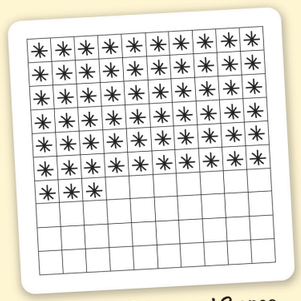
Do The Math®
Created by Marilyn Burns

FROM MARILYN BURNS

Dear Colleague,

Understanding our remarkable place-value system is essential in order for students to learn to add efficiently. I've found that many students are familiar with numbers up to 100—and can even count to 100 and higher—but do not understand the place-value structure of numbers. These lessons provide this necessary foundation by building on students' previous experience with ten-frames and introducing them to a hundred-frame, a 10-by-10 grid.

The activity *Stars in a Minute* then gives students experience with representing quantities up to 100 on the hundred-frame. Students draw stars on the hundred-frame for one minute, and then rely on the visual representation of tens and ones to write the matching numeral. The activity builds students' understanding of our place value system of numeration.



There are 6 tens and 3 ones.
60 + 3 = 63
There are 63 stars.

Also, the captivating children's book *Out for the Count* provides students a clear and compelling context both for representing different quantities on the hundred-frame into tens and ones, and also for adding 10 to any number.

2 tens and 3 ones
20 + 3 = 23 pythons

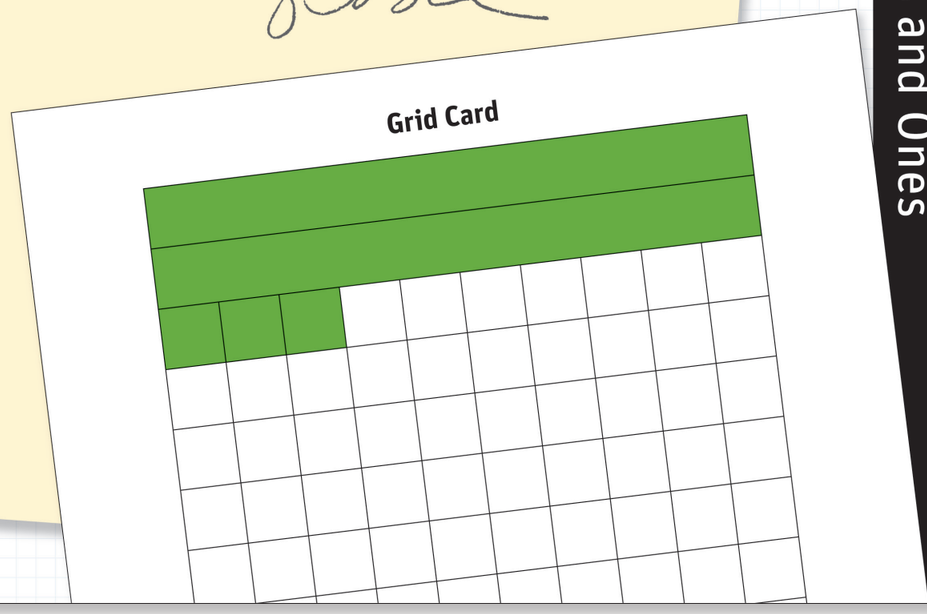
Shifting from the hundred-frame to a hundred-pocket chart connects students' learning to the numerical representations of quantities and to the numerical pattern that adding 10 to any number, for example 33 + 10 = 43, results in increasing the 10s but not the 1s. This pattern later becomes an important addition tool.

Marilyn Burns

> "Understanding our remarkable place-value system is essential in order for students to learn to add efficiently."

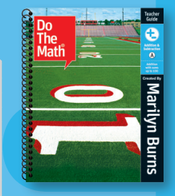
In Lessons 11–15, students...

- Identify pairs of numbers with sums of 10.
- Calculate the sum to 99 for any two or three addends.
- Solve word problems with two addends with sums to 99.
- Write any two-digit number as tens and ones.
- Communicate ideas with key math vocabulary: *add, addition, equation, plus, equals,* and *sum.*



Lessons 11–15

Represent Numbers as Tens and Ones



Addition & Subtraction A: Addition with sums up to 100
Reduced Teacher Guide, pages 48–49

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PLANNER

See pages 10–13 for full lesson.

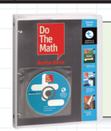
See pages 14-16 for full lesson.

