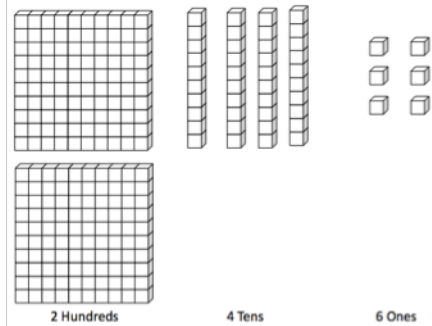## Working with Base Ten

Computation in 2nd grade is grounded in place value. Students need to understand what the digits in a number represent.


2 Hundreds   4 Tens   6 Ones

The image above shows 246 as 2 hundreds, 4 tens, and 6 ones. We must understand that numbers can be taken apart in different ways to use them efficiently. Some other ways to think about 246 include:

- 2 hundreds, 4 tens, and 6 ones (200 + 40 + 6)
- 23 tens and 16 ones (230 + 16)
- 22 tens and 26 ones (220 + 26)
- 1 hundreds, 14 tens, and 6 ones (100 + 140 + 6)

Addition with Base Ten Blocks

We use base ten blocks when beginning to learn addition. Students may progress to drawing pictures of these blocks with sticks and dots. Later, students work with numbers only. Each picture below shows 125 + 36.
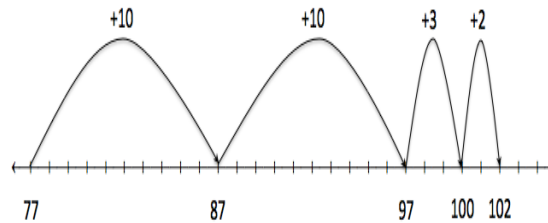
125 →
36 →
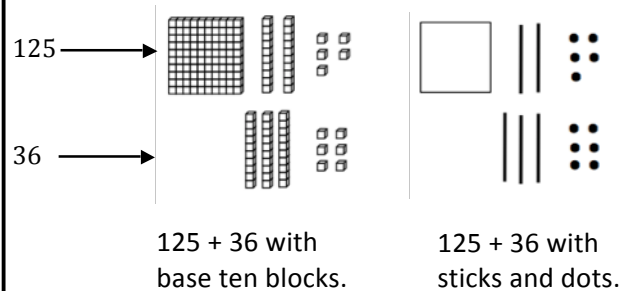
125 + 36 with base ten blocks.   125 + 36 with sticks and dots.

Addition with Number Lines

Number lines are useful for adding numbers. Students use them as they transition away from blocks. Numbers can be broken apart and added in different ways. The number line below shows one way to add 77 + 25.

+10   +10   +3   +2

77   87   97   100 102

Addition with Partial Sums

We can break apart addends by place value and then add the parts. This gives us partial sums that we can add back together at the end.

Consider 248 + 345

$$248 \quad = \quad 200 + 40 + 8$$
$$\underline{+\ 345 \quad = \quad 300 + 40 + 5}$$
$$500 + 80 + 13$$
$$500 + 93$$
$$593$$

Partial sums is a strategy many people use to add numbers mentally.

Addition: Adjusting

Sometimes, it makes sense to give a value from one addend to the other for a "more friendly" problem.
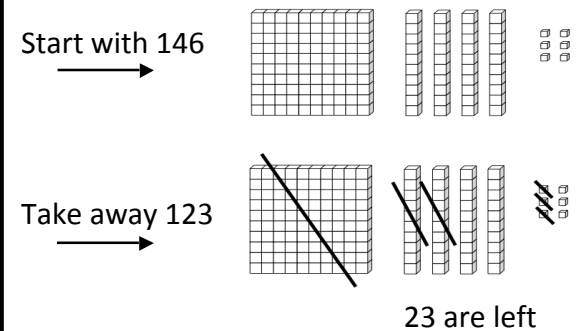
Consider 28 + 37	Consider 49 + 27
28 + 37 = 65	49 + 27 = 76
+2 -2	+1 -1
30 + 35 = 65	50 + 26 = 76

Subtraction with Base Ten Blocks

We begin with the total amount when subtracting with base ten blocks. Consider 146 – 123. We begin with 146. We take away or cross off 123. We are left with 23. So, 146 – 123 = 23.

