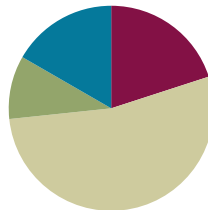


# Lesson 10

**Objective:** Use math drawings to represent the composition when adding a two-digit to a three-digit addend.

## Suggested Lesson Structure

■ Application Problem	(6 minutes)
■ Fluency Practice	(12 minutes)
■ Concept Development	(32 minutes)
■ Student Debrief	(10 minutes)
<b>Total Time</b>	<b>(60 minutes)</b>



### Application Problem (6 minutes)

Moses sold 24 raffle tickets on Monday and 4 fewer on Tuesday. How many tickets did he sell in all on both days?

Note: This two-step problem gets students thinking about relationships and gives them an embedded opportunity to add multiples of 10. It is done at the beginning of the lesson since the fluency exercises flow into the day’s Concept Development.

Monday 

20	4
----	---

 } ?

Tuesday 

--

 }

$24 - 4 = 20$   
 $24 + 20 = 44$

Moses sold 44 tickets on both days.

### Fluency Practice (12 minutes)

- Compensation **2.NBT.5** (3 minutes)
- Sprint: Subtraction from Teens **2.OA.2** (9 minutes)

### Compensation (3 minutes)

Note: This fluency drill reviews the mental math strategy taught in Lesson 4, to use compensation by breaking apart one addend to make the other addend into a multiple of 10, and therefore easier to add mentally. To use compensation with subtraction, add the same number to the minuend and subtrahend to make a multiple of 10.

- T: (Write  $52 - 39 = \underline{\quad}$ .) Let’s use a mental math strategy to subtract. How much more does 39 need to make the next ten?
- S: 1 more.
- T: Add 1 to each number and give me the number sentence.

S:  $53 - 40 = 13$ .

T:  $37 - 19$ .

S:  $38 - 20 = 18$ .

Continue with the following possible sequence:  $29 + 23$ ,  $38 + 19$ ,  $32 - 19$ ,  $24 - 19$ , and  $34 + 19$ .

### Sprint: Subtraction from Teens (9 minutes)

Materials: (S) Subtraction from Teens Sprint

Note: This Sprint builds fluency with subtracting within 20 using mental strategies.

### Concept Development (32 minutes)

Materials: (S) Math journals or paper

The goal of place value models is to help students understand the quantities involved in written addition. As this understanding deepens, students will no longer need to use models; they will be able to solve with numbers alone.

This lesson is designed to give students ample time working with bare numbers and chip models to develop conceptual understanding and procedural fluency with the written method. It anticipates that students will grasp this understanding at different rates. As students demonstrate proficiency (i.e., they are able to explain why they composed a ten using place value language), encourage them to dispense with the models.

T: Copy the following problem on your paper in vertical form:  $26 + 147$ .

T: Use place value language to prove to your partner that you have lined the numbers up correctly.

S: (Explain that 6 and 7 are in the ones place, 2 and 4 are in the tens place, and 1 is in the hundreds place.)

T: Next to the written addition, draw a chip model to solve, and record each change using the algorithm.

T: When you're finished, check your work with a partner, and explain how your model matches the written addition. Use place value language to explain each step.



#### NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

Allow students to use disks, labeled disk drawings, and chip models for as long as is necessary to demonstrate proficiency with this method.



#### NOTES ON MULTIPLE MEANS OF REPRESENTATION:

For students who need additional support with the vertical method, provide lined paper so they can write their problems in columns. Instruct them to turn their paper 90 degrees and to use the vertical lines as columns, making sure the right-hand column (ones place) is aligned first. It may help to write the problems starting with the ones place and moving left.

MP.3

MP.3

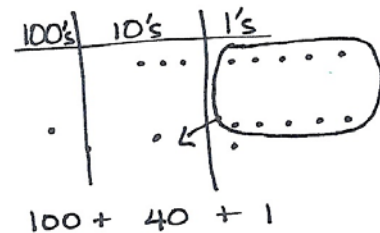
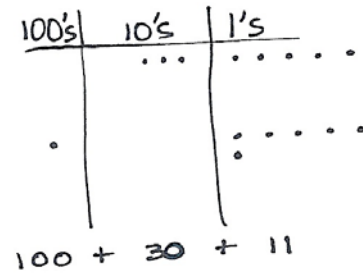
Circulate to listen in on conversations and offer support as needed.

T: Who would like to share his or her work with the class? Use place value language to explain how the model helps you to understand the written addition. (Choose a student.)