	LESSON 11	LESSON 12		LESSON 13	LESSON 14	LESSON 15
Lesson Summary	Students learn to use a hundred-frame as a tool for counting quantities, counting by tens and adding on the spillovers. Students then write numbers as a number of tens plus a number of ones.	Students show two-digit numbers as tens and ones and write equations for the numbers.		Students use a hundred-frame to add 10 to two-digit numbers, counting to the next ten and then adding the spillover.	Students identify patterns in the numbers on a hundred chart and use the patterns to locate numbers on the chart.	ASSESSMENT ✓Progress Monitoring Students demonstrate understanding of the objectives of Lessons 11–14 by completing *WorkSpace* pages independently.
Objectives Find an alignment to standards at www.scholastic.com/DoTheMath/community	• Write any two-digit number as tens and ones. • Communicate ideas with key math vocabulary: *add, equation, plus,* and *equals.*	• Calculate the sum to 19 for more than two addends. • Write any two-digit number as tens and ones. • Communicate ideas with key math vocabulary: *equation, plus,* and *equals.*		• Calculate the sum to 99 for any two addends. • Write any two-digit number as tens and ones. • Identify pairs of numbers with sums of 10. • Solve word problems with two addends with sums to 99. • Communicate ideas with key math vocabulary: *add, addition, equation, plus, equals,* and *sum.*	• Write any two-digit number as tens and ones.	• Solve word problems with two addends with sums to 99. • Calculate the sum to 99 for any two addends. • Communicate ideas with key math vocabulary: *add, addition, equation, plus,* and *equals.*
Materials T = Teacher Bag S = Student Bag	• ***WorkSpace*** page 18 • **hundred-frame** (magnetic board, grid card, magnetic strips, magnetic squares) T • **clock with second hand**	• ***WorkSpace*** pages 19 and 20 • ***Out for the Count,*** by Kathryn Cave • **ten-frames** S T • **color tiles** S T • **hundred-frame** (magnetic board, grid card, magnetic strips, magnetic squares) T • **green crayons** • ***Do The Math Community News***		• ***WorkSpace*** page 21 • ***Out for the Count,*** by Kathryn Cave • **hundred-frame** (magnetic board, grid card, magnetic strips, magnetic squares) T • **crayons** (two colors)	• ***WorkSpace*** page 22 • **hundred-pocket chart** (pocket wall chart and cards) T • **hundred-frame** (magnetic board, grid card, magnetic strips, magnetic squares) T	• ***WorkSpace*** pages 23 and 24 • **hundred-pocket chart** (pocket wall chart and cards) T
Built-in Differentiation	Using a hundred-frame to **visually represent** numbers 1 to 10 as combinations of tens and ones reinforces students' understanding of place value.	The **visual representations** in *Out for the Count* provide students with clear examples of grouping tens and ones.		Identifying **patterns** for adding 10 on the hundred-frame, and verifying them through counting one-by-one, reinforces students' understanding of place value.	The **visual representation** of the hundred-pocket chart encourages students to focus on rows of tens and spillover ones, helping them to move beyond the notion of quantities as a collection of ones.	Assessing with familiar **visual models** and **symbolic representations** allows students to show their understanding.

Lessons 11–15

Represent Numbers as Tens and Ones

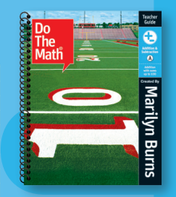
Teaching Arithmetic: Lessons for Introducing Place Value by Maryann Wickett and Marilyn Burns, pages 1–13 and 59–69



TeacherSpace™: Addition & Subtraction CD-ROM contains videos, professional articles, and reproducibles to support teaching these lessons.

50 Represent Numbers as Tens and Ones

Addition & Subtraction A: *Addition with sums up to 100*
Reduced Teacher Guide, pages 50–51



Addition & Subtraction A
Teacher Guide
Planner: Lessons 11–15

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LESSON 13 Adding 10 on a hundred-frame

Last Lesson Students show two-digit numbers as tens and ones and write equations.

Lesson 13 Students use a hundred-frame to add 10 to two-digit numbers.

Next Lesson Students identify patterns in the numbers on a hundred chart.

Lesson Summary

Students use a hundred-frame to add 10 to two-digit numbers, counting to the next ten and then adding the spillover.

