

Addition and Subtraction Within 1,000 with Word Problems to 100

In this module, students build upon all their previous work with place value. They extend their work with addition and subtraction algorithms to numbers up to 1,000. Students continue to use drawings and models to strengthen and deepen their conceptual understanding. They also continue to work with various types of word problems with numbers up to 100.

Strategy Example: the arrow way of showing $570 - 110$. Notice that the solution builds on an easier problem first: $570 - 100$. Then, students can complete the problem by subtracting 10 more. (See reverse for more on the arrow way.)

$$\begin{array}{l} 570 \xrightarrow{-100} 470 \\ 570 \xrightarrow{-100} 470 \xrightarrow{-10} 460 \end{array}$$

First I subtracted 100. Then I subtracted 10.

Strategy Example: In this example of compensation, the subtraction problem $514 - 290$ is made much simpler by adding 10 to both numbers before solving:

$$\begin{array}{r} 514 \\ -290 \\ \hline \end{array}$$

$514 - 290$

$$\begin{array}{r} +10 \quad 514 \\ +10 \quad -290 \\ \hline 524 - 300 \end{array}$$

What Came Before this

Module: Students worked on fluency in adding and subtracting to 100 and built conceptual understanding for operations on numbers up to 200.

What Comes After this

Module: In Module 6, students begin to examine the foundations of multiplication and division. They learn about equal groups, arrays, and the idea that numbers other than 1, 10, and 100 can be units/groups.

New Terms in this Module:

Algorithm: a step-by-step procedure to solve a particular type of problem

Compensation: a simplifying strategy where students add or subtract the same amount to or from both numbers to create an equivalent but easier problem, e.g., $610 - 290 = 620 - 300 = 320$

Compose: to make 1 larger unit from 10 smaller units

Decompose: to break 1 larger unit into 10 smaller units

New groups below: show newly composed units on the line below the appropriate place in the addition algorithm

Simplifying strategy: e.g., to solve $299 + 6$, think $299 + 1 + 5 = 300 + 5 = 305$

Familiar Terms:

| | |
|-------------------------------|--------------|
| Addend | Addition |
| Bundle | Difference |
| Equation | Number bond |
| Place value | Rename |
| Subtraction | Tape diagram |
| Total | Unbundle |
| Units of ones, tens, hundreds | |

+ How You Can Help at Home:

- Help your student practice counting both backward and forward by 10s and 100s.
- Given any two- or three-digit number, help your student practice finding 10 more or 10 less, and/or 100 more or 100 less than the number.

Key Common Core Standards:

- Use place value understanding and properties of operations to add and subtract.
 - Add and subtract within 1000, using concrete models or drawings and strategies.
 - Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900.
 - Explain why addition and subtraction strategies work, using place value and the properties of operations.

$$590 \xrightarrow{+10} 600 \xrightarrow{+30} 630 \xrightarrow{+200} 830$$

This is an example of how one might add $590 + 240$ using the arrow way. Notice that 240 has been decomposed, or chunked, into $10 + 30 + 200$ in order to make the adding easier.

$$\begin{array}{r} 780 - 390 \\ 780 \xrightarrow{-300} 480 \xrightarrow{-80} 400 \xrightarrow{-10} 390 \end{array}$$

This is a simple subtraction example of $780 - 390$. In this case, 390 has been decomposed into 300, 80, and 10.

Spotlight on Math Strategies:

The Arrow Way

Students will frequently use this strategy in this module of *A Story of Units*.

The *arrow way* is a strategy for both addition and subtraction that is heavily featured in this module.

At first glance, arrow notation, or the *arrow way* of doing mathematical operations, may seem complicated. However, it is a very helpful method, and it is actually very similar to what many of us have naturally learned to do mentally while adding and subtracting.

The arrow way involves chunking a number into more manageable mental pieces in order to add or subtract. Students use numbers that they have become confident working with, such as 100 and 10, in order to simplify the problem. They record their mathematical thinking as an expression with arrows in between the numbers to show the chunks of numbers that they are working with as they go.

This method is just one of several that students will be encouraged to use throughout this module. By employing various models and strategies, students deepen their facility with the mathematics they are learning and eventually build a tool kit of strategies to choose from as math becomes more complex throughout the elementary grades.

Sample Problem from Module 5:
(Example taken from Module 5, Lesson 9)

The table to the right represents the halftime score at a basketball game.

| | |
|-------------|-----------|
| Red Team | 63 points |
| Yellow Team | 71 points |

The red team scored 19 points in the second half.

The yellow team scored 13 points in the second half.

- Who won the game?
- By how much did that team win?

This problem gives students many options for solving. They can choose from the strategies they have learned in this module to do the addition and subtraction necessary to solve the problem.