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>					<p><b>f.</b> Ten thousand</p> <p>ten thou- sands</p> <table border="1"> <tr> <td>T</td> <td>H</td> <td>T</td> <td>O</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> <td>0</td> </tr> </table>	T	H	T	O	1	0	0	0
T	H	T	O															
1	0	0	0															

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

<p><b>a.</b> <math>2000 + 90 =</math> _____</p> <p><math>3000 + 200 =</math> _____</p>	<p><b>b.</b> <math>8000 + 5 =</math> _____</p> <p><math>1000 + 80 + 7 =</math> _____</p>
<p><b>c.</b> <math>8000 + 200 + 20 =</math> _____</p> <p><math>2000 + 500 + 90 + 8 =</math> _____</p>	<p><b>d.</b> <math>4000 + 50 =</math> _____</p> <p><math>2000 + 800 + 7 =</math> _____</p>

4. What part of these numbers is missing?

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

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 \_\_\_\_\_

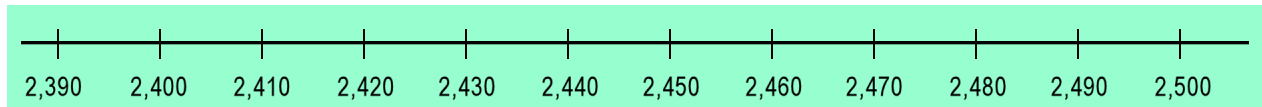
6. These numbers are written as sums, but in a scrambled order! Write them as normal numbers.

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

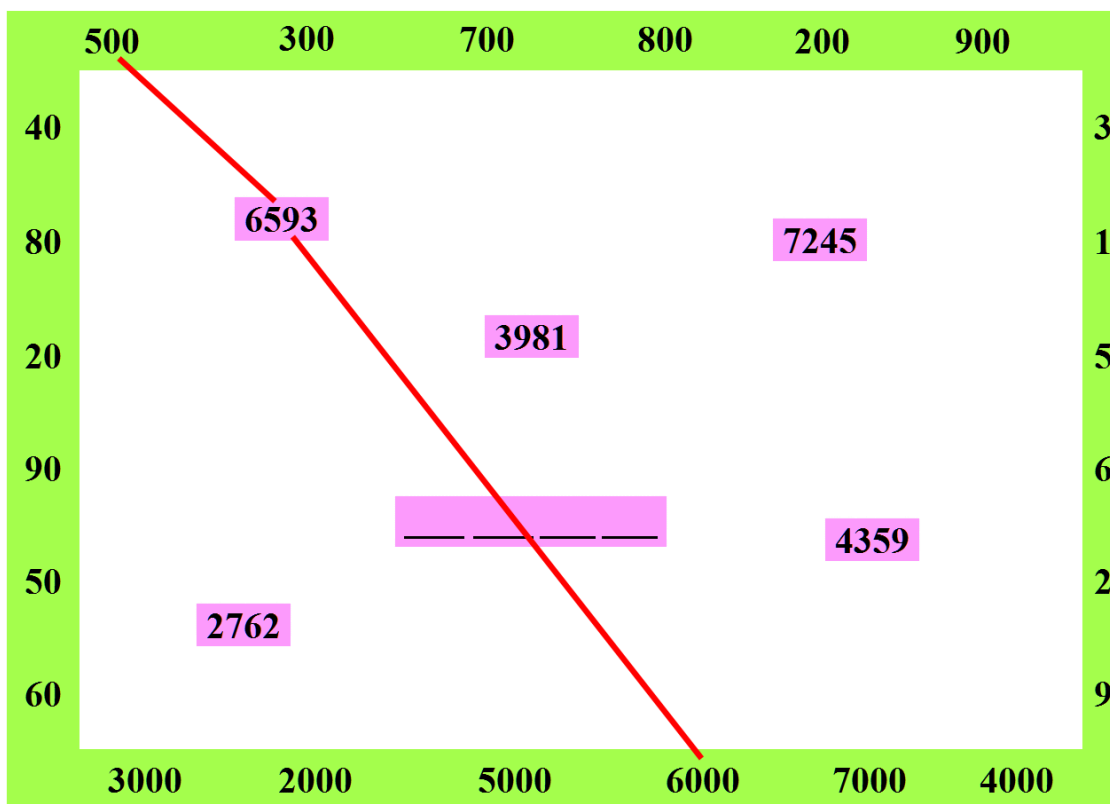
9. Draw a number line from 7,650 to 7,750 with tick marks at every 10.

Mark these numbers on the number line (approximately):

7659 7672 7745 7717 7688



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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## 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. The student divides shapes into new ones and also encounters some tilings (aka. tessellations). Next, we study some quadrilaterals in detail, 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 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 multiplications such as  $3 \times 40$  or  $90 \times 7$ . It is included here so that students can use their multiplication skills to calculate areas of bigger rectangles.

Then students solve problems involving area and perimeter. This is necessary so that they learn to distinguish between these two concepts.

Lastly, we touch on solids, such as cubes, rectangular prisms, pyramids, cones, and cylinders, 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 plastic models for the solids (search the Internet for “geometric solids”).

<b>The Lessons</b>	page	span
Shapes .....	46	4 pages
Some Special Quadrilaterals .....	50	3 pages
Perimeter .....	53	3 pages
Problems with Perimeter .....	56	3 pages
Getting Started with Area .....	59	2 pages
More About Area .....	60	4 pages
Multiplying by Whole Tens .....	65	4 pages
Area Units and Problems .....	69	4 pages
Area and Perimeter Problems .....	73	2 pages
More Area and Perimeter Problems .....	75	3 pages
Solids .....	78	2 pages
Mixed Review Chapter 7 .....	80	2 pages
Geometry Review .....	82	2 pages

## Helpful Resources on the Internet

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

### SHAPES

#### Shapes Splat

Get points by clicking on the correct shapes.

[http://www.sheppardsoftware.com/mathgames/earlymath/shapes\\_shoot.htm](http://www.sheppardsoftware.com/mathgames/earlymath/shapes_shoot.htm)

#### 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/](http://www.thatquiz.org/tq-f/math/shapes/)

#### Quadrilateral Shapes Shoot

Practice identifying quadrilaterals. You can choose relaxed or fast mode.

<http://www.sheppardsoftware.com/mathgames/geometry/shapeshoot/QuadShapesShoot.htm>

#### Matching Shapes

Pair all the tiles by matching the polygons with their proper names.

[http://www.mathplayground.com/matching\\_shapes.html](http://www.mathplayground.com/matching_shapes.html)

#### Interactive Quadrilaterals

Drag the corners to play with squares, rectangles, rhombi, and more.