Objectives

- Calculate the sum to 99 for any two addends.
- Write any two-digit number as tens and ones.
- Identify pairs of numbers with sums of 10.
- Solve word problems with two addends with sums to 99.
- Communicate ideas with key math vocabulary: *add*, *addition*, *equation*, *plus*, *equals*, and *sum*.

Materials

- ***WorkSpace*** page 21 [T] = Teacher Bag
- ***Out for the Count***, by Kathryn Cave
- **hundred-frame** (magnetic board, grid card, magnetic strips, magnetic squares) [T]
- **crayons** (two colors)

Language Development

Key Math Vocabulary

ENGLISH	SPANISH
add	sumar
addition	*adición*
equals	*es igual a*
equation	*ecuación*
plus	más
sum	*suma*

Academic Vocabulary

ENGLISH	SPANISH
more	más
row	fila

Cognates are shown in italics; pointing out the similarity of these words to their English equivalents will help your Spanish-speaking students acquire vocabulary.

WHOLE GROUP

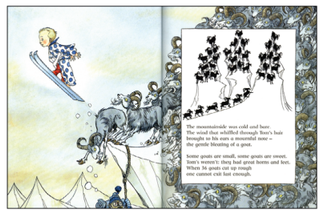
STEP 1 Introduce adding 10 to a number.

❶ Introduce the lesson.

💬 ***In* Out for the Count,** ***Tom counted many things. Today, we're going to solve problems in which there are 10 more of each thing. We'll take the number of things that Tom counted in the story, add 10, and find out how many there are in all.***

❷ Present a problem.

Show students the page in *Out for the Count* on which Tom counts the goats.



💬 ***Tom counted 36 goats. Let's say there are 10 more.***

Have students think, pair, share.

Write the problem on the board.

Tom counted 36 goats.
There are 10 more.
How many goats are there in all?

SUPPORTING INSTRUCTION

Students' typical response is to count on 10 from 36. The goal of this section, however, is to teach students the strategy of "going to the next 10" and then "counting on the extras" (or spillover). Students will examine the pattern of adding 10 to a two-digit number: the ones digit stays the same, while the tens digit increases by one 10.

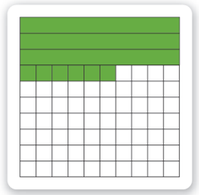
WHOLE GROUP

STEP 2 Model adding 10 with the hundred-frame.

❶ Demonstrate 36 + 10.

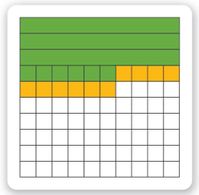
💬 ***Let's use the hundred-frame to show the goats that Tom counted. 36 is 3 tens and 6 ones.***

Place 3 magnetic strips and 6 magnetic squares on the magnetic hundred-frame (the grid card attached to the magnetic board).



💬 ***Remember when we filled ten-frames and had spillovers? The hundred-frame works the same way. We can look at a row of 10 and see what spills over. Let's add 10 squares and see how many spill over into the next row.***

Count out 10 magnetic squares and then place them on the hundred-frame, counting aloud as you place each one (37, 38, 39, . . . 46).



💬 ***So, adding 10 to 36 makes 46.***

WHOLE GROUP

STEP 3 Demonstrate writing addition equations.

❶ Write an equation to show the sum.

💬 ***Let's use numbers to write about what we did. We started with 36, and added 10 to make 46. We can write an equation to show the sum.***

Write the equation on the board.

36 + 10 = 46

❷ Write equations to show the addition steps.

Point to the 4 squares at the end of the fourth row of the hundred-frame, and then to the 6 squares in the fifth row.

💬 ***It took 4 to fill the row, and 6 spilled over. Here's how we can write addition equations to show this.***

36 + 10 = 46
36 + 4 = 40
40 + 6 = 46

Ask students to think, pair, share about how the equations 36 + 4 = 40 and 40 + 6 = 46 tell how to figure out 36 plus 10. (If you add 4 from the 10 to 36, you make the next ten, 40. And then you have a spillover of 6 to add on.)

CONTINUE

Addition & Subtraction A: *Addition with sums up to 100*
Reduced Teacher Guide, pages 60–61

WHOLE GROUP

STEP 4 Elicit students' help to add 10 to a two-digit number.

❶ Present another problem.

Show students the page in *Out for the Count* on which Tom counts the bears.

