

Multiplication and Division

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. This prepares them for more complicated strategies in subsequent grades. One strategy that supports this understanding is *multiplying up*.

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

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

Partial Quotients

One strategy, *partial quotients*, begun in Grade 3 continues in Grade 4 with larger numbers.

Students are exposed to various strategies to ensure a good foundation is laid as students move into the middle grades.

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

Unit Fractions

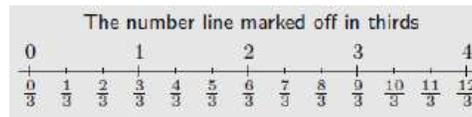
A fourth grader has to understand the unit fraction and be able to apply this understanding to addition and subtraction of fractions.

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

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

Fractions and the Number Line

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



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

Equivalent Fractions

Understanding fraction equivalence is very important in Grade 4. Students need to understand how an equivalent fraction is obtained.

In the diagram, each whole is the square, measured by area. The top figure shows the whole divided horizontally into 3 rectangles of equal area. Two of these rectangles are shaded, so the figure represents $\frac{2}{3}$. The bottom figure is divided into 4×3 small rectangles of equal area.



$$\frac{2}{3} = \frac{8}{12}$$

The shaded area comprises 4×2 of these rectangles, so the diagram represents $\frac{4 \times 2}{4 \times 3}$ or $\frac{8}{12}$.

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

Parent Roadmap



Grade 4 Math

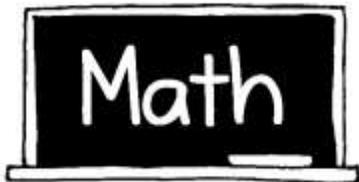
Key Concepts

- Multiplication and Division
- Working with Fractions



COWETA COUNTY
SCHOOL SYSTEM

Adapted from Cobb County Schools



By the time students reach fourth 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.

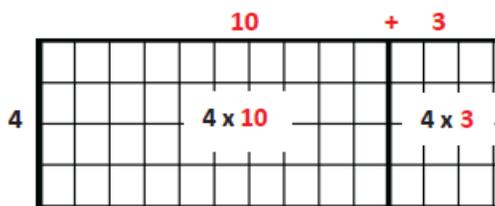
Multiplication Strategies

Students come to fourth grade knowing multiplication facts from memory. Students can use strategies to help them with these facts.

8×9 could be seen as

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

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

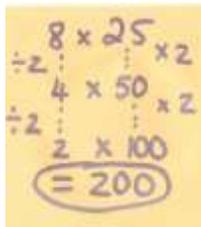


Students investigated working with the distributive property in Grade 3.

$$\begin{array}{l} 4 \times 13 = 72 \\ (4 \times 10) + (4 \times 3) \end{array}$$

Mental Multiplication Strategies

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.

Area Model of Multiplication

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



Here a student has built a 12×23 area model that shows the product 276.

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

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

Partial Products

Once students understand 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.

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

Division with Place Value, Properties

Fourth graders explore division by finding whole number quotients and remainders using strategies based on place value and 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.