<http://www.mathsisfun.com/geometry/quadrilaterals-interactive.html>

#### Polygon Playground

Drag various colorful polygons to the work area to make your own creations!

<http://www.mathcats.com/explore/polygons.html>

### **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>

### **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>

### **Tangram Game**

Arrange the five geometrical shapes that are given to form various shapes.

<http://www.tangramgames.co.uk/tangramgameA/>

### **Interactivate! Tessellate**

An online, interactive tool for creating your own tessellations. Choose a shape, then edit its corners or edges. The program automatically changes the shape so that it will tessellate (tile) the plane. Then push the tessellate button to see your creation!

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

### **Online Kaleidoscope**

Create your own kaleidoscope creation with this interactive tool.

[https://web.archive.org/web/20160309222840/http://www.zefrank.com/dtoy\\_vs\\_byokal/](https://web.archive.org/web/20160309222840/http://www.zefrank.com/dtoy_vs_byokal/)

## **AREA AND PERIMETER**

### **Free Worksheets for Area and Perimeter**

Create customizable worksheets for the area and the perimeter of rectangles. Options include using images, generating word problems, or problems where the student writes an expression for the area using the distributive property.

[http://www.homeschoolmath.net/worksheets/area\\_perimeter\\_rectangles.php](http://www.homeschoolmath.net/worksheets/area_perimeter_rectangles.php)

### **FunBrain: Shape Surveyor Geometry Game**

An easy game that practices finding either the perimeter or area of rectangles.

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

### **Perimeter Shapes Shoot Game**

“Shoot” the shapes that have the given perimeter.

<http://www.sheppardsoftware.com/mathgames/geometry/shapeshoot/PerimeterShapesShoot.htm>

### **Perimeter at Gordons**

Work out the perimeter of the shapes. There are many options to choose from.

<http://www.wldps.com/gordons/Perimeter.swf>

### **Shape Explorer**

Find the perimeter and area of odd shapes on a rectangular grid.

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

### **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>

### **Build a Robot**

Collect six parts to build your own robot by answering questions about perimeter.

[http://www.learnalberta.ca/content/me3us/flash/lessonLauncher.html?lesson=lessons/12/m3\\_12\\_00\\_x.swf](http://www.learnalberta.ca/content/me3us/flash/lessonLauncher.html?lesson=lessons/12/m3_12_00_x.swf)

### **Area Shapes Shoot Game**

Click on the shapes that show the given area.

<http://www.sheppardsoftware.com/mathgames/geometry/shapeshoot/AreaShapesShoot.htm>

### **Math Playground: Party Designer**

You need to design areas for the party, such as a crafts table, food table, seesaw, and so on, so they have the given perimeters and areas.

<https://www.mathplayground.com/PartyDesigner/index.html>

### **Zoo Designer**

You have been hired to design five enclosures for the animals at a local zoo. Use your knowledge of area and perimeter to design the correct enclosures and to earn your ZooDesigner Points.

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

### **Area Blocks**

Cover your grid with shapes before your opponent does.

[http://www.mathplayground.com/area\\_blocks.html](http://www.mathplayground.com/area_blocks.html)

### **Area and Perimeter Builder**

Create your own rectangular shapes using colorful blocks and explore the relationship between perimeter and area. You can choose to show the side lengths to understand how a perimeter works. You can also use two work areas (grids) to compare the area and perimeter of two shapes side-by-side. Lastly, challenge yourself in the game screen to build shapes or find the area of various figures.

[http://phet.colorado.edu/sims/html/area-builder/latest/area-builder\\_en.html](http://phet.colorado.edu/sims/html/area-builder/latest/area-builder_en.html)

### **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](http://www.mathplayground.com/area_perimeter.html)

### **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>

### **Area and the Distributive Property Quiz**

Use area models to represent the distributive property in finding area of rectangles.

<https://www.khanacademy.org/math/cc-third-grade-math/cc-third-grade-measurement/cc-third-grade-area-distributive-property/e/area-and-the-distributive-property>

## MULTIPLY BY MULTIPLES OF TEN

### Multiplying by Multiples of Ten

Drag the correct answer to its corresponding problem.

[http://mrnussbaum.com/grade\\_3\\_standardsmultbytens/](http://mrnussbaum.com/grade_3_standardsmultbytens/)

### Multiplication Quiz

Practice your skills of multiplying by multiples of ten in this 10-question online quiz.

<http://www.thatquiz.org/tq-1/?-jkg04-lc-p0>

## SOLIDS

### Identify solids

Select the name and drop it onto 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>

### Under the Sea

First, choose 3-D shapes. Then, click on a “magic crystal” to start an activity.

<http://www.learnalberta.ca/content/me3usa/flash/index.html?goLesson=14>

### 2-D and 3-D Shapes

Learn about different solids and see them rotate.

[http://coolsciencelab.com/2D\\_3D\\_shapes.swf](http://coolsciencelab.com/2D_3D_shapes.swf)

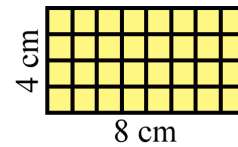
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## Area and Perimeter Problems

Sometimes it's easy to confuse perimeter and area.

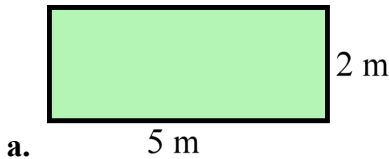
- AREA has to do with covering the shape with squares. Your answer will be in square centimeters, square inches, square feet, square meters, or just square units.
- PERIMETER has to do with “going all the way around.” Your answer will be in some unit of length, such as centimeters, meters, inches, or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



**Area:**  $4 \text{ cm} \times 8 \text{ cm} = 32 \text{ cm}^2$ .

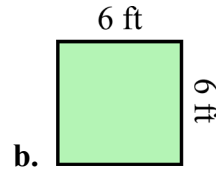
**Perimeter:**  
 $4 \text{ cm} + 8 \text{ cm} + 4 \text{ cm} + 8 \text{ cm} = 24 \text{ cm}$

