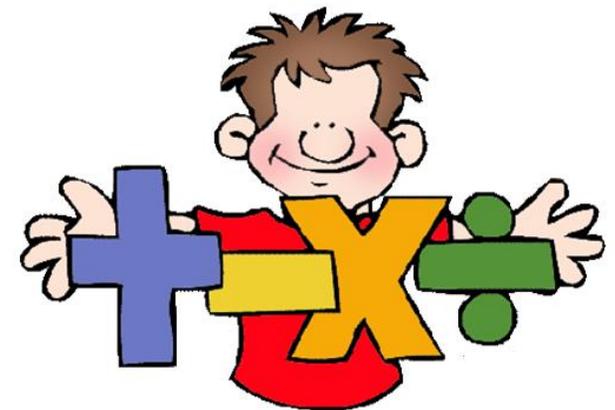


# Parent Math Strategy Guide

## Grade 4

### Multiplication & Division Working with Fractions



## Cobb County Schools

Students in fourth grade are encouraged to see the relationship between multiplication and division. Their task is to make sense of division and have a real understanding of the concept, thereby preparing for more complicated strategies in subsequent grades. One strategy that supports this is *multiplying up*.

$$\begin{array}{l}
 624 \div 6 \\
 6 \times 40 = 240 \\
 6 \times 40 = 240 \\
 \hline
 480 \\
 6 \times 20 = 120 \\
 \hline
 600 \\
 6 \times 4 = 24 \\
 \hline
 624 \\
 \hline
 104 \quad 624 \\
 \hline
 \text{Ans: } 624 \div 6 = 104
 \end{array}$$

This student has used the *multiplying up* strategy to find the solution to  $624 \div 6$ .

One strategy, *partial quotients*, began in grade 3 and continues in grade 4 with larger numbers.

Students are exposed to various strategies to ensure a good foundation in number sense.

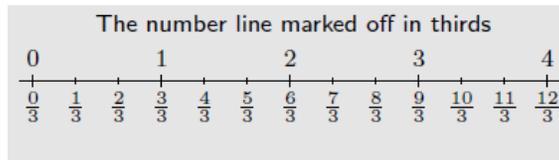
$$\begin{array}{r}
 6 \overline{)624} \\
 \underline{-240} \quad 40 \\
 384 \\
 \underline{-240} \quad 40 \\
 144 \\
 \underline{-120} \quad 20 \\
 24 \\
 \underline{-24} \quad 4 \\
 0
 \end{array}$$

A fourth grader has to understand the unit fraction and be able to apply this understanding to addition and subtraction of fractions.

$$\frac{5}{8} = \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8}$$

OR  $\frac{2}{8} + \frac{3}{8}$  etc...

Students need to see fractions on a number line and apply this knowledge to different situations.



A fourth grader should develop an understanding of a fraction as a number.

Understanding fraction equivalence is very important in grade 4. Students need to understand how an equivalent fraction is obtained.  $\frac{2}{3} = \frac{8}{12}$



The whole is the square, measured by area. The left drawing is divided into 3 rectangles of equal area, and the shaded region is 2 of the 3 equal pieces. The right drawing is divided into 3 x 4 small rectangles of equal area, and the shaded area comprises 2 x 4 of these and so it represents  $\underline{2} \times 4 = \underline{8}$ .  
3 x 4 12

**Grade 4 expectations when working with fractions are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.**

# Math



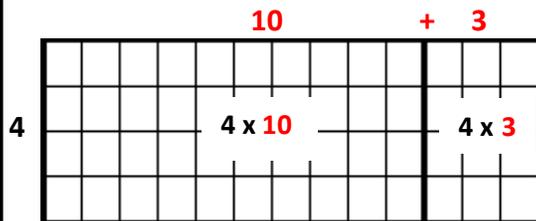
By the time students reach 4<sup>th</sup> grade, they have mastered addition and subtraction strategies. Students now understand the standard algorithm for addition and subtraction and are able to apply it fluently to solve real-world problems.

Fourth graders come to this grade level knowing multiplication facts from memory. Students can use strategies to help them with these facts:

$8 \times 9$  could be seen as

$$\begin{array}{l} 8 \times 10 = 80 \\ 80 - 8 = 72 \end{array} \quad \text{OR} \quad \begin{array}{l} 8 \times 5 = 40 \\ 8 \times 4 = 32 \\ 72 \end{array}$$

A fourth grade student is familiar with building simple multiplication problems using base ten blocks. This drawing shows the problem  $4 \times 13$ .



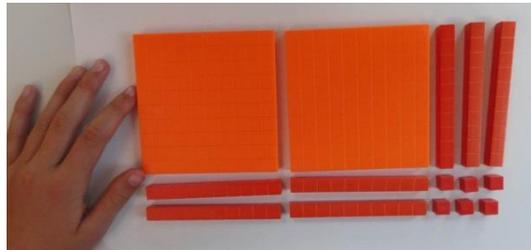
Students investigated working with the distributive property in grade 3.

$$(4 \times 10) + (4 \times 3) \\ 40 + 12 = 52$$

A strategy that helps students multiply numbers mentally is *doubling and halving*.

Here the student halves one number and multiplies the other number by two to get a friendly number that is easy to work with mentally.

Students now begin to work with the *area model of multiplication* using 2-digit x 2-digit numbers.



Here a student has built a  $12 \times 23$  area model that shows the product 276.

Once again, the distributive property (based on the model) helps students understand multiplication.

$$\begin{array}{l} 12 \times 23 = 276 \\ (10 + 2) \times (20 + 3) \\ (10 \times 20) + (2 \times 20) + (10 \times 3) + (2 \times 3) \\ 200 + 40 + 30 + 6 = 276 \end{array}$$

Once students have understood the models and can apply the distributive property to these multiplication problems, they move to *partial products*.

	40	9	
20	800	180	
6	240	54	

Students draw models and calculate the product.

$$\begin{array}{r} 49 \\ \times 26 \\ \hline 800 \\ 240 \\ 180 \\ + 54 \\ \hline 1274 \end{array}$$

Fourth graders explore division by finding whole number quotients and remainders using strategies based on place value and the properties of operations. A strategy based on place value that is used to assist students with understanding division is *explicit trades*.

In this example, the student had to trade 2 tens for 20 ones. This should be clearly explained using place value language.