Getting Ready to Teach Unit 4

Math Expressions VOCABULARY

As you teach this unit, emphasize understanding of these terms.

- 10-group
- 10-stick
- teen number
- decade number

See the Teacher Glossary.

Learning Path in the Common Core Standards

This unit builds on the work with teen numbers that began in Kindergarten. Children explore tens and ones using physical groupings and math drawings. Activities provide repeated experience in building 2-digit numbers with strong visual support. Children extend these place value concepts to adding with 1- and 2-digit numbers.

Help Children Avoid Common Errors

Math Expressions gives children opportunities to analyze and correct errors, explaining why the reasoning was flawed.

In this unit we use Puzzled Penguin to show typical errors that children make. Children enjoy teaching Puzzled Penguin the correct way, why this way is correct, and why Puzzled Penguin made an error. Common errors are presented in the Puzzled Penguin feature in the following lessons:

- **Lesson 4:** Correctly breaks apart a number to make a ten, but then adds the same part to 10 instead of the remaining part
- **Lesson 12:** Compares the ones before comparing the tens
- **Lesson 14:** Incorrectly adds tens instead of ones

In addition to Puzzled Penguin, there are other suggestions listed in the Teacher Edition to help you watch for situations that may lead to common errors. As a part of the Unit Test Teacher Edition pages, you will find a common error and prescription listed for each test item.

Decade Numbers

Lesson 1

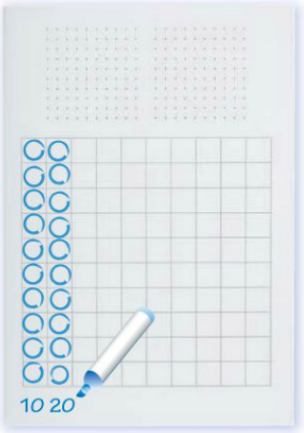
Using the MathBoard One of the first steps in mastering numbers to 100 involves learning the names of the decade numbers and making the association between these words and the corresponding tens they represent.

(10, 20, 30, . . .)

(1 ten, 2 tens, 3 tens, . . .)

With this knowledge, children are soon able to add tens mentally (30 + 40 = 3 tens + 4 tens). These skills are introduced and practiced with a number of physical supports.

Special configurations on the MathBoard, such as the Dot Array and the 10 × 10 Grid shown here, serve as concrete supports for counting by tens.

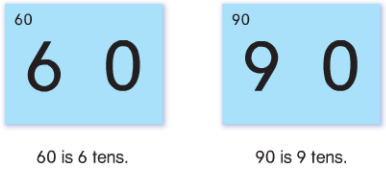


Using Their Fingers During the daily Quick Practice routines, children flash fingers as they practice counting to 100 by tens. Later in the unit, they will use number flashes to show a number with both tens and ones (34 = 3 tens and 4 ones).

from THE PROGRESSIONS FOR THE COMMON CORE STATE STANDARDS ON NUMBER AND OPERATIONS IN BASE TEN

Base-Ten Units Each place of a base-ten numeral represents a base-ten unit: ones, tens, tenths, hundreds, hundredths, etc. The digit in the ones place represents 0 to 9 of those units. Because ten like units make a unit of the next highest value, only ten digits are needed to represent any quantity in base ten. The basic unit is a one (represented by the rightmost place for whole numbers). In learning about whole numbers, children learn that ten ones compose a new kind of unit called a ten. They understand two-digit numbers as composed of tens and ones, and use this understanding in computations, decomposing 1 ten into 10 ones and composing a ten from 10 ones.

Using Secret Code Cards With the help of Demonstration Secret Code Cards, children practice saying and visualizing decade numbers in random order. The cards help children make the connection between these groupings and their numeric symbols.



Quick Practice student-led rhyming activities help children build fluency with adding a ten when decade numbers are given out of sequence. Other activities build fluency with numbers before and after these groups of ten.

40 lions in a den. Add a ten. (50)
70 lions in a den. Add a ten. (80)
39 tigers at the door. Here's one more. (40)
90 tigers in a line. With 1 less, there's 89.