1. Find the area and perimeter of the rectangles.



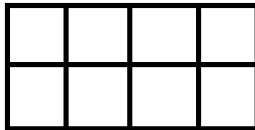
Perimeter = \_\_\_\_\_

Area = \_\_\_\_\_



Perimeter = \_\_\_\_\_

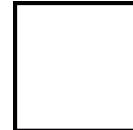
Area = \_\_\_\_\_



c. 4 in. wide, 2 in. tall

Perimeter = \_\_\_\_\_

Area = \_\_\_\_\_



d. A square with 3 cm sides

Perimeter = \_\_\_\_\_

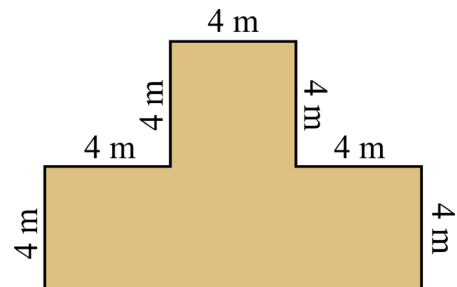
Area = \_\_\_\_\_

2. Find the area and perimeter of this shape.

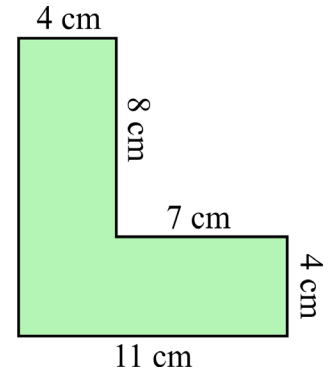
Notice that one side length is not given.  
 You need to figure that out.

Area:

Perimeter:



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:

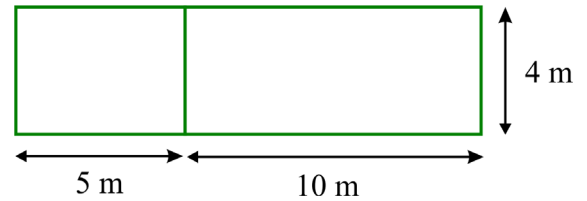
4. This is a two-part lawn.

- a. Find the areas of the two parts.

\_\_\_\_\_ and \_\_\_\_\_

- b. Find the total area.

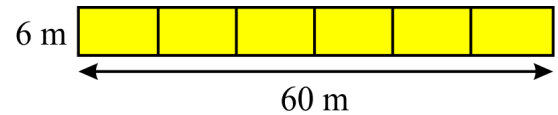
- c. Find the perimeter.



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

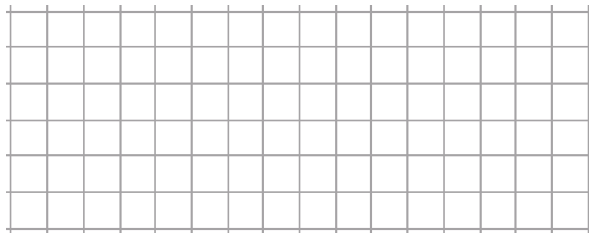
Area of each part:

Total area:

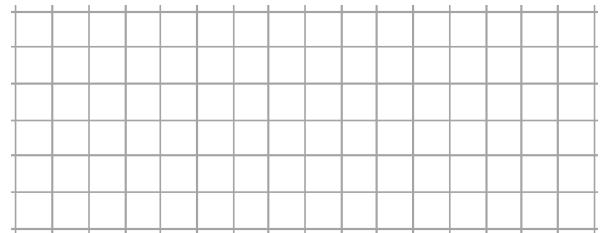


### Puzzle Corner

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.

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# Chapter 8: Measuring

## Introduction

In this chapter we delve into both customary and metric measuring units.

Note: If you have the digital version of this book (PDF file), print the pages as 100%, not “shrink to fit,” “print to fit,” or similar. If you print “shrink to fit”, some exercises about measuring in inches and centimeters will not come out right, but will be “shrunk” compared to reality.

First, students learn about units of length. We start 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. If your student has trouble with the fractions, consider studying some lessons from chapter 10 (Fractions) first.

Next, students measure using centimeters and millimeters. They also create line plots from measurement data. 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. First, we deal with pounds and ounces, and next, with grams and kilograms. It is very helpful if you can use a kitchen scale for these lessons.

Lastly, we study liquid volume, first of all with customary units (cup, pint, quart, and gallon) and then with metric units (liter and milliliter).

Many of the lessons in this chapter have an optional section about conversions between measuring units, such as changing meters into centimeters, or feet into inches. Converting between units is beyond the Common Core standards for third grade (it is 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. People in the United States, Liberia or Myanmar do not use the metric system a lot, while people in other countries mainly use the metric system. The units that you do not use are likely to be forgotten. So encourage the student(s) to have free play time with measuring devices such as scales, 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
Cups, Pints, Quarts, and Gallons .....	110	3 pages
Milliliters and Liters .....	113	2 pages
Mixed Review Chapter 8 .....	115	2 pages
Review Chapter 8 .....	117	2 pages

## Helpful Resources on the Internet

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

### GENERAL

#### Measures

An online activity about metric measuring units and how to read scales, a measuring cup, and a ruler.

Note: you will need to use the British spellings “centimetres” and “millilitres” in the activity.

<http://flash.topmarks.co.uk/674>

#### Conversion Quizzes - ThatQuiz.org

Create customizable quizzes about conversions between measuring units.

<http://www.thatquiz.org/tq-n/science/metric-system/>

#### Reading Scales

Illustrate how to read a variety of measuring devices, such as scales, a measuring cup, and a thermometer.

You can generate examples using different scales on different devices.

<http://www.teacherled.com/resources/dials/dialsload.html>

### MEASURING LENGTH

#### The Ruler Game

Click on the given measurement on a ruler. You can choose to practice whole inches, half,  $\frac{1}{4}$ ,  $\frac{1}{8}$ , or  $\frac{1}{16}$  parts of an inch.

<http://www.rulergame.net/>

#### Measure It!

Practice measuring lines with either centimeters or inches. Multiple choice questions.

<https://www.funbrain.com/games/measure-it>

#### Reading a Tape Measure Worksheets

Generate printable worksheets - you can choose to which accuracy to measure: inches, or inches and feet.

[http://themathworksheetsite.com/read\\_tape.html](http://themathworksheetsite.com/read_tape.html)

#### Reading a Metric Ruler

This page has illustrated instructions and then a short practice exercise.

<https://web.archive.org/web/20161111010020/http://www.texasgateway.org:80/node/3970>

#### Length Quiz

Choose the best measurement for each object in this interactive online quiz.

[http://www.softschools.com/quizzes/math/length\\_measurement/quiz2107.html](http://www.softschools.com/quizzes/math/length_measurement/quiz2107.html)

#### Measuring - Find Lengths with a Ruler

Drag the ruler to measure the length of the given lines. Choose “Tenths” for this grade level, then enter the length using a decimal, such as 0.3 cm.

<http://media.abcya.com/games/measuring/flash/measuring.swf>

#### Metric Length Matching

Match the correct conversions.