Start with 146 →

Take away 123 →

23 are left

Subtraction: Partial Differences

Sometimes, it is more efficient to break apart a number and subtract the parts.

Consider 436 - 128

We might break 128 into (**100 + 20 + 8**).

436 – **100** = 336   So, 436 – 128 = 308
336 – **20** = 316
316 – **8** = 308.

Consider 847 - 637

We don't have to use place value.
We might break 637 into (**600 + 37**).

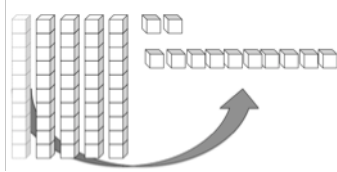847 – **600** = 247
247 – **37** = 210   So, 847 – 637 = 210

Subtraction: Regrouping

Sometimes a problem requires a group of ten to be regrouped so that ones can be taken away. Consider 52 - 28

This is 52. There aren't enough ones to take away.

This is 52 after regrouping 1 ten to make 4 tens and 12 ones.

Now, we can take away 8 ones from 12 ones.

Subtraction: Adjusting

We can use "friendlier numbers" to solve problems. 500 – 239 can be challenging to regroup. But the difference between these numbers is the same as the difference between 499 – 238. Now, we don't need to regroup.

(Original problem)	**500**	-	**239 =**
(Compensation)	- 1		- 1
	499	-	238 = 261

Subtraction: Unknown Addend or Think Addition

Many people think of subtraction as unknown addition problems. Instead of finding the difference, they think about what the missing addend is. Consider the problem below.
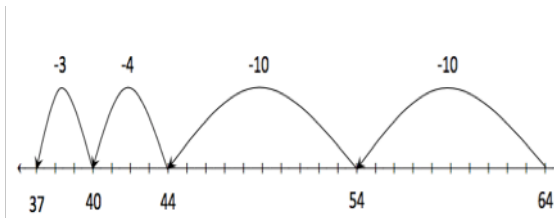
(Original problem) **347 – 249 = ?**

(Think Addition) "249 plus what number equals 347?" **249 + ? = 347**
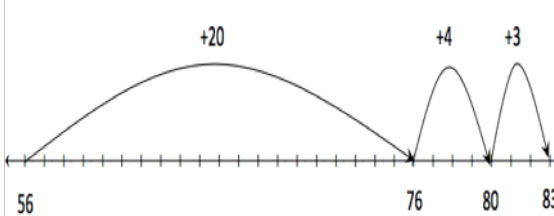
Subtraction: Number Line

Counting Back on the Number Line:
Consider **64 – 27**. We can start at 64 and count back using friendly numbers. After counting back 27, we land on 37. So, 64-27 = 37.

Counting Up on the Number Line:
Consider **83 – 56**. Another strategy is to find the difference by counting up. To do this, start with 56 and count up to 83. We can add 20, add 4, and add 3 (27).
So, 83 – 56 = 27.

Using an Open Number Line:
Students begin to work with open or empty number lines as they become more comfortable with numbers and number lines. These number lines do not have individual tick marks. Consider 184 – 139 = 45.
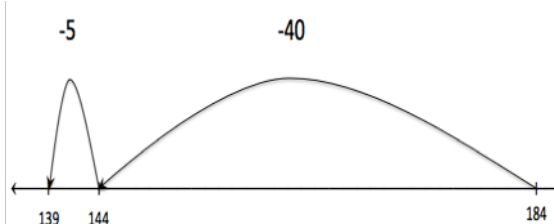
Developing Computational Fluency

Grade 2

Elementary Mathematics Office
Howard County Public School System

This brochure highlights some of the methods for developing computational fluency. For more information about computation and elementary mathematics visit http://smart.wikispaces.hcpss.org