Tens and Ones

Lessons

2 3 7 8 9 11 17 18

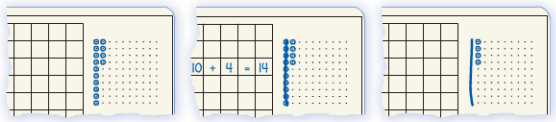
Teen Numbers After learning the decade numbers, children begin building an integrated concept of tens and ones starting with teen numbers. Integrating tens and ones into 2-digit numbers represents an enormous conceptual advance over simply counting by tens, and this skill takes practice. In Unit 4, practice is provided in a variety of ways as children repeatedly link tens groupings to concrete quantities, number words, and written numbers. In this way, they begin to construct the complex web of meanings and symbols that make up 2-digit numbers.

from THE PROGRESSIONS FOR THE COMMON CORE STATE STANDARDS ON NUMBER AND OPERATIONS IN BASE TEN

Teen Numbers Grade 1 students take the important step of viewing ten ones as a unit called a "ten." They learn to view the numbers 11 through 19 as composed of 1 ten and some ones. They learn to view the decade numbers 10–90, in written and in spoken form, as 1 ten to 9 tens. More generally, first graders learn that the two digits of a two-digit number represent amounts of tens and ones, e.g., 67 represents 6 tens and 7 ones. The number words continue to require attention.

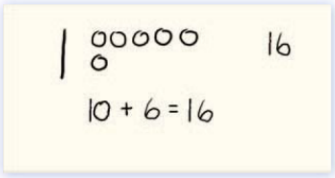
10-Sticks and Circles Children learn to sort 2-digit numbers into tens and ones by drawing sticks (worth 10) and circles (worth 1). This system of representation allows them to visualize the meaning of the numbers and to understand the separate functions of the tens and ones in our number system. The system evolves gradually from the Dot Array on the MathBoard to freehand representations:

Development of 10-Sticks on Dot Array **Freehand**

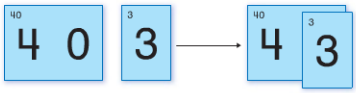


Story Problems In this unit, children solve teen story problems by differentiating tens and ones.

Marco has a bag of 10 marbles and 6 extra marbles. How many marbles does he have?

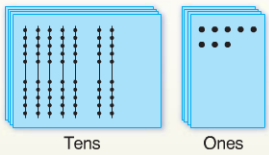


Secret Code Cards A tens card and a ones card are used together to demonstrate the "invisible" zero in the tens place. These cards offer visual reinforcement of place value concepts.

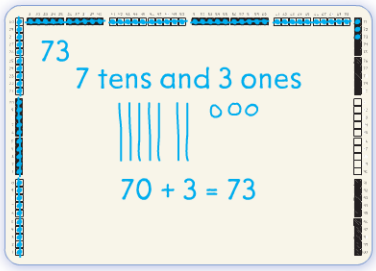


43 = 40 + 3

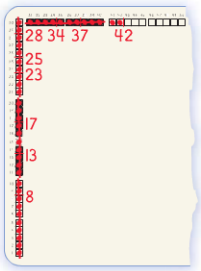
The backs of the Secret Code Cards feature ten-sticks and circles that correspond to the numbers on the front. The back of the 70-card and the back of the 8-card are shown here.



Number Path The numbers to 100 are presented in order and in groups of ten around the edge of the MathBoard. Children draw tens and ones on the Number Path and relate them to the tens and ones they draw freehand.



Math Games *Math Expressions* introduces several games to help children build concepts of tens and ones. In a game called *One Hundred Ants*, children draw numbers to represent ants and keep adding on new ants until they reach 100. The Number Path below shows 37 ants and 5 more just added. Children see that they made a new 10-group, and so they draw a 10-stick through the circles from 31 through 40. This prepares them for the regrouping they will do later.



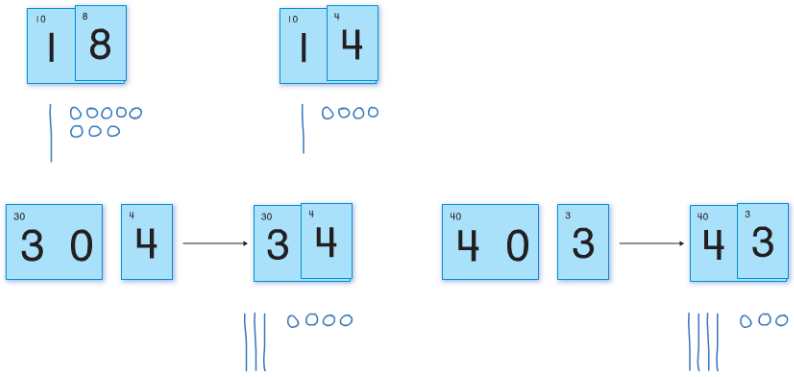
Unseen Numbers Children also solve problems with multiples of 10 in which the tens are unseen. They are represented as boxes, jars, or other containers labeled 10. Because it is not possible to count each object, children must apply ten-structured concepts to find the answer.

Each box has 10 muffins. How many muffins are there?