<http://www.sheppardsoftware.com/mathgames/measurement/MeasurementMeters.htm>

## LINE PLOTS

### Data Analysis: Line Plots

First, play a game. Then, make a line plot using the game scores.

<http://www.k5learning.com/sample-lessons/grade-3-data-analysis>

### Solve Problems with Line Plots

Answer questions using line plots and data sets.

<https://www.khanacademy.org/math/early-math/cc-early-math-measure-data-topic/cc-early-math-line-plots/e/solving-problems-with-line-plots-1>

## MEASURING WEIGHT/MASS

### Interactive Measuring Scales

Add weights to the scales and choose to show or hide the total weight.

[http://www.taw.org.uk/lic/itp/itps/measuringScales\\_1\\_8.swf](http://www.taw.org.uk/lic/itp/itps/measuringScales_1_8.swf)

### Scales Reader

Simple online practice of reading the scales. Choose “up to 500 g” or “up to 1 kg” for this level.

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

### Mostly Postie!

Choose “grams”. Place a letter on the scale, and enter the reading, and click “check.”

<http://www.ictgames.com/mobilePage/mostlyPostie/index.html>

### Ounce or Pound

Click and drag to show which unit you would use to weigh the object.

[http://www.harcourtschool.com/activity/ounces\\_pounds/](http://www.harcourtschool.com/activity/ounces_pounds/)

### Get the Weight

Estimate the weight of the items that are placed on the balance scale. The longer you hold down the mouse button, the bigger your estimate of its weight. Available both for customary and metric units.

<http://www.mathnook.com/math/get-the-weight-standard.html>

<http://www.mathnook.com/math/get-the-weight-metric.html>

### Best Measure

Match each thing with its best estimated weight.

<http://www.sheppardsoftware.com/mathgames/measurement/BestMeasure2.htm>

### 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>

## VOLUME/CAPACITY

### Gallon Bot or Gallon Man

This is a graphical creation that allows students to better visualize the customary units of volume.

<https://www.superteacherworksheets.com/pz-gallon-man.html>

### Taking Measures Capacity Game

Click on the object on the table that best matches the measure or object at the top of the screen.

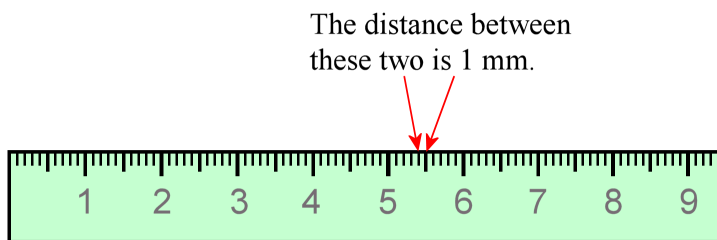
<http://www.bbc.co.uk/skillswise/game/ma23capa-game-taking-measures-capacity>

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# Centimeters and Millimeters

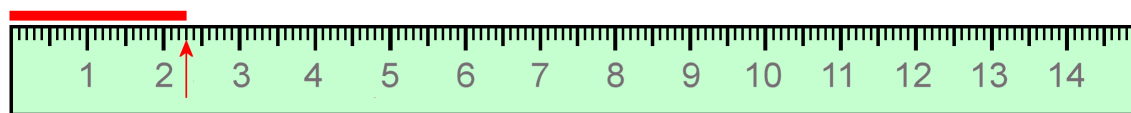
This ruler measures in centimeters. The numbers signify whole centimeters. All the shorter lines between those are for *millimeters*.

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



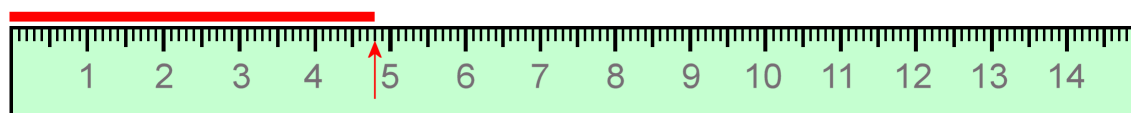
Look at the ruler: **there are 10 millimeters in each centimeter.**

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



This line is 2 cm 3 mm long. At the same time, it is 23 mm long. Why?

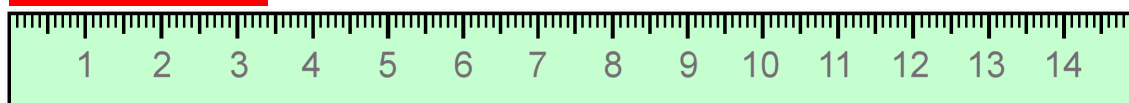
Each centimeter is 10 mm, so 2 cm is 20 mm. That means 2 cm 3 mm makes 23 mm in total.



This line is 4 cm 8 mm long. At the same time, it is 48 mm long.

1. Measure the lines using the ruler, first in whole centimeters and millimeters. Then write their lengths using millimeters only.

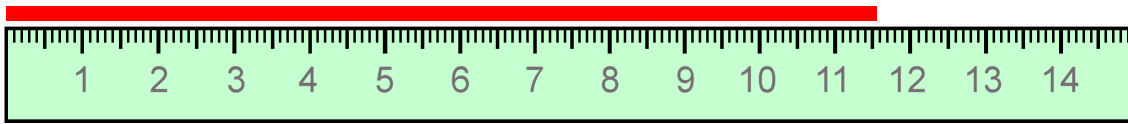
a. \_\_\_\_\_ cm \_\_\_\_\_ mm = \_\_\_\_\_ mm



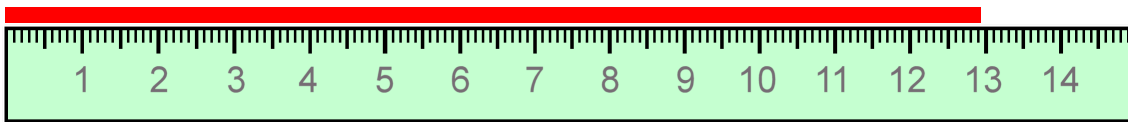
b. \_\_\_\_\_ cm \_\_\_\_\_ mm = \_\_\_\_\_ mm