💬 ***How many bears did Tom count?*** (61)

Let's say there are 10 more bears.

Write the word problem on the board.

> Tom counted 61 bears.
> There are 10 more.
> How many bears are there in all?

❷ Guide students to solve the problem on the hundred-frame.

💬 ***Let's show the number of bears Tom counted on the hundred-frame. How many tens are in 61?*** (6)

So, how many strips should I put on the frame? (6)

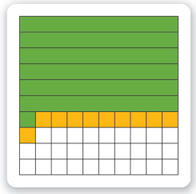
How many ones are in 61? (1)

How many squares should I put on the frame? (1)

Place 6 strips and 1 square on the hundred-frame.

💬 ***Now, let's add 10 to 61.***

Have students count aloud as you place 10 more squares on the hundred-frame.



❸ Write equations for the addition steps.

💬 ***How many bears are there in all?*** (71)

What is the equation? (61 + 10 = 71)

Point to the seventh row.

💬 ***How many squares did it take to fill this row?*** (9)

How many spilled over? (1)

Write the equations on the board.

> Tom counted 61 bears.
> There are 10 more.
> How many bears are there in all?
> 61 + 10 = 71
> 61 + 9 = 70
> 70 + 1 = 71

WHOLE GROUP

STEP 5 Students tell how to add 10 to a two-digit number.

❶ Present the problem.

Explain the directions on *WorkSpace* page 21 to students. Have them look at the first problem on *WorkSpace* page 21. Read it aloud together.

Have students think, pair, share about how to color the hundred-grid to show the addition. (Color 1 row and 2 squares green, a total of 12 green. Color 10 more squares yellow.)

Have students color the hundred-grid for Problem 1.

Have students think, pair, share about how to complete the equations. Write the equations on the board.

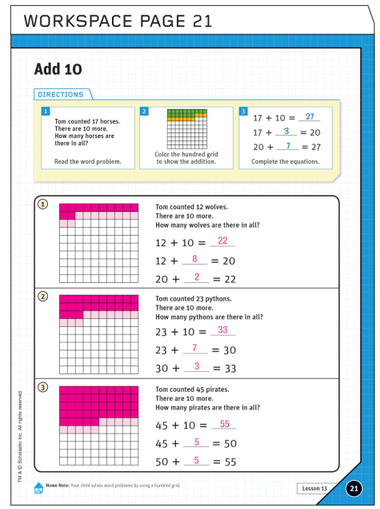
> 12 + 10 = 22
> 12 + 8 = 20
> 20 + 2 = 22

INDIVIDUALS

STEP 6 Students add 10 to two-digit numbers and write equations.

❶ Students complete *WorkSpace* page 21.

Have students complete the page independently.


WORKSPACE PAGE 21

Add 10

DIRECTIONS

1 Tom counted 17 horses. There are 10 more. How many horses are there in all? — Read the word problem.

2 Color the hundred grid to show the addition.

3 17 + 10 = 27; 17 + 3 = 20; 20 + 7 = 27 — Complete the equations.

1 Tom counted 12 wolves. There are 10 more. How many wolves are there in all?
12 + 10 = 22
12 + 8 = 20
20 + 2 = 22

2 Tom counted 23 pythons. There are 10 more. How many pythons are there in all?
23 + 10 = 33
23 + 7 = 30
30 + 3 = 33

3 Tom counted 45 pirates. There are 10 more. How many pirates are there in all?
45 + 10 = 55
45 + 5 = 50
50 + 5 = 55

Home Note: Your child solves word problems by using a hundred grid.

Lesson 13 21

❷ Students share their work with their partners.

Have partners compare their answers for *WorkSpace* page 21. If two partners have different answers, they should explain their thinking to one another, find the mistakes, and correct them.

STOP

Addition & Subtraction A: *Addition with sums up to 100*
Reduced Teacher Guide, pages 62–63

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LESSON 15 Assessing student understanding

Last Lesson Students identify patterns in the numbers on a hundred chart.

Lesson 15 Students demonstrate understanding of the objectives of Lessons 11–14.

Next Lesson Students use various strategies to add 10 to two-digit numbers.

Lesson Summary

Students demonstrate understanding of the objectives of Lessons 11–14 by completing *WorkSpace* pages independently.

