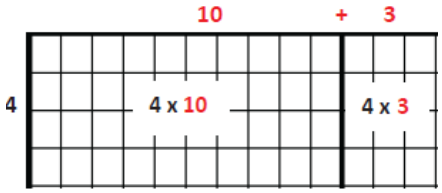
By the <u>end</u> third grade, all students should know, from memory, all products of two 1-digit numbers.

Area Model of Multiplication

Students move to building larger arrays also called the *area model of multiplication*. A student has shaded an array, 3 × 22, on the grid paper below.

Third graders progress to diagrams that explain the area model of multiplication with larger numbers.



Familiarity with the area model above allows students to move to working with partial products.

4 x 13
(4 x 10) + (4 x 3)
40 + 12 = 52

Equal Shares

Third graders begin division by sharing.

Three students need to share 12 trapezoids equally.

Repeated Subtraction

The most important division concept is the understanding of equal shares.

20 ÷ 5

Students explore division using strategies. One such strategy involves *repeated subtraction.*

20
− 5
15
− 5
10
− 5
5
− 5
0

Multiplying Up

This third grader has used the *multiplying up* strategy. This involves finding the solution to a division problem through multiplication.

45 ÷ 3
3 x 10 = 30
3 x 5 = 15
30 + 15 = 45

10 + 5 = 15 so 3 x 15 = 45

Partial Quotients

Another strategy a third grader may use is the *partial quotient* strategy.

3 ⟌ 45	
− 30	10
15	
− 15	5
0	

Parent Roadmap

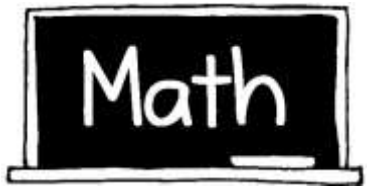
Grade 3 Math

Key Concepts

- Strategies for addition and subtraction
- Strategies for multiplication and division

COWETA COUNTY SCHOOL SYSTEM

Adapted from Cobb County Schools



Addition and Subtraction Strategies

Partial Sums

248 + 345 =
500 + 80 + 13
500 + 80 = 580
580 + 13 = 593

```
  248
+ 345
  500
   80
+  13
  593
```

In the example above, two students used the *partial sums* strategy and recorded their thinking in two different ways. Breaking apart the numbers helps make it easier to compute.

Compensation

```
  −3    +3
326 + 247 =
323 + 250 = 573
```

This example shows how a student could use *compensation* to solve an addition problem.

Expanded Form

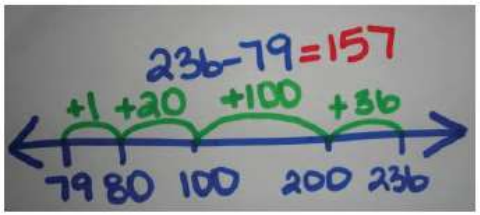
Third graders can also use the strategy of *expanded notation*. One number is kept whole and the other is broken into expanded form for easy-to-use chunks.

216 + 149 =

216 + (100 + 40 + 4 + 5)
216 + 100 = 316
316 + 40 = 356
356 + 4 = 360
360 + 5 = 365

Open Number Line

236 − 79 =



1 + 20 + 100 + 36 = 157

This third grader used an *open number line* and added up chunks starting at 79 and counting up to 236 in order to subtract. Students are encouraged to use this strategy in a way that makes sense to them.

Friendly Numbers

Students choose to use friendly numbers to make it easier when doing mental computation.

Students may solve a subtraction problem by *keeping a constant difference.*

236 − 79 =

(236 + 1) − (79 + 1) =
237 − 80 = 157

By adding 1 to 236 and making 237, as well as adding 1 to 79 to make 80 (*keeping the difference constant*) this student makes it easier to subtract.

Multiplication and Division Strategies

Repeated Addition

Students have opportunities to show their thinking in multiple ways that make sense to them.

4 x 9

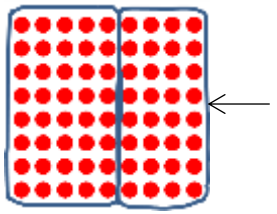
9 + 9 + 9 + 9 = 36

```
9 + 9 = 18          OR      9 + 9 = 18
18 + 9 = 27                 9 + 9 = 18
27 + 9 = 36                 18 + 18 = 36
```

Arrays

Once students understand the concept of repeated addition, they move to understanding how arrays represent multiplication facts.

This grid shows an 8 × 9 array. Students soon recognize that facts can be made up of smaller facts.



Here a student has split 8 × 9 into two arrays: 8 × 5 and 8 × 4. This helps make the computation easier.