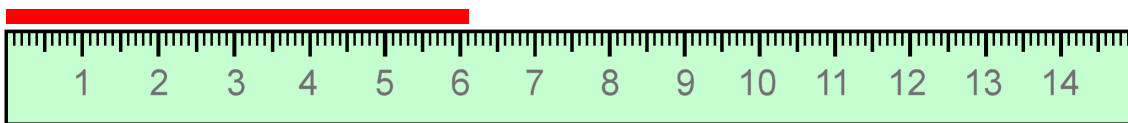




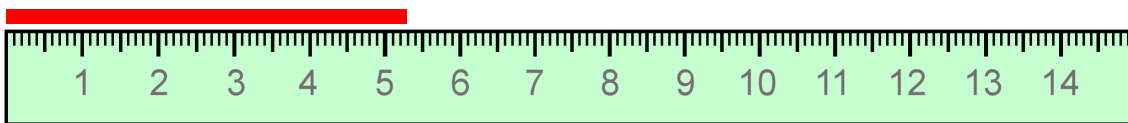
c. \_\_\_\_\_ cm \_\_\_\_\_ mm = \_\_\_\_\_ mm



d. \_\_\_\_\_ cm \_\_\_\_\_ mm = \_\_\_\_\_ mm



e. \_\_\_\_\_ cm \_\_\_\_\_ mm = \_\_\_\_\_ mm



f. \_\_\_\_\_ cm \_\_\_\_\_ mm = \_\_\_\_\_ mm

2. Draw lines using a ruler.

a. 7 cm 8 mm

b. 10 cm 5 mm

c. 14 mm

d. 55 mm

e. 126 mm

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

4. Change between centimeters and millimeters.

a.	b.	c.
1 cm = _____ mm	1 cm 1 mm = <u>11</u> 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

5. Change between millimeters and centimeters.

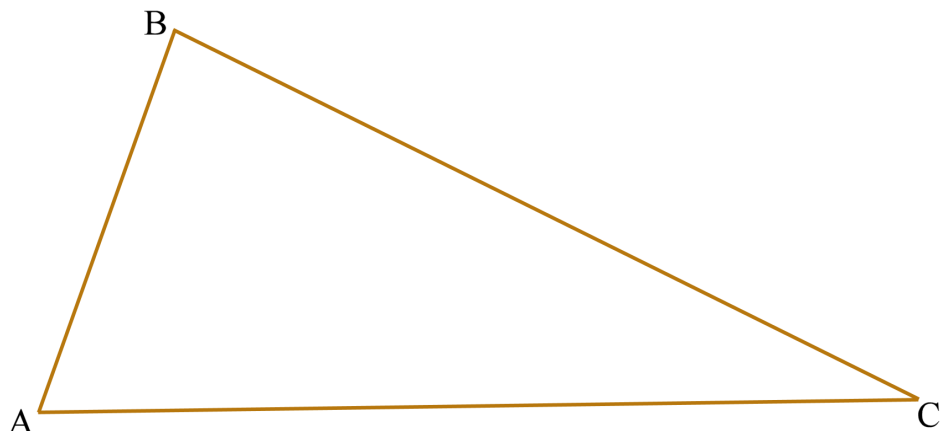
a.	b.	c.
70 mm = _____ cm	12 mm = ____ cm ____ mm	89 mm = ____ cm ____ mm
100 mm = _____ cm	45 mm = ____ cm ____ mm	102 mm = ____ cm ____ mm

6. Measure the sides of this triangle in millimeters.

Side AB \_\_\_\_\_ mm

Side BC \_\_\_\_\_ mm

Side CA \_\_\_\_\_ mm



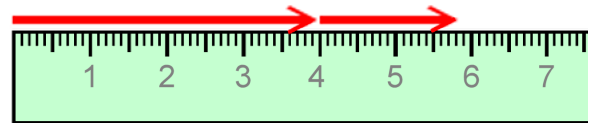
7. Find the perimeter of the triangle in the previous exercise.

8. Draw the third side of this triangle.  
Then measure its sides.  
Lastly, find its perimeter in millimeters.



The first arrow is 4 cm. The second arrow is 1 cm 8 mm. How long are they together?  
Add, giving your answer in millimeters.

$$4 \text{ cm} + 1 \text{ cm } 8 \text{ mm} = 5 \text{ cm } 8 \text{ mm} = 58 \text{ mm}$$



Add centimeters with centimeters, and millimeters with millimeters.  
Remember that 10 millimeters makes 1 centimeter.

$$9 \text{ mm} + 6 \text{ cm} + 2 \text{ mm} = 6 \text{ cm } 11 \text{ mm} = 7 \text{ cm } 1 \text{ mm} = 71 \text{ mm}$$

If you have both millimeters and centimeters, change the centimeters to millimeters first:

$$84 \text{ mm} + \underline{3 \text{ cm}} + 9 \text{ mm} = 84 \text{ mm} + \underline{30 \text{ mm}} + 9 \text{ mm} = 123 \text{ mm} \text{ (which is also } 12 \text{ cm } 3 \text{ mm)}$$

9. Work out these “line additions.” Give your answers in millimeters.

a. 1 cm 5 mm + 5 mm	b. 28 mm + 7 cm
c. 5 mm + 5 cm 8 mm	d. 2 cm 4 mm + 4 cm 5 mm
e. 52 mm + 2 cm 4 mm	f. 6 cm + 8 mm + 17 mm
g. 9 mm + 17 mm + 2 cm	h. 139 mm + 50 cm + 2 mm

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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, based on 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 or she still needs some practice with the multiplication tables, but otherwise it is better to delay this chapter until the tables are nearly mastered.

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  $12 \div 3$  would mean, “If you share 12 bananas equally between 3 people, how many bananas does each one get?”

The second way has to do with grouping. The problem  $12 \div 3$  would be, “If you have 12 items, how many groups of three items can you make?” This is often called measurement division. 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. In 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  $1 \div 0 =$  infinity), but for now, this is how we present it for third graders.

Lastly, students study the concept of remainder, or division that is not exact. The lesson starts by letting the student find the remainder by using visual models (you could also use manipulatives). Then students learn how to find the remainder by calculating. This concept will be studied again in fourth grade.

A friendly reminder: you can find free videos covering topics of this chapter of the curriculum at <https://www.mathmammoth.com/videos/> (choose 3rd 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 Chapter 9 .....	148	2 pages
Review Chapter 9 .....	150	2 pages

# Helpful Resources on the Internet

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

## CONCEPT OF DIVISION

### Sharing

Solve word problems involving sharing. Choose “with remainders”.

<http://www.topmarks.co.uk/Flash.aspx?f=sharingv2>

### Airline Grouping

Practice division as making groups.

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

### Division by Sharing Fish

Drag and drop the fish into the fish tanks to “share” them. Fill in the empty boxes.

<http://www.snappymaths.com/multdiv/earlymultdiv/interactive/sharing2/sharingframe.htm>

## DIVISION FACTS

### Puzzle Pics Division

Drag the puzzle pieces to the correct answers and reveal the mystery picture!