Objectives

- Solve word problems with two addends with sums to 99.
- Calculate the sum to 99 for any two addends.
- Communicate ideas with key math vocabulary: *add, addition, equation, plus,* and *equals.*

Materials

- ***Workspace*** pages 23 and 24 [T] = Teacher Bag
- **hundred-pocket chart** (pocket wall chart and cards) [T]

Preparation

hundred-pocket chart
Place a blank card—white side showing—in front of each number except the following numbers: 7, 12, 23, 36, 45, 54, 61, 70, 88, and 97.

Language Development

Key Math Vocabulary

ENGLISH	SPANISH
add	sumar
addition	*adición*
equals	*es igual a*
equation	*ecuación*
plus	más

Academic Vocabulary

ENGLISH	SPANISH
column	*columna*
pattern	*patrón*
row	fila

Cognates are shown in italics; pointing out the similarity of these words to their English equivalents will help your Spanish-speaking students acquire vocabulary.

WHOLE GROUP

STEP 1 Find patterns for adding 1 and adding 10 on a hundred-pocket chart.

❶ Introduce the lesson.

💬 ***Today we'll use patterns on a hundred-pocket chart to add numbers. Then you'll show me how much you know about using patterns to locate numbers on a 1 to 100 chart and to add 10 to numbers.***

❷ Use the hundred-pocket chart to add 1 to numbers.

Point to the hundred-pocket chart (which should have only the following numbers visible: 7, 12, 23, 36, 45, 54, 61, 70, 88, and 97).

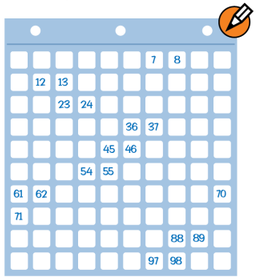
💬 ***These are the numbers of things that Tom counted in* Out for the Count.** ***We are going to figure out how many there would be if Tom had counted 1 more of each thing.***

Choose a student to add 1 to the 7 sheep, state the addition equation, $7 + 1 = 8$, and reveal the 8 by moving the blank card behind it.

💬 ***7 sheep plus 1 more equals 8 sheep.***

Repeat the procedure for the following quantities:
12 wolves, 23 pythons, 36 goats, 45 pirates, 54 penguins, 61 bears, 70 bats, 88 ghosts, and 97 tigers.

💬 ***As I move from left to right on any row of the chart, I add 1 for each pocket. If I'm at the end of a row, I move to the first pocket of the next row.***



❸ Use the hundred-pocket chart to add 10 to numbers.

Point to 7 on the chart.

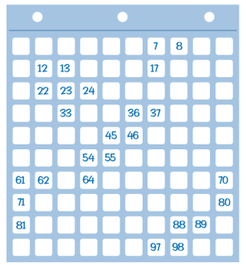
💬 ***If we move down one pocket, we land on 17. How many pockets would we have to count one-by-one to go from 7 to 17?*** (10)

Each time I move down one pocket, it's the same as counting 10 pockets one-by-one or adding 10. Let's count to see.

Have students count the number of pockets from 7 to 17 with you. (Start with 8.)

💬 ***So, if we want to add 10 to a number on a hundred-pocket chart, we can just go to the number below it.***

Choose a student to add 10 to the number of wolves and reveal the 22 by moving the blank card behind it. Repeat the procedure for the 23 pythons, 36 goats, 45 pirates, 54 penguins, 61 bears, 70 bats, and 88 ghosts.



SUPPORTING INSTRUCTION

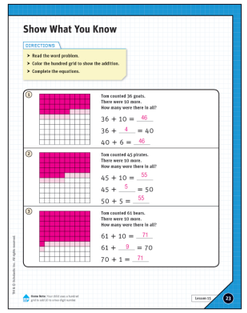
If you feel students need more verification of the pattern, count the number of pockets from several of the numbers to the numbers that are 10 more (the same as you counted the number of pockets from 7 to 17).

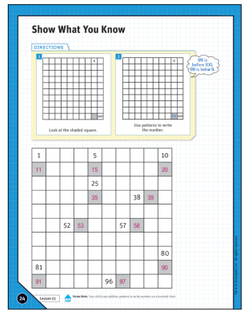
INDIVIDUALS

STEP 2 Students complete an assessment.

❶ Students complete *Workspace* pages 23 and 24.