Repeat the procedure for the original activity in which students solve written additions by drawing chip models. Use the following possible sequence:  $35 + 106$ ,  $81 + 109$ ,  $117 + 48$ , and  $23 + 159$ .

When students have finished, invite two volunteers to the board. One draws a model of  $35 + 106$  *before* bundling a ten. The other draws the model *after* bundling the ten. Encourage the remaining students to be active observers and to notice the similarities and differences between the models.

- T: Talk with your partner. Describe how the models are similar and different before and after bundling a ten.
- S: Before you bundle a ten there is 1 hundred, 3 tens, and 11 ones. → After bundling, there is 1 hundred, 4 tens, 1 one. → We renamed 3 tens 11 ones as 4 tens 1, but the hundred stayed the same. →  $100 + 30 + 11$  is the same as  $100 + 40 + 1$ .
- T: (Label the drawings. See image at right.)



Continue to support students who need assistance. Release students who demonstrate proficiency with the models and written additions to work on the Problem Set independently.

### Problem Set (10 minutes)

Students should do their personal best to complete the Problem Set within the allotted 10 minutes. For some classes, it may be appropriate to modify the assignment by specifying which problems they work on first. Some problems do not specify a method for solving. Students solve these problems using the RDW approach used for Application Problems.

**Student Debrief (10 minutes)**

**Lesson Objective:** Use math drawings to represent the composition when adding a two-digit to a three-digit addend.

The Student Debrief is intended to invite reflection and active processing of the total lesson experience.

Invite students to review their solutions for the Problem Set. They should check work by comparing answers with a partner before going over answers as a class. Look for misconceptions or misunderstandings that can be addressed in the Debrief. Guide students in a conversation to debrief the Problem Set and process the lesson. You may choose to use any combination of the questions below to lead the discussion.

- When you used the chip model for Problem 1(a), how did you know whether or not to bundle a new unit of ten?
- For Problem 1(b), where did you write the new ten in the written addition? How did it match your chip model?
- For Problem 1, can you tell if you will need to bundle ones just by looking at the digits in the ones place? What mental strategy helps you to know? (Partners to ten.)
- For Problem 1(d), does it matter what number you draw first on your place value chart? Why not? Does adding a three-digit number change how you add?
- Look at Problem 1(e). Think of the word *re-naming*. How did we use bundling to rename the solution? Use place value language (i.e., hundreds, tens, and ones) to explain.

Lesson 10 Problem Set 2•4

e.  $79 + 107 =$  \_\_\_\_\_

Before bundling a ten

After bundling a ten

2. a. On Saturday, Colleen earned 4 ten-dollar bills, and 18 one-dollar bills working on the farm. How much money did Colleen earn?

b. On Sunday, Colleen earned 3 ten dollar-bills and 16 one dollar-bills. How much money did she earn on both days?

COMMON CORE Lesson 10: Use math drawings to represent the composition when adding a two-digit to a three-digit addend. engage<sup>ny</sup> 4.B.5  
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**Exit Ticket (3 minutes)**

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help you assess the students’ understanding of the concepts that were presented in the lesson today and plan more effectively for future lessons. You may read the questions aloud to the students.

**A**

# Correct \_\_\_\_\_

Subtract.

1	$11 - 10 =$		23	$19 - 9 =$	
2	$12 - 10 =$		24	$15 - 6 =$	
3	$13 - 10 =$		25	$15 - 7 =$	
4	$19 - 10 =$		26	$15 - 9 =$	
5	$11 - 1 =$		27	$20 - 10 =$	
6	$12 - 2 =$		28	$14 - 5 =$	
7	$13 - 3 =$		29	$14 - 6 =$	
8	$17 - 7 =$		30	$14 - 7 =$	
9	$11 - 2 =$		31	$14 - 9 =$	
10	$11 - 3 =$		32	$15 - 5 =$	
11	$11 - 4 =$		33	$17 - 8 =$	
12	$11 - 8 =$		34	$17 - 9 =$	
13	$18 - 8 =$		35	$18 - 8 =$	
14	$13 - 4 =$		36	$16 - 7 =$	
15	$13 - 5 =$		37	$16 - 8 =$	
16	$13 - 6 =$		38	$16 - 9 =$	
17	$13 - 8 =$		39	$17 - 10 =$	
18	$16 - 6 =$		40	$12 - 8 =$	
19	$12 - 3 =$		41	$18 - 9 =$	
20	$12 - 4 =$		42	$11 - 9 =$	
21	$12 - 5 =$		43	$15 - 8 =$	
22	$12 - 9 =$		44	$13 - 7 =$	

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**B** Improvement \_\_\_\_\_ # Correct \_\_\_\_\_