[http://www.mathplayground.com/puzzle\\_pics\\_division.html](http://www.mathplayground.com/puzzle_pics_division.html)

### Flying High Division

Fly your plane safely through the storm clouds by answering questions correctly.

<http://www.multiplication.com/games/play/flying-high-division>

### Math Mahjong - Division

Try to match all the tiles.

[http://www.sheppardsoftware.com/mathgames/mahjong/mahjongMath\\_division\\_easy.htm](http://www.sheppardsoftware.com/mathgames/mahjong/mahjongMath_division_easy.htm)

### Bike Racing Math Division

Win the race by clicking on the correct answer to speed up the motorcycle.

<http://www.mathnook.com/math/bike-racing-math-division.html>

### Operation Snowman

Choose which operation you would use to solve the word problems.

[http://www.harcourtschool.com/activity/operation\\_snowman/](http://www.harcourtschool.com/activity/operation_snowman/)

### Division Flashing Numbers

Divide each number by the given number and click on the flashing sign beneath when it is showing the right answer.

<http://www.topmarks.co.uk/Flash.aspx?b=maths/division>

### **Math Magician Games**

Practice division skills with these interactive online flashcards. Answer 20 questions in one minute.

<http://web.archive.org/web/20160828220841/http://oswego.org/ocsd-web/games/mathmagician/mathdiv.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>

### **Tux Math**

A free software for practicing math facts with many options. Includes all operations. You need to shoot falling comets that can damage penguins' igloos.

<http://sourceforge.net/projects/tuxmath>

## **MISCELLANEOUS**

### **Dividing by Zero at Math Is Fun**

This page gives illustrations of why division by zero is undefined.

<https://www.mathsisfun.com/numbers/dividing-by-zero.html>

### **Division Facts with Remainders**

Type the answers into the boxes and click “check”.

<http://www.mathplayground.com/division02.html>

### **Rags to Riches Word Problems**

Solve math problems about the Water Park and you will win tickets to the park!

<https://www.quia.com/rr/10249.html>

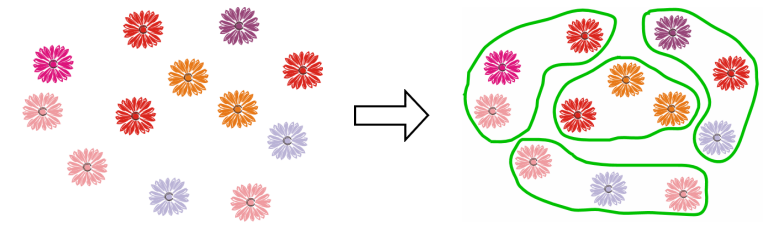
### **Word Problems with Katie**

Practice multiplication and division with these simple word problems.

<http://www.mathplayground.com/WordProblemsWithKatie2.html>

# Division as Making Groups

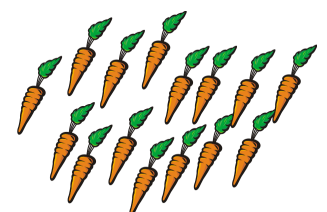
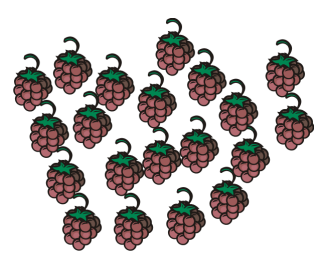
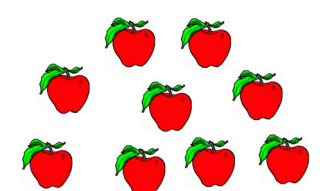
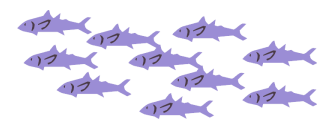

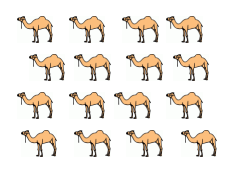
There are 12 daisies. Make groups of 3.



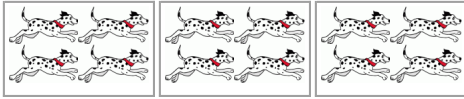
How many groups? Four groups.

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

1. Divide into groups.

<p>a. There are <u>15</u> carrots. Make groups of 5.</p>  <p>How many groups? _____</p> <p>How many 5's are there in <u>15</u>? _____</p>	<p>b. There are _____ berries. Make groups of 4.</p>  <p>How many groups? _____</p> <p>How many 4's are there in _____? _____</p>	<p>c. There are _____ apples. Make groups of 3.</p>  <p>How many groups? _____</p> <p>How many 3's are there in _____? _____</p>
<p>d. There are _____ fish. Make groups of 2.</p>  <p>How many groups? _____</p> <p>How many 2's are there in _____? _____</p>	<p>e. There are _____ daisies. Make groups of 6.</p>  <p>How many groups? _____</p> <p>How many 6's are there in _____? _____</p>	<p>f. There are _____ camels. Make groups of 4.</p>  <p>How many groups? _____</p> <p>How many 4's are there in _____? _____</p>





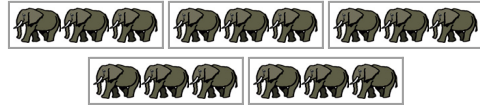
**DIVIDE... 12 dogs into groups of four.**

How many groups? Three

How many 4's in 12? \_\_\_\_\_

$$12 \div 4 = 3$$

“Twelve divided by four is three.”



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

How many groups? \_\_\_\_\_

How many 3's in 15? \_\_\_\_\_

$$15 \div 3 = 5$$

“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,  $18 \div 6 = 3$

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

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

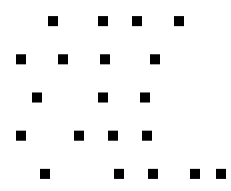
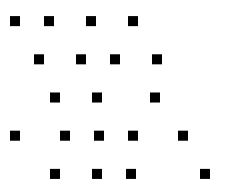
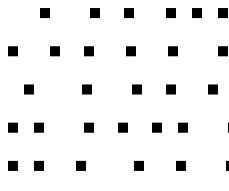
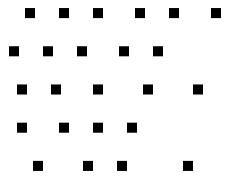
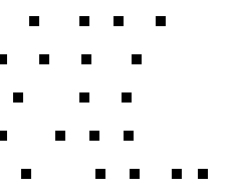
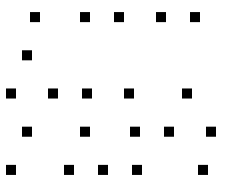
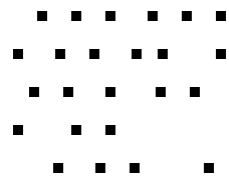
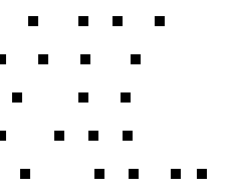
3. Make a division sentence.

