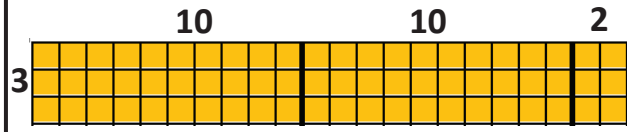
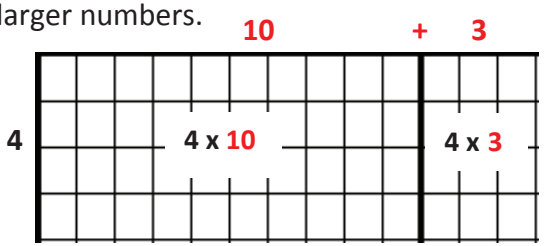
By the <u>end</u> of grade 3 all students should know from memory, all products of two 1-digit numbers.

Students move to building larger arrays (also called the *area model of multiplication*



A student has shaded an array, 3 x 22, on grid paper.

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

Third graders begin division by sharing.

Three students need to share 12 trapezoids equally.

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

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

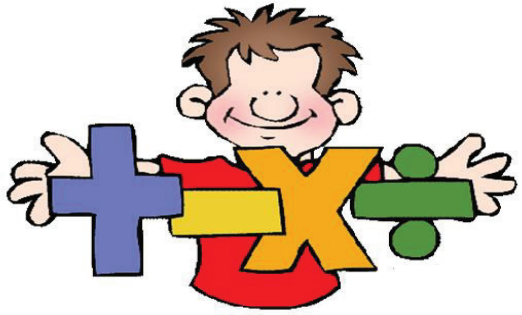
10 + 5 = 15 so 3 x 15 = 45

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

3 | 45	
– 30	10
15	
– 15	5
0	

Parent Roadmap

Grade 3



Cobb County Schools

Strategies for addition, subtraction, multiplication and division

Math

Addition and Subtraction Strategies

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

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

Here, 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.

– 3 + 3
326 + 247 =
323 + 250 = 573

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

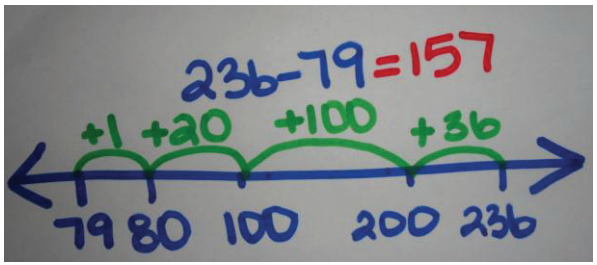
Third graders can also use the strategy *adding up in chunks.*

216 + 149 =

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

One number is kept whole and the second number is broken into easy-to-use chunks.

236 – 79 =



1 + 20 + 100 + 36 = 157

This third grader used an *open number line* and added up in 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.

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

4 x 9

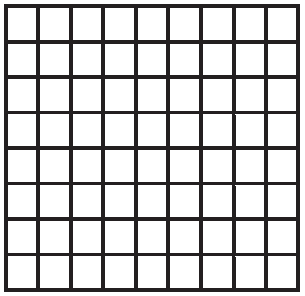
9 + 9 + 9 + 9 = 36

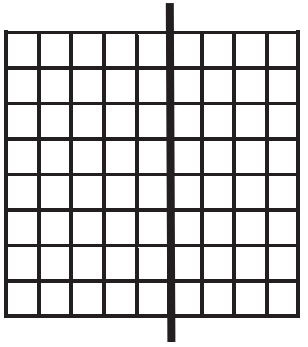
9 + 9 = 18	**OR**	**9 + 9 = 18**
18 + 9 = 27		**9 + 9 = 18**
27 + 9 = 36		**18 + 18 = 36**

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

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

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





Here a student has split 8 x 9 into two arrays, namely; 8 x 5 and 8 x 4. This helps to make the computation easier.