Explain the directions for *Workspace* pages 23 and 24 and have students complete the pages independently.





CONTINUE

Addition & Subtraction A: *Addition with sums up to 100*
Reduced Teacher Guide, pages 68–69

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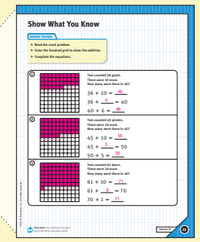
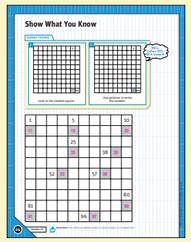
ASSESSMENT ✓ Progress Monitoring

Objectives
- Solve word problems with two addends with sums to 99.
- Calculate the sum to 99 for any two addends.
- Communicate ideas with key math vocabulary: *add*, *addition*, *equation*, *plus*, and *equals*.

Assess

Use the annotated pages to correct *Workspace* pages 23 and 24.





Note the progress of each student in the appropriate rows on the tracking chart on page 145.

Differentiating Instruction

Although the lessons are carefully scaffolded and paced at a rate more likely to give students a chance for optimal learning, there will be instances when students are still struggling and need extra support. Also, there will be instances when students would benefit from additional challenges or practice. Try the teaching ideas below.

For Students Who Need More Support

- If a student is having difficulty adding 10 to two-digit numbers, it may be because he or she needs more practice with numbers that add to 10. In order to add 10 to a two-digit number, it helps to know that, for example, if it takes 2 to go to the next 10 then (because $8 + 2 = 10$) the spillover is 8. Use *Quick Look* cards and have the student state the number needed to make ten.
- When the student is proficient with finding pairs of numbers with sums of 10, use the hundred-frame. Begin by placing 1 strip and 9 green squares on the magnetic board. Have the student state the number represented by the strip and squares (19). Then present the problem $19 + 10$ and have the student think about how many squares it takes to get to the next 10 (1) and the number of squares that will spillover (9). Have the student verify this with yellow squares. Continue with starting numbers of 29, 39, and so on, having the student figure out the number of squares to the next 10 and the amount of the spillover. For each, write an equation $19 + 10 = 29$, $29 + 10 = 39$, and so on. Then follow the same procedure for starting numbers ending in 8, then 7, and so on.

For Students Ready for a Challenge

- Have pairs who are ready for a challenge take turns rolling a number cube two times to make a two-digit number. For example, if a student rolls a 3 and then a 6, the number is 36. The student adds 10 to the number mentally and writes an addition equation (for example, $36 + 10 = 46$). Students take turns and the student with the greater sum gets a point. The first student to earn 5 points wins.

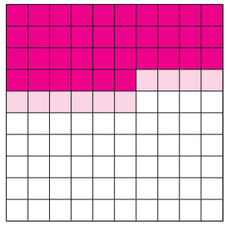
To review the full-size Annotated Teacher Version of this *WorkSpace* see page 17.

Addition & Subtraction A: *Addition with sums up to 100*
Reduced Teacher Guide, page 70

Show What You Know

DIRECTIONS
- Read the word problem.
- Color the hundred grid to show the addition.
- Complete the equations.

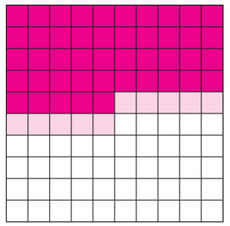
1



Tom counted 36 goats.
There were 10 more.
How many were there in all?

$36 + 10 =$ 46
$36 +$ 4 $= 40$
$40 + 6 =$ 46

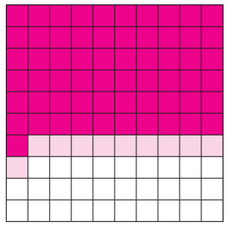
2



Tom counted 45 pirates.
There were 10 more.
How many were there in all?

$45 + 10 =$ 55
$45 +$ 5 $= 50$
$50 + 5 =$ 55

3



Tom counted 61 bears.
There were 10 more.
How many were there in all?

$61 + 10 =$ 71
$61 +$ 9 $= 70$
$70 + 1 =$ 71

Home Note: Your child uses a hundred grid to add 10 to a two-digit number.

Addition & Subtraction A: *Addition with sums up to 100*
Reduced Annotated WorkSpace, *page 23*

Addition & Subtraction A
Annotated *WorkSpace*
Lesson 15