<p>a. Divide 10 rams into groups of two. How many groups?</p> <p>_____ ÷ _____ = _____</p>	<p>b. Divide _____ camels into groups of four. How many groups?</p> <p>_____ ÷ _____ = _____</p>	<p>c. Divide _____ apples into groups of six. How many groups?</p> <p>_____ ÷ _____ = _____</p>
<p>d. Divide _____ books into groups of three. How many groups?</p> <p>_____ ÷ _____ = _____</p>	<p>e. Divide _____ scissors into groups of five. How many groups?</p> <p>_____ ÷ _____ = _____</p>	<p>f. Divide _____ crosses into groups of three. How many groups?</p> <p>_____ ÷ _____ = _____</p>

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

a. $18 \div 3 = \underline{\quad}$	b. $24 \div 2 = \underline{\quad}$
c. $21 \div 3 = \underline{\quad}$	d. $25 \div 5 = \underline{\quad}$
e. $15 \div 5 = \underline{\quad}$	f. $24 \div 8 = \underline{\quad}$

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

<p>a. Make groups of 4</p>  <p><math>\underline{\quad} \div 4 = \underline{\quad}</math></p>	<p>b. Make groups of 2</p>  <p><math>\underline{\quad} \div 2 = \underline{\quad}</math></p>	<p>c. Make groups of 6</p>  <p><math>\underline{\quad} \div 6 = \underline{\quad}</math></p>	<p>d. Make groups of 3</p>  <p><math>\underline{\quad} \div 3 = \underline{\quad}</math></p>
<p>e. Make groups of 5</p>  <p><math>\underline{\quad} \div 5 = \underline{\quad}</math></p>	<p>f. Make groups of 7</p>  <p><math>\underline{\quad} \div 7 = \underline{\quad}</math></p>	<p>g. Make groups of 6</p>  <p><math>\underline{\quad} \div 6 = \underline{\quad}</math></p>	<p>h. Make groups of 10</p>  <p><math>\underline{\quad} \div 10 = \underline{\quad}</math></p>

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

The box  is for the  $\times$  or  $\div$  symbol.

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

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

<p><b>a.</b></p> <p>4 <math>\div</math> 2 = _____</p> <p>6 <math>\div</math> 2 = _____</p> <p>8 <math>\div</math> 2 = _____</p> <p>10 <math>\div</math> 2 = _____</p> <p>12 <math>\div</math> 2 = _____</p> <p>14 <math>\div</math> 2 = _____</p> <p>16 <math>\div</math> 2 = _____</p> <p>_____ <math>\div</math> 2 = _____</p> <p>_____ <math>\div</math> 2 = _____</p>	<p><b>b.</b></p> <p>20 <math>\div</math> 10 = _____</p> <p>30 <math>\div</math> 10 = _____</p> <p>40 <math>\div</math> 10 = _____</p> <p>50 <math>\div</math> 10 = _____</p> <p>_____ <math>\div</math> 10 = _____</p> <p>_____ <math>\div</math> 10 = _____</p> <p>_____ <math>\div</math> 10 = _____</p> <p>_____ <math>\div</math> 10 = _____</p> <p>_____ <math>\div</math> 10 = _____</p>	<p><b>c.</b></p> <p>10 <math>\div</math> 5 = _____</p> <p>15 <math>\div</math> 5 = _____</p> <p>20 <math>\div</math> 5 = _____</p> <p>25 <math>\div</math> 5 = _____</p> <p>_____ <math>\div</math> 5 = _____</p> <p>_____ <math>\div</math> 5 = _____</p> <p>_____ <math>\div</math> 5 = _____</p> <p>_____ <math>\div</math> 5 = _____</p> <p>_____ <math>\div</math> 5 = _____</p>
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# Chapter 10: Fractions

## Introduction

The last chapter of *Math Mammoth Grade 3* deals with a few elementary fraction topics: 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 digital 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 that the various rules for calculations should not be introduced 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 included 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 Chapter 10 .....	175	2 pages
Fractions Review .....	177	3 pages

## Helpful Resources on the Internet

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

### Matching Fractions Level 1

Match each fraction to its visual model.

[http://www.sheppardsoftware.com/mathgames/fractions/memory\\_fractions1.htm](http://www.sheppardsoftware.com/mathgames/fractions/memory_fractions1.htm)

### Fractions Splat

Four levels: (1) Identify equal or unequal parts; (2) Identify shapes that are divided into halves, thirds, and fourths; (3) and (4) Find the visual model that matches the given fraction.

[http://www.sheppardsoftware.com/mathgames/earlymath/fractions\\_shoot.htm](http://www.sheppardsoftware.com/mathgames/earlymath/fractions_shoot.htm)

### Concentration from Illuminations

A matching game you can play by yourself or against a friend, matching fractions to equivalent visual representations. (The game also allows you to play a matching game with whole numbers, shapes, or multiplication facts.) Available also for your phone or tablet.

<http://illuminations.nctm.org/Activity.aspx?id=3563>

### Fraction Frenzy 4

Choose the pizza picture that matches the fraction shown using the four arrow keys.

<http://www.mathwarehouse.com/games/our-games/fraction-games/fraction-frenzy-4/>

### Fractions Matcher

Match each fraction or mixed number with the corresponding picture.

[http://phet.colorado.edu/sims/html/fraction-matcher/latest/fraction-matcher\\_en.html](http://phet.colorado.edu/sims/html/fraction-matcher/latest/fraction-matcher_en.html)

### Fraction Fling

Identify the fractions or mixed numbers that are illustrated by the models by “shooting” them with a slingshot.

[http://www.abcy.com/fraction\\_fling.htm](http://www.abcy.com/fraction_fling.htm)

### Puzzle Pics—Number-Line Fractions

Drag the puzzle piece to the number line that illustrates the given fraction, and reveal the mystery picture!

[http://www.mathplayground.com/puzzle\\_pics\\_fractions.html](http://www.mathplayground.com/puzzle_pics_fractions.html)

### Animal Rescue: Fractions Number-Line Game

Move the arrow to the correct place on the number line and rescue the animals!

<http://www.sheppardsoftware.com/mathgames/fractions/AnimalRescueFractionsNumberLineGame.htm>

### Conceptua Fractions: Identify Fractions

A visual tool that shows fractions or mixed numbers using a pie, a bar, dots, and a number line.