Subtract.					
1	11 - 1 =		23	16 - 6 =	
2	12 - 2 =		24	14 - 5 =	
3	13 - 3 =		25	14 - 6 =	
4	18 - 8 =		26	14 - 7 =	
5	11 - 10 =		27	14 - 9 =	
6	12 - 10 =		28	20 - 10 =	
7	13 - 10 =		29	15 - 6 =	
8	18 - 10 =		30	15 - 7 =	
9	11 - 2 =		31	15 - 9 =	
10	11 - 3 =		32	14 - 4 =	
11	11 - 4 =		33	16 - 7 =	
12	11 - 7 =		34	16 - 8 =	
13	19 - 9 =		35	16 - 9 =	
14	12 - 3 =		36	20 - 10 =	
15	12 - 4 =		37	17 - 8 =	
16	12 - 5 =		38	17 - 9 =	
17	12 - 8 =		39	16 - 10 =	
18	17 - 7 =		40	18 - 9 =	
19	13 - 4 =		41	12 - 9 =	
20	13 - 5 =		42	13 - 7 =	
21	13 - 6 =		43	11 - 8 =	
22	13 - 9 =		44	15 - 8 =	

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Name \_\_\_\_\_

Date \_\_\_\_\_

1. Solve using the algorithm. Draw chips and bundle when you can.

a.  $127 + 18 =$  \_\_\_\_\_

Hundreds	Tens	Ones

b.  $136 + 16 =$  \_\_\_\_\_

Hundreds	Tens	Ones

c.  $109 + 41 =$  \_\_\_\_\_

Hundreds	Tens	Ones

d.  $29 + 148 =$  \_\_\_\_\_

Hundreds	Tens	Ones

e.  $79 + 107 =$  \_\_\_\_\_

Hundreds	Tens	Ones

Before bundling a ten      \_\_\_\_\_ hundreds      \_\_\_\_\_ tens      \_\_\_\_\_ ones

After bundling a ten      \_\_\_\_\_ hundreds      \_\_\_\_\_ tens      \_\_\_\_\_ ones

Solve by drawing chips on a place value chart and bundling when needed.

2. a. On Saturday, Colleen earned 4 ten-dollar bills and 18 one-dollar bills working on the farm. How much money did Colleen earn?

b. On Sunday, Colleen earned 3 ten dollar-bills and 16 one dollar-bills. How much money did she earn on both days?





Name \_\_\_\_\_

Date \_\_\_\_\_

1. Solve using the algorithm. Draw chips and bundle when you can.

a.  $125 + 17 =$  \_\_\_\_\_

Hundreds	Tens	Ones

b.  $148 + 14 =$  \_\_\_\_\_

Hundreds	Tens	Ones


c.  $107 + 56 =$  \_\_\_\_\_

Hundreds	Tens	Ones

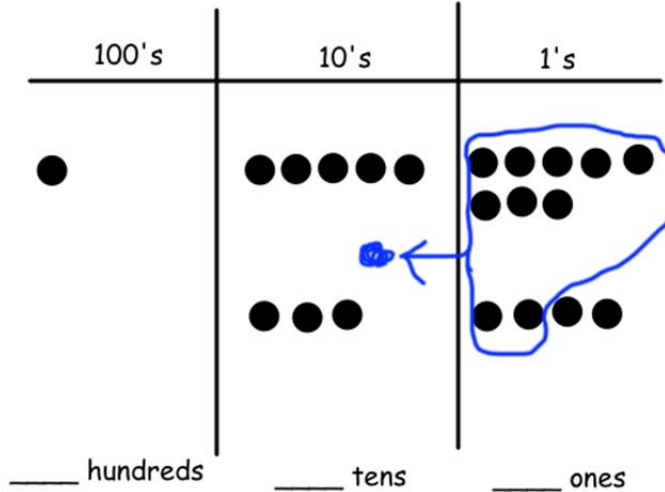
d.  $38 + 149 =$  \_\_\_\_\_

Hundreds	Tens	Ones

Jamie started to solve this problem when she accidentally dropped paint on her sheet. Can you figure out what problem she was given and her answer from her work?

e. 1  = \_\_\_\_\_

\_\_\_\_\_ + \_\_\_\_\_ = \_\_\_\_\_



Solve by drawing chips on a place value chart and bundling when needed.

2. a. In the morning, Mateo borrowed 4 bundles of ten markers and 17 loose markers from the art teacher. How many markers did Mateo borrow?

b. In the afternoon, Mateo borrowed 2 bundles of ten crayons and 15 loose crayons. How many markers and crayons did Mateo borrow in all?