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# Math Mammoth Introduction to Fractions

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# Introduction

*Math Mammoth Introduction to Fractions* contains lessons for fraction arithmetic for grades 1-4, following the Common Core Standards. This material does not include division or multiplication of fractions, nor adding unlike fractions, which are topics for 5th and 6th grades. Also, most of the material here is for 3rd and 4th grades, and only a few lessons are meant for grades 1-2.

The topics covered are on a simple level, constantly illustrated with visual models, and with small denominators. The presentation avoids spelling out specific rules for manipulating fractions, but instead relies on the usage of pictures on a very concrete level. Children easily confuse the various rules for fraction arithmetic, because there are so many. There is a place for the rules, as *shortcuts* for ideas that are already understood, but we do not start with them. The goal is to let the big ideas sink in conceptually first, followed by some shortcuts.

The topics covered are

- one half and one fourth
- concept of a fraction
- concept of a mixed number
- comparing fractions
- equivalent fractions
- adding and subtracting like fractions
- adding and subtracting mixed numbers with like fractional parts
- adding one fraction that has tenths and another that has hundredths (such as  $3/10 + 7/100$ )
- multiplying a fraction by a whole number

The lessons are organized by topic, not by increasing difficulty. For reference, in 1st grade, students only study the concept of one half and one fourth. In 2nd grade, they study the concept of a fraction and optionally the easiest (first) lesson on comparing fractions. In 3rd grade, according to the Common Core Standards, students study the concept of a fraction, fractions on a number line, comparing fractions, and equivalent fractions. And in 4th, they study mixed numbers, comparing fractions, equivalent fractions, adding and subtracting fractions and mixed numbers, and multiplying fractions by whole numbers.

*The answers are at the back of the book.*

*I wish you success in your math teaching!*

*Maria Miller, the author*

# Helpful Resources on the Internet

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

## *General*

### **Visual Fractions**

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

<http://www.visualfractions.com/>

### **Conceptua Math Fraction Tools**

Free and interactive fraction tools for identifying fractions, adding and subtracting, estimating, comparing, equivalent fractions, finding common denominators and more. Each activity uses several fraction models such as fraction circles, horizontal and vertical bars, number lines, etc. that allow students to develop conceptual understanding of fractions. Free registration required.

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

### **Fraction Games at Sheppard Software**

Games for addition and subtraction of fractions, simplifying fractions, equivalent fractions, and a fraction of a set.

<http://www.sheppardsoftware.com/math.htm#fractions>

### **Who Wants pizza?**

This site explains the concept of fraction, addition, and multiplication with a pizza example, then has some interactive exercises.

<http://math.rice.edu/~lanius/fractions/index.html>

### **Fractioncity**

Make “fraction streets” and help children with comparing fractions, equivalent fractions, addition of fractions of like and unlike denominators while they drive toy cars on the streets. This is not an online activity but has instructions of how to do it at home or at school.

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

### **Fraction Worksheets: Equivalent Fractions, Simplifying, Convert to Mixed Numbers**

Create custom-made worksheets for some other fraction operations.

<http://www.homeschoolmath.net/worksheets/fraction-b.php>

## *Fractions and mixed numbers*

### **Identifying Fractions at Conceptua Fractions**

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

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

### **Visualizing Fractions**

The computer shows a fraction, and you divide the pie and color the pieces.

[http://nlvm.usu.edu/en/nav/frames\\_asid\\_103\\_g\\_2\\_t\\_1.html](http://nlvm.usu.edu/en/nav/frames_asid_103_g_2_t_1.html)

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

### **Pattern Blocks—Parts as Wholes**

Click on the “Activities” in the top menu, and click on arrows until you find Parts as Wholes activity.

[http://nlvm.usu.edu/en/nav/frames\\_asid\\_170\\_g\\_2\\_t\\_3.html](http://nlvm.usu.edu/en/nav/frames_asid_170_g_2_t_3.html)

### **Fraction Model**

Adjust the numerator and the denominator, and the applet shows the fraction as a pie/rectangle/set model, as a decimal and as a percent.

<http://illuminations.nctm.org/ActivityDetail.aspx?ID=44>

### **Clara Fraction's Ice Cream Shop**

Convert improper fractions to mixed numbers and scoop the right amount of ice cream flavors onto the cone.

<http://www.mrnussbaum.com/icecream/index.html>

### *Addition and subtraction*

#### **MathSplat**

Click on the right answer to addition problems or the bug splats on your windshield!

<http://fen.com/studentactivities/MathSplat/mathsplat.htm>

#### **Action Fraction**

A racing game with several levels where you answer questions about adding and subtraction fractions. The levels advance from using like fractions to using unlike fractions and eventually subtraction.

[http://funschool.kaboose.com/formula-fusion/number-fun/games/game\\_action\\_fraction.html](http://funschool.kaboose.com/formula-fusion/number-fun/games/game_action_fraction.html)

#### **Fraction Worksheets: Addition and Subtraction**

Create custom-made worksheets for the four operations with fractions and mixed numbers. Choose “Like Fractions” for this level.

<http://www.homeschoolmath.net/worksheets/fraction.php>

### *Comparing Fractions*

#### **Comparison Shoot Out**

Choose level 2 or 3 to compare fractions and shoot the soccer ball to the goal.

<http://www.fuelthebrain.com/Game/play.php?ID=47>

#### **Comparing Fractions—XP Math**

Simple timed practice with comparing two fractions.

<http://xpmath.com/forums/arcade.php?do=play&gameid=8>

#### **Ordering Fractions at Conceptua Fractions**

An interactive tool where students place numbers, visual models, and decimals on a number line.

<http://www.conceptuamath.com/fractions.html#OrderingFractions>

#### **Fractional Hi Lo**

The computer has selected a fraction. You guess and it tells you if your guess was too high or too low.

<http://www.theproblemsite.com/games/hilo.asp>

## *Equivalent fractions*

### **Equivalent Fractions from National Library of Virtual Manipulatives (NLVM)**

See the equivalency of two fractions as the applet divides the whole into more pieces.

[http://nlvm.usu.edu/en/nav/frames\\_asid\\_105\\_g\\_2\\_t\\_1.html](http://nlvm.usu.edu/en/nav/frames_asid_105_g_2_t_1.html)

### **Equivalent Fractions**

Draw two other equivalent fractions for the given fraction. Choose either a square or a circle for the shape.

<http://illuminations.nctm.org/ActivityDetail.aspx?ID=80>

### **Fraction Frenzy**

Click on pairs of equivalent fractions, as fast as you can. See how many levels you can get!

<http://www.learningplanet.com/sam/ff/index.asp>

### **Fresh Baked Fractions**

Practice equivalent fractions by clicking on a fraction that is not equal to others.

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

### **Free Equivalent Fractions Worksheets**

Create custom-made worksheets for equivalent fractions that can either include pie images or not.

[http://www.homeschoolmath.net/worksheets/equivalent\\_fractions.php](http://www.homeschoolmath.net/worksheets/equivalent_fractions.php)