<https://www.conceptuamath.com/app/tool/identifying-fractions>

### 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://mrnussbaum.com/clarafraction/>

## EQUIVALENT FRACTIONS

### 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.

<http://illuminations.nctm.org/Activity.aspx?id=3510>

### Conceptua Math: Equivalent Fractions

In this tool, you can use pie, rectangular, or number-line model. Divide each shape into parts using the sliders. Then click on parts to color or uncolor them.

<https://www.conceptuamath.com/app/tool/equivalent-fractions>

### Equivalent Fractions Shoot

Click the fraction picture that is equivalent to the given fraction. Choose “Level 1” for this grade level.

[http://www.sheppardsoftware.com/mathgames/fractions/equivalent\\_fractions\\_shoot.htm](http://www.sheppardsoftware.com/mathgames/fractions/equivalent_fractions_shoot.htm)

### Laura Candler's Fraction File Cabinet

This web page offers several free printables, activities, and games for grades 3-6.

<http://www.lauracandler.com/filecabinet/math/fractions.php>

## COMPARING

### Balloon Pop Fractions

Pop the balloons in order from the smallest to the largest fraction.

[http://www.sheppardsoftware.com/mathgames/fractions/Balloons\\_fractions3.htm](http://www.sheppardsoftware.com/mathgames/fractions/Balloons_fractions3.htm)

### Ordering Fractions

Drag the fractions into the right order, from the lowest to the highest.

<http://www.topmarks.co.uk/Flash.aspx?b=maths/fractions>

### Fractions Gallery - Ordering Simple Fractions

Put the fractions in order, from the least to the greatest.

<http://www.free-training-tutorial.com/math-games/fractions-gallery-game.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.

<https://www.conceptuamath.com/app/tool/place-fractions-on-a-number-line>

## GENERAL

### Fractioncity

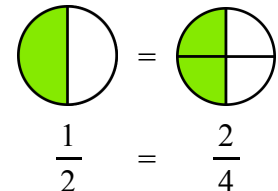
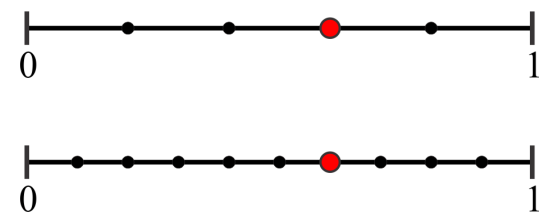
Children learn about comparing fractions, equivalent fractions, and addition of fractions while they drive toy cars on the “fraction streets”. This is not an online activity but a craft-type activity.

<http://www.teachnet.com/lesson/math/fractioncity.html>

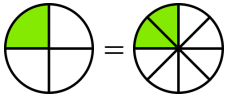



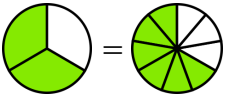



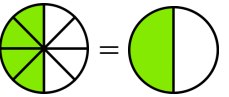

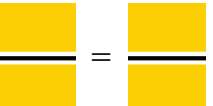

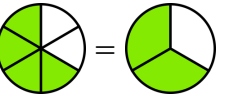

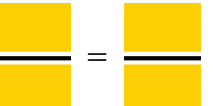









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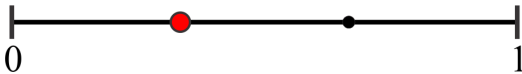
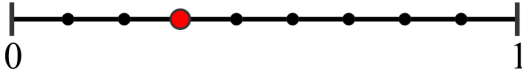


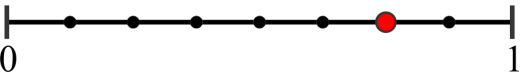
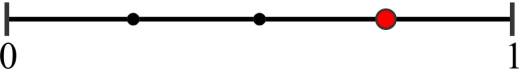


# Equivalent Fractions

<p>If you eat half of a pizza or <math>\frac{2}{4}</math> of a pizza you have eaten the same amount. The two fractions are <b>equivalent</b>.</p> <p>We can write an equal sign between them: <math>\frac{1}{2} = \frac{2}{4}</math>.</p>	
<p>The dot for <math>\frac{3}{5}</math> is in the same place on the number line as the dot for <math>\frac{6}{10}</math>. Again, the two fractions are equivalent. We can write <math>\frac{3}{5} = \frac{6}{10}</math>.</p>	

1. Write the equivalent fractions.

 =  <b>a.</b>  = 	 =  <b>b.</b>  = 	 =  <b>c.</b>  = 	 =  <b>d.</b>  = 
<b>e.</b>  =   	<b>f.</b>  =   		

2. Write the equivalent fractions.

  <b>a.</b>  = 	  <b>b.</b>  = 
---	---

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

= <b>a.</b> $\frac{1}{4} =$	= <b>b.</b> $\frac{1}{2} =$	= <b>c.</b> $\frac{6}{8} =$	= <b>d.</b> $\frac{2}{3} =$
<b>e.</b> $\frac{1}{3} =$ 	<b>f.</b> $\frac{8}{12} =$ 		















4. Mark the equivalent fractions on the number lines.

  <b>a.</b> $\frac{3}{4} = \frac{6}{8}$	  <b>b.</b> $\frac{3}{9} = \frac{1}{3}$
  <b>c.</b> $\frac{3}{6} =$	  <b>d.</b> $\frac{2}{6} =$

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

  <b>a.</b> $\frac{2}{4} = \frac{1}{2}$	  <b>b.</b> $\frac{2}{3} = \frac{4}{6}$
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6. Color and write many fractions that are equivalent to the first fraction.

<p>a. </p> <p></p> <p></p> <p></p>	<p><math>\frac{1}{3}</math></p> <p></p> <p></p> <p></p>	<p>b. </p> <p></p> <p></p> <p></p>	<p><math>\frac{1}{4}</math></p> <p></p> <p></p> <p></p>
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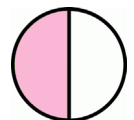
7. Four children have a chocolate bar to share. Cassy says, “Let’s divide it into four equal pieces, and everybody gets one piece.” Hannah says, “No, let’s divide it into twelve equal pieces and everybody gets three pieces.”



Whose idea lets everybody get a fair share?

8. Draw a picture to show that  $\frac{1}{2} = \frac{4}{8}$ .

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  $\frac{5}{5}$  and  $\frac{4}{4}$  equivalent fractions?  
Why or why not?

<p><b>Puzzle Corner</b></p>	<p>Which is longer, a line that is <math>3\frac{1}{2}</math> inches long or a line that is <math>3\frac{1}{4}</math> inches long? How much longer is it?</p>
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