Comparing Numbers

Lessons 3 12 16

Secret Code Cards These place value cards help children focus on the place value of the numbers. Because they can pull the cards apart and put them together, they can always see the hidden ten. Children use familiar models to compare teen numbers and then 2-digit numbers. Children use tens and ones language to discuss which number is greater and why.



Finally, children write the comparison two ways.

Compare 53 and 54.

53 < 54

54 > 53

from THE PROGRESSIONS FOR THE COMMON CORE STATE STANDARDS ON NUMBER AND OPERATIONS IN BASE TEN

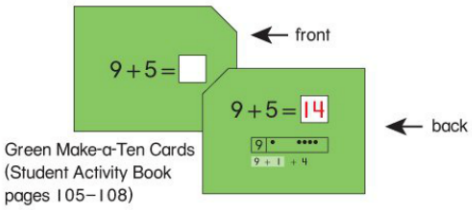
Compare Numbers Grade 1 students use their base-ten work to help them recognize that the digit in the tens place is more important for determining the size of a two-digit number. They use this understanding to compare two two-digit numbers, indicating the result with the symbols >, =, and <. Correctly placing the > and < symbols is a challenge for early learners. Accuracy can improve if students think of putting the wide part of the symbol next to the larger number.

Addition Strategies

Lessons 3 4 5 10

Counting On for Teen Numbers Children learn to solve problems such as 9 + 4 = ☐ using their fingers to count on. Children also solve teen story problems by counting on and then regrouping to emphasize the ten that is contained in the teen number.

Make a Ten for Teen Totals Children use the Green Make-a-Ten Cards to think through making a ten to add.



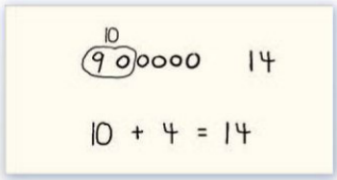
Green Make-a-Ten Cards (Student Activity Book pages 105–108)

Children also solve problems where they model making a ten to solve the problem.

9 alligators swim in the river.

Then 5 more alligators jump into the river.

How many alligators are in the river now?



from THE PROGRESSIONS FOR THE COMMON CORE STATE STANDARDS ON OPERATIONS AND ALGEBRAIC THINKING

Make a Ten

These make-a-ten methods have three prerequisites reaching back to Kindergarten:

a. knowing the partner that makes 10 for any number,

b. knowing all decompositions for any number below 10 so that you can find the partner for the number that makes 10, and

c. knowing all teen numbers as 10 + *n* (e.g., 12 = 10 + 2, 15 = 10 + 5).

Decomposing Numbers

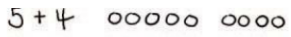
Lessons 6 10 13 14 15 16

Doubles This strategy is based on understanding how to decompose one addend based on the other addend. This is a difficult strategy for young children, but with lots of practice it can help with mentally adding two numbers with a total greater than ten.

4 + 4 = 8	8 + 8 = 16
4 + 5 = 8 + 1 = 9	8 + 7 = 16 – 1 = 15
4 + 6 = 8 + 2 = 10	8 + 6 = 16 – 2 = 14

Adding Tens and Ones In Unit 4, children begin to prepare for multi-digit operations by adding decade numbers and by adding single-digit numbers to decade numbers. These exercises are designed to help children distinguish between tens and ones.

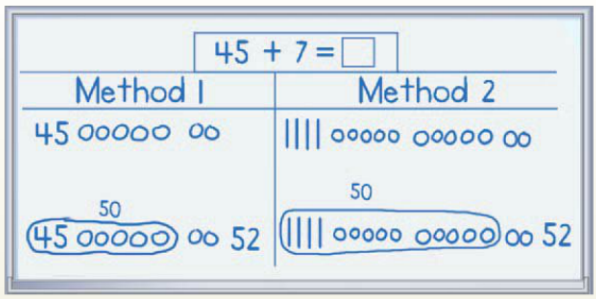
5 + 4



50 + 40

50 + 4

Adding a Two-Digit and One-Digit Number Later in the unit, children add single-digit numbers to any 2-digit number by counting on. Because most of these problems involve creating a new ten group, they help prepare children for later 2-digit addition with grouping.



from THE PROGRESSIONS FOR THE COMMON CORE STATE STANDARDS ON OPERATIONS AND ALGEBRAIC THINKING

Doubles Another Level 3 method that works for certain numbers is a doubles +1 or +2 method: 6 + 7 = 6 + (6 + 1) = (6 + 6) + 1 = 12 + 1 = 13. These methods do not connect with place value the way make-a-